Immingham Green Energy Terminal

Environmental Impact Assessment

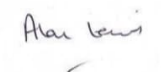
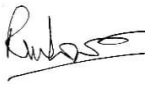
Preliminary Environmental Information Report

Volume II – Main Report

Chapter 18: Water Quality, Coastal Protection, Flood Risk and Drainage

Associated British Ports

Document History

Document Ref	60673509_EIA_PEI REPORT		
Revision	P 1.0		
Author	Alan Lewis		
Signed		Date	20/12/2022
Approved By	Richard Lowe		
Signed		Date	20/12/2022
Document Owner	AECOM		

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18.1 Introduction

18.1.1 This chapter presents the preliminary findings of the assessment of the likely effects of the Project on water quality, coastal protection, flood risk and drainage. This chapter sets out the assessment methodology used, the datasets used to inform the assessment, an outline of baseline conditions, and sets out the likely significant effects the Project will have upon local conditions.

18.1.2 There are interrelationships related to the Project's potential effects on water quality, coastal protection, flood risk and drainage and other disciplines. Therefore, reference should also be made to the following chapters:

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

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

c. **Chapter 17: Marine Water and Sediment Quality**.

d. **Chapter 19: Climate Change**.

e. **Chapter 21: Ground Conditions and Land Quality**.

18.1.3 This chapter is also supported by the following figures:

a. **Figure 18.1: Study Area** (PEI Report, Volume III).

b. **Figure 18.2: Environment Agency Flood Map for Planning** (PEI Report Volume III).

18.2 Approach to Assessment

Scope and Methods

18.2.1 A scoping exercise was undertaken in August 2022 to establish the form and nature of the water quality, coastal protection, flood risk and drainage assessment, and the approach and methods to be followed.

18.2.2 The Scoping Report (**Appendix 1.A** of PEI Report, Volume IV) records the findings of the 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 water quality, coastal protection, flood risk and drainage.

18.2.3 Following receipt of the Scoping Opinion (**Appendix 1.B** of PEI Report, Volume IV) regarding the information to be provided in the Environmental Statement (ES) the following approach has been agreed with the Planning Inspectorate and statutory consultees which has been taken into account as part of the ongoing water quality, coastal protection, flood risk and drainage assessment.

Table 18.1 Scoping Opinion comments on water quality, coastal protection, flood risk and drainage

Consultee	Summary of Response	How comments have been addressed in this chapter
Environment Agency	Paragraph 17.2.14 considers that the residual risk from overtopping or failure of defences is low and as a result, the potential impacts of this are given little weight in the remainder of the Report. The flood risk assessment will need to recognise that the probability of defence failure is not suitable for planning purposes; we would refer the Applicant to paragraph 024 of the recently updated Planning Practice Guidance (Flood risk and coastal change section) for further information on what is required in this respect. To help with considering the residual risk the Environment Agency has produced Coastal Hazard Mapping which covers the site (this is not referenced as a data source in paragraph 17.2.1). To obtain this information the Applicant is advised to make a formal enquiry to our Customers and Engagement team at LNenquiries@environment-agency.gov.uk. Please request a Product 3/8. There is no charge for this information. COMAH regulated sites are expected to consider the level of flood risk and appropriate resilience. This is set out in the Inspection of COMAH Operator Flood Preparedness delivery guide. The delivery of this is not specifically required within the EIA for planning purposes, but it will need to be considered as part of the pre-operation Safety Report. As such, it would be prudent to consider this alongside planning guidance on flood risk so that any additional mitigation standards, which may be required during site operation (e.g. for the storage of hazardous substances), can be included from the outset. Although physical processes are considered in Chapter 17, we would also like to see a discussion (or cross-reference to any discussion in Chapter 15) regarding geomorphology resulting from said processes	This will be addressed in the Flood Risk Assessment (FRA) which will accompany the DCO applicable and be referenced by the ES. Existing flood risk issues are considered in **Section 18.4** and potential impacts detailed in **Section 18.7**.
Anglian Water	There are significant existing Anglian Water assets including water mains along the south side of the site and within the roads to the north and east. Water recycling assets including rising mains also run to the south, east	Noted.

Consultee	Summary of Response	How comments have been addressed in this chapter
	and north of the site. Maps of Anglian Water's assets are available to view at: www.digdat.co.uk	
Anglian Water	Anglian Water notes that the promoter identifies at Page 211 that surface water on site is managed by the Port of Immingham (17.2.21). We conclude from this that no surface water will be managed via the Anglian Water public sewer network. At 17.2.3 the promoter comments on the proximity of an Anglian Water 600mm foul sewer in proximity to the site boundary. The rising main on the southern edge of the site is 450mm, the sewers to the north and east of 300mm with connections of 150mm. These assets are part of and serve the wider Immingham Water Recycling catchment including the town of Immingham to the west.	Noted.
Anglian Water	We note that other than a reference to a 'main water pipe' (2.2.7) the promoter does not refer to the water supply network assets which run along Kings Road, Queens Road and the southern boundary of the site. Through consultation proposed in 17.7.1 Anglian Water would want to ensure the location and nature of these assets is identified and protected. To reduce the need for diversions and the attendant carbon impacts of those works, ground investigation would enable the promoter to design out these potential impacts and so also reduce the potential impact on services if construction works cause a pipe burst or damage to supporting infrastructure. This approach would accord with Project Objective C. at 2.4.2. The Scoping Report refers to Anglian Water assets and that: • the project relies upon a connection to the 'local sewer network' (21.4.7), • a potable water supply connection is required to a 'local main water network' (2.4.20) • a 'site wide cooling water system' is required (2.4.22) In view of the guidance in the National Policy Statements we would have anticipated that the scoping would have included and then considered the approach to water supply, water resources and water recycling assets.	The presence of Anglian Water assets has been noted and this information will be used to inform Project planning and design. Anglian Water will be contacted to discuss the requirements for potable water on the Site once the water volumes needed are defined.

Consultee	Summary of Response	How comments have been addressed in this chapter
	Anglian Water requests that these points are assessed early in the EIA to set out how the project will be supplied with water, its wastewater managed, how water assets serving residents and business will be protected and how design has been altered to reduce the need for new water infrastructure or the diversion of existing assets.	
Anglian Water	We support the inclusion of water (17.5.3) including water infrastructure in the Construction Environment Management Plan and Water Management Plan. The CEMP and a WMP should include steps to remove the risk of damage to Anglian Water assets from plant and machinery including haul roads. Further advice on minimising and then relocating Anglian Water existing assets can be obtained from: connections@anglianwater.co.uk	This information is noted.
Anglian Water	The site is in the East Lincolnshire Water Resource Zone (WRZ), which supplies water to Grimsby the eastern parts of Lincolnshire WRZ and serves communities as far south as Boston. We note that whilst the scoping considers water environment impacts it does not look at water resources. As the site is within an area of 'serious water stress' designated by the Environment Agency and water is used in the project construction and operation this indicates that water resources should be assessed in the EIA, learning lessons from previous projects such as Sizewell C. This may include consideration of the Socio- Economic effects of the use of water for the project in the context of growth and climate change as well the potential impacts on communities and business if these services are distributed. There is no reference to assessment of the carbon costs of relocating water infrastructure if assets are impacted during construction or operation. Anglian Water notes that the applicant has not sought to scope these matters out by providing sufficient information to reach a conclusion that the projects impact regarding water supply as well as water recycling and water quality, are not significant.	Water requirements will be discussed with Anglian Water in order to determine Project impacts on local water resources. Potential Project impacts will be reported in the ES.

Consultee	Summary of Response	How comments have been addressed in this chapter
Anglian Water	Anglian Water would welcome the instigation of discussions with Associated British Ports as the prospective applicant, in line with the requirements of the 2008 Planning Act and guidance. Experience has shown that early engagement and agreement is required between NSIP applicants and statutory undertakers during design and assessment and well before submission of the draft DCO for examination. Consultation at the statutory PEIR stage would in our view be too late to inform design and may result in delays to the project. We would recommend discussion on the following issues: 1. Requirement for potable and raw water supplies 2. Impact of development on Anglian Water's assets including groundwater and water abstraction and the need for mitigation 3. Requirement for water recycling connections 4. The design of the project to minimise interaction with Anglian Water assets and specifically to avoid the need for diversions which have carbon costs 5. Confirmation of the project's cumulative impacts (if any) with Anglian Water projects 6. Draft Protective Provisions	The Applicant will consult with Anglian Water on this matter.
Planning Inspectorate	Paragraph 17.2.14 considers that the residual risk from overtopping or failure of defences is low. The Applicant's attention is drawn to the Environment Agency's consultation response and paragraph 024 of the Planning Practice Guidance (Flood risk and coastal change) which states that information on the probability of flood defence failure is unsuitable for planning purposes given the substantial uncertainties involved in such long-term predictions. The Applicant is advised to use the Environment Agency Coastal Hazard Mapping when considering residual flood risk and agree the detailed flood risk methodology and mitigation with the Environment Agency where possible.	This will be addressed in the FRA which will accompany the DCO application and be referenced in the ES.

Consultee	Summary of Response	How comments have been addressed in this chapter
Planning Inspectorate	Paragraph 17.2.5 notes that tide-locking is an existing problem for Habrough Marsh Drain and North Beck Drain. The Inspectorate draws attention to concerns within the consultation response from North East Lindsey Drainage Board that offshore infrastructure in proximity to the gravity outfall of Habrough Marsh Drain could impede drainage. The ES should consider any likely impacts arising from the construction and operation of the offshore infrastructure on the function of drains outfalls and implications for flood risk onshore.	This will be addressed in the FRA which will accompany the DCO Application and be referenced by the ES.
North East Lindsey Drainage Board	The onshore part of the site is within the North East Lindsey Drainage Board area. Generally, the report contains appropriate references to North East Lindsey Drainage Board and the Board has already provided information to the consultants. An area of concern is the impact off shore. The proposals show new infrastructure in the Humber near to the gravity outfall of Habrough Marsh Drain, there is concern that this will result in siltation which will impede the discharge. The FRA should address this and put in place measures to mitigate it.	This will be addressed in the FRA which will accompany the DCO Application and be referenced by the ES.

Legislation, Policy and Guidance

18.2.4 **Table 18.2** presents the legislation, policy and guidance relevant to the water quality, coastal protection, flood risk and drainage assessment and details how their requirements will be met by the Project.

Table 18.2 Relevant legislation, policy and guidance regarding Water Quality, Coastal Protection, Flood Risk and Drainage

Legislation/ Policy/ Guidance	Consideration within the PEI Report
The Water Act 2014 (Ref 18-27)	
The aim of the Act was to reform the water industry to make it more innovative and responsive to customers and to increase the resilience of water supplies to natural hazards such as droughts and floods. The Act describes provisions for the following: abstraction water license modifications, waterworks records, flood insurance for households, internal drainage boards, regulations for the water environment and Regional Flood and Coastal Committees.	Abstractions located within 1km radius of the Site boundary are described in **Paragraph 18.3.3**.
The Floods and Water Management Act 2010 (Ref 18-31)	
The aim of the Act was to make provision about water, including provision about the management of risks in connection with flooding and coastal erosion.	Flood risks associated with Project will be investigated in the FRA to be submitted with the DCO application. Baseline flood risks are described in **Section 18.4**.
The Land Drainage Act 1991 (as amended) (Ref 18-32)	
The aim of the Act was to reform the water industry to make it more innovative and responsive to customers and to increase the resilience of water supplies to natural hazards such as droughts and floods. The Act describes provisions for the following: abstraction water license modifications, waterworks records, flood insurance for households, internal drainage boards, regulations for the water environment and Regional Flood and Coastal Committees.	Abstractions located within a 1km radius of Site boundary are described in **Paragraph 18.3.3**. Flood risks associated with Project will be investigated in the FRA to be submitted with the DCO application.
The Water Resources Act 1991 (Ref 18-26)	
Previously under the Water Resources Act 1991 and now under the *Environmental Permitting (England and Wales) Regulations 2016 (as amended)* it is an offence for a person to cause or knowingly permit pollution of controlled waters The Act provides a framework for the application of environmental permits as well as receiving, varying, transferring and surrendering permits and compliance/enforcement of permits.	Controlled waters are discussed in **Paragraph 18.4**. Potential impacts upon controlled waters are discussed in **Sections 18.5** and **18.7**.

Legislation/ Policy/ Guidance	Consideration within the PEI Report
The Salmon and Freshwater Fisheries Act 1975 as amended (Ref 18-33)	
The Act is a law passed by the government of the United Kingdom in 1975 in an attempt to protect salmon and trout from commercial poaching, to protect migration routes, to prevent wilful vandalism and neglect of fisheries, ensure correct licensing and water authority approval.	The mitigation measures are detailed in **Section 18.5** and aim to protect salmon and freshwater fisheries within the Humber estuary.
The Environmental Permitting (England and Wales) Regulations 2016 (Ref 18-25)	
The Regulations set out the measures for those carrying out activities that may cause imminent threats of, or actual 'environmental damage', which require a permit. These Regulations also outline the authorities responsible for enforcing the Regulations. Such Regulations cover environmental permits, discharge into regulated facilities, enforcement and offences, public registers and powers/functions of the regulator and authority.	**Section 18.5** provides details of mitigation measures that aim to prevent environmental damage.
The Environmental Damage (Prevention and Remediation) Regulations 2015 (Ref 18-34)	
The Regulations concern the prevention and remediation of environmental damage to: (a) protected species or natural habitats, or a site of special scientific interest, (b) surface water or groundwater, or (c) land, as specified in regulation 4. They implement Directive 2004/35/EC of the European Parliament and of the Council on environmental liability with regard to the prevention and remedying of environmental damage.	Protected habitats and water bodies are discussed in **Section 18.4**. Potential impacts are discussed in **Sections 18.6** and **18.7**, whilst mitigation measures are detailed in **Section 18.5**.
The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 & 2017 (Ref 18-35)	
The principal objective of the framework is for all groundwater, surface water and coastal water bodies to achieve 'good' status by 2015 and maintain this status. It includes broader ecological objectives as well as aims to prevent deterioration of all water bodies. The framework aims to develop sustainable water use and reduce and eliminate the presence of hazardous substances within water bodies. It must be considered in any scheme that has the potential to have an impact on any part of the water environment. This is incorporated in The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.	Water Framework Directive (WFD) surface water and groundwater bodies are described in **Section 18.4** and **Table 18.5**. Potential impacts to WFD surface water bodies are outlined in **Section18.7**.
The Eels (England and Wales) Regulations 2009 (Ref 18-36)	
The Regulations implement in England and Wales Council Regulation (EC) No 1100/2007 establishing measures for the recovery of the stock of European eel. They require holders of licences to fish for eels other than by rod and line to submit eel catch returns to record information	The Eel regulations will be used to inform any potential abstractions impacts from the Humber Estuary and any

Legislation/ Policy/ Guidance	Consideration within the PEI Report
relating to eels caught of 12cm or less in length and aquaculture production business operators to keep records of eels of less than 12cm received. Eels from or to England or Wales must be accompanied by a certificate identifying the origin of the eels and that eels for export were caught in a manner consistent with the relevant eel management. The Regulations further provide for close seasons, the free passage of eels and enforcement.	alterations made to inlets found within the Project boundary. Eel catches were recorded in the Environment Agency's fish data explorer for the Humber as considered in **Section 18.4**.
The Groundwater (England and Wales) Regulations 2009 (Ref 18-37)	
The Regulations implement in England and Wales Community legislation on pollution of groundwater. They provide rules for the granting by the Environment Agency of a permit under these Regulations, consent under section 91(8) of the Water Resources Act 1991 and (with exceptions) an environmental permit under the Environmental Permitting (England and Wales) Regulations. In addition, the Regulations create an offence of discharge of a hazardous substance or non-hazardous pollutant without a permit, provide for powers of enforcement of the Environment Agency and prescribe penalties for offences committed under these Regulations.	Potential impacts associated with the discharge of a hazardous substances or non-hazardous substances are considered in **Section 18.7**.
The Control of Pollution (Oil Storage) (England) Regulations 2001 (Ref 18-38)	
The Regulations require a person having custody or control of oil to carry out certain works and take certain precautions and other steps for preventing pollution of any waters which are controlled waters for the purposes of Part III of the Water Resources Act 1991. Regulation 2(2) sets out circumstances in which these Regulations do not apply to the storage of oil. Regulation 3 imposes general requirements in relation to the storage of oil. Additional requirements which apply to specific types of container are imposed by regulation 4 and regulation 5. Regulation 6 contains transitional provisions. Where in a transitional case the Environment Agency considers that there is a significant risk of pollution of controlled waters from the oil in question it has the power to serve a notice on the person having custody or control to minimise the risk (see reg.7).	Controlled waters are discussed in **Section 18.4**, whilst potential risks to controlled waters are discussed in **Section 18.7**.
The Floods and Water (Amendment etc) (EU Exit) Regulations 2019	
Draft regulation laid before Parliament to the European Union (withdrawal) Act 2018, for approval by resolution of each House of Parliament to come into force on exit day	Continuity legislation – see above.
National Policy Statement for Ports (NPSfP) (Ref 18-9)	
The NPSfP is a framework to address proposals for port development in the UK and associated development (rail and road). This describes the UK Government's conclusions on new port infrastructure in the context of future demand, needs and the current economy. The Project	NPSfP requirements are being used to establish the impact of the Project on the water environment – refer to

Legislation/ Policy/ Guidance	Consideration within the PEI Report
is considered to be a Nationally Significant Infrastructure Project (NSIP) within the ports industry. The aims of the NPSfP for development and flood risk are to ensure that flood risk from all sources of flooding is taken into account at all stages in the planning process, to avoid inappropriate development in areas at risk of flooding and to direct development away from areas at highest risk. Where new development is, exceptionally, necessary in such areas, including 'water compatible' development, the policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall. Port development is defined as being water compatible development and, therefore, acceptable in high flood risk areas (Paragraph 5.2.3). The NPSfP state*s "all applications for port development of 1 hectare or greater in Flood Zone 1 and all proposals for projects located in Flood Zones 2 and 3 should be accompanied by a flood risk assessment (FRA). This should identify and assess the risks of all forms of flooding to and from the project and demonstrate how these flood risks will be managed, taking climate change into account*" (Paragraph 5.2.4). The NPSfP notes that the latest set of UK Climate Projections should be used in assessments to ensure the appropriate adaptation measures have been identified. "A*pplicants should apply, as a minimum, the emissions scenario that the independent Committee on Climate Change suggests the world is currently most closely following – and the 10%, 50% and 90% estimate ranges. These results should be considered alongside relevant research which is based on the climate change projections such as Environment Agency Flood Maps*" (Paragraph 4.13.7). Paragraph 5.2.18 of the NPSfP states "T*he Government's view is that there is no 'public good' need, on national resilience grounds, to require a higher specification than will secure commercial resilience of the individual facility, notwithstanding that some types of severe weather may effect ports in a region or along a particular stretch of coastline, for example from a storm surge. The NPSfP provides more generally for resilience and diversity of ports provision. Applicants will be in the best position to make a commercial judgement on the required appropriate adaptation measures to reduce the risk from long term climate change as it affects their own facilities*". In Section 5.6 of NPSfP it states that "Infrastructure development can have adverse effects on the water environment, including groundwater, inland surface water, transitional waters and coastal waters. During the construction, operation and decommissioning phases, it can lead to increased demand for water, involve discharges to water and cause adverse ecological effects resulting from physical modifications to the water environment." The consideration of these effects in terms of water bodies failing to meet environmental objectives established under WFD legislation will be necessary.	**Section 18.7**. The FRA which will accompany the DCO application will be undertaken in line with applicable policy requirements.
National Planning Policy Framework (NPPF) (18-39)	

Legislation/ Policy/ Guidance	Consideration within the PEI Report
The NPPF sets out the government's planning policies and how these are expected to be applied. The NPPF states that "*when determining planning applications, LPA's should ensure that flood risk is not increased elsewhere (…) where appropriate, applications should be supported by a site-specific Flood Risk Assessment*". "*Strategic policies should set out an overall strategy for the pattern, scale and quality of development, and make sufficient provision for: …(d) conservation and enhancement of the natural, built and historic environment*…". This includes landscapes and green infrastructure, and planning measures to address climate change mitigation and adaptation (paragraph 20d). "*Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures. Policies should support appropriate measures to ensure the future resilience of communities and infrastructure to climate change impacts*…". Development should not cause unacceptable levels of water pollution and should help improve water quality wherever possible (paragraph 153). "*Planning policies and decisions should contribute to and enhance the natural and local environment by: … (e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as water quality, taking into account relevant information such as river basin management plans …*" (paragraph 174e).	The impact of the Project on the water environment of the NPPF will be detailed in the ES and in the supporting FRA. **Section 18.7** provides a preliminary assessment of water environment effects.
National Planning Practice Guidance (NPPG) (Ref 18-10)	
The NPPG provides guidance for local planning authorities on assessing the significance of water environment effects of proposed developments. The guidance highlights that adequate water and wastewater infrastructure is needed to support sustainable development.	This guidance has been considered within **Section 18.7** when establishing the potential effects of the Project on the local aquatic environment and ensuring the sustainability of the development.
Flood Risk and Coastal Change NPPG (18-40)	
The Flood Risk and Coastal Change NPPG recommends that "*Local Plans should apply a sequential, risk-based approach to the location of development to avoid where possible flood risk to public and property and manage any residual risk, taking account of the impacts of climate change, by:* • *Applying the Sequential Test;*	The NPPG provides general guidance on flood risks which will be taken into account in the ES and the supporting FRA. **Section 18.7** provides

Legislation/ Policy/ Guidance	Consideration within the PEI Report
• *Applying the Exception Test if necessary;* • *Safeguarding land from development that is required for current and future flood management;* • *Using opportunities offered by new development to reduce the causes and impacts of flooding; and* • *Where climate change is expected to increase flood risk, seeking opportunities to facilitate the relocation of the development*".	a preliminary assessment of water environment effects.
Government's Green Future: 25 Year Plan to Improve the Environment (Ref 18-41*)*	
Sets out the government's goals for improving the environment within a generation and leaving it in a better state than we found it. With regards to the water environment, the Plan includes specific goals to reduce the environmental impact of water abstraction, meet the objectives of River Basin Management Plans under the WFD, reduce leakage from water mains, improve the quality of bathing waters, restore protected freshwater site to a favourable condition, and do more to protect communities and businesses from the impact of flooding, coastal erosion and drought.	The green future plans were used in **Section 18.5** for assessing the impact of the development on the river estuary bordering the Site.
Government's Water Strategy for England, Future Water (Ref 18-42)	
Sets out the government's goals for improving the aquatic environment within a generation ensuring that water quality remains high, with resources being maintained and future drought scenarios being mitigated with the environment also being protected from climate change events.	The strategy has been used during the completion of **Sections 18.4** where baseline conditions and future impacts are explored.
Non-statutory Technical Standards for Sustainable Drainage Systems (SuDS) (Ref 18-43)	
Sets out the Government's long-term vision for water and the framework for water management in England. It aims to permit the supply of secured water supplies whilst ensuring an improved and protected water environment. Planning policy encourages developers to include SuDS in their proposals where practicable. Defra have provided guidance on the use, design and construction of SuDS in Non-Statutory Technical Standards.	This technical standard is being used to assess the SuDS requirements within the FRA (which will be submitted with the DCO application and referenced by the ES) and the Drainage Strategy to be submitted as part of the ES.
North East Lincolnshire Council (NELC) Local Plan (Ref 18-14)	
The following policies of the NELC Local Plan are relevant to the water quality, coastal protection, flood risk and drainage assessment: Policy 33: Flood Risk. This policy outlines the requirements of the Sequential and Exception Tests and sets out criteria that development proposals should demonstrate in order to minimise flood risk impacts and mitigate against the likely effects of climate change. This criteria includes a undertaking a site-specific flood risk assessment , no unacceptable increased risk of flooding to the development site or	Key information has been provided within the NELC local planning rules for the FRA, the contents of which has been reviewed for the completion of the flooding assessments within **Sections 18.4** and **18.7**.

Legislation/ Policy/ Guidance	Consideration within the PEI Report
existing properties, the development will be safe during its lifetime, SuDS have been incorporated into the development unless their use has been deemed inappropriate, opportunities to provide NFM and mitigation through green infrastructure, arrangements for the adoption, maintenance and management of any mitigation measures, access to any watercourse or flood defence asset for maintenance, clearance, repair or replacement is not adversely affected; and the restoration, improvement or provision of additional flood defence infrastructure represents an appropriate response to local flood risk, and does not conflict with other Plan policies. Policy 34: Water Management. This policy outlines the requirements of development proposals in relation to potential impacts to surface and groundwater. Such requirements include sustainable and adequate water supplies on site, efficient water use, adequate foul water treatment and appropriate sewerage systems. The Humber River Basin Management Plan (RBMP) should be considered. The policy also refers to the importance of protecting groundwater within Source Protection Zones (SPZ) during construction and operational phases. Policy 33: Flood Risk. This policy outlines the requirements of the Sequential and Exception Tests and sets out criteria that development proposals should demonstrate in order to minimise flood risk impacts and mitigate against the likely effects of climate change. This criteria includes a undertaking a site-specific flood risk assessment , no unacceptable increased risk of flooding to the development site or existing properties, the development will be safe during its lifetime, SuDS have been incorporated into the development unless their use has been deemed inappropriate, opportunities to provide NFM and mitigation through green infrastructure, arrangements for the adoption, maintenance and management of any mitigation measures, access to any watercourse or flood defence asset for maintenance, clearance, repair or replacement is not adversely affected; and the restoration, improvement or provision of additional flood defence infrastructure represents an appropriate response to local flood risk, and does not conflict with other Plan policies. Policy 40: Developing a green infrastructure network. This policy outlines the importance of green spaces and infrastructure within developments, as well as biodiversity, climate change mitigation and sustainable water management. As part of this policy, open areas between Immingham and the northern industrial development will be given specific protection. Policy 40: Developing a green infrastructure network. This policy outlines the importance of green spaces and infrastructure within developments, as well as biodiversity, climate change mitigation and sustainable water management. As part of this policy, open areas between Immingham and the northern industrial development will be given specific protection.	

18.3 Assessment Scope

18.3.1 There is no standard guidance in place for the assessment of the likely significant effects on the water environment from developments of this type. Based on professional judgement and experience of other similar schemes, a qualitative assessment of the likely significant effects on surface water quality, coastal protection, flood risk and drainage receptors would be undertaken.

18.3.2 The classification and significance of effects would be determined using the principles of the guidance and the criteria set out in DMRB LA 113 (Ref 18-17) adapted to take account of hydromorphology. Although these assessment criteria were developed for road infrastructure projects, this method is suitable for use on any development project and it provides a robust and well tested method for predicting the significance of effects. The methodology also considers advice set out in DfT TAG Unit A3, Environmental Impact Appraisal (Ref 18-18).

18.3.3 Following DMRB LA 113 (Ref 18-17), the importance of the receptor (refer to) and the magnitude of impact (refer to) are determined independently and are then used to determine the overall classification and significance of effects (refer to).

18.3.4 Whilst other disciplines may consider ‘receptor sensitivity’, ‘receptor importance’ is considered here. This is because when considering the water environment, the availability of dilution means that there can be a difference in the sensitivity and importance of a water body. For example, a small drainage ditch of low conservation value and biodiversity with limited other socio-economic attributes, is very sensitive to impacts, whereas an important regional scale watercourse, that may have conservation interest of international and national significance and support a wider range of important socio-economic uses, is less sensitive by virtue of its ability to assimilate discharges and physical effects. Irrespective of importance, all controlled waters in England are protected by law from being polluted.

Table 18.3 Defining the Importance/Sensitivity of Water Receptors

Importance	General Criteria	Surface Water	Hydromorphology	Flood Risk
Very high	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.	Watercourse having a WFD classification as shown in a River Basin Management Plan (RBMP) and Q95 ≥ 1.0m^3/ s; Site protected/ designated under international or UK habitat legislation (SAC, SPA, SSSI, WPZ, Ramsar Site). Critical social or economic uses (e.g. public water supply and navigation).	Unmodified, near to or pristine conditions, with well-developed and diverse geomorphic forms and processes characteristic of river and lake type.	Floodplain or defence protecting more than 100 residential properties from flooding; Flood Zone 3a and/ or 3b; Essential Infrastructure or highly vulnerable development; Human receptors – general public / visitors; Offsite regional sewerage networks
High	Receptor of national or regional importance with a low ability to absorb change without fundamentally altering its present character.	Watercourse having a WFD classification as shown in a River Basin Management Plan (RBMP) and Q95 < 1.0m^3/ s; Major Cyprinid Fishery; Species protected under international or UK habitat legislation. Critical social or economic uses (e.g. water supply and navigation). Important social or economic uses such as water supply, navigation or mineral extraction.	Conforms closely to natural, unaltered state and would often exhibit well-developed and diverse geomorphic forms and processes characteristic of river and lake type. Deviates from natural conditions due to direct and/ or indirect channel, floodplain, bank modifications and/ or catchment development pressures.	Floodplain or defence protecting between 10 and 100 residential properties or industrial premises from flooding; Flood Zone 3a; More vulnerable development; Human receptors – construction workers and site operatives with knowledge of site conditions; Low lying land and local pumped drainage network.
Medium	Receptor of regional or local importance, with medium ability to absorb, adapt to or recover from change. The receptor is of regional or local importance and has medium capacity to absorb change, adapt to or recover from	Watercourse detailed in the Digital River Network but not having a WFD classification as shown in a RBMP. May be designated as a local wildlife Site (LWS) and support a small/ limited population	Shows signs of previous alteration and/ or minor flow/ water level regulation but still retains some natural features or may be recovering towards conditions indicative of the higher category.	Floodplain or defence protecting 10 or fewer industrial properties from flooding; Flood Zone 2; Less vulnerable development; Surface water drainage network including drainage ditches.

Importance	General Criteria	Surface Water	Hydromorphology	Flood Risk
	change without significantly altering its present character.	of protected species. Limited social or economic uses.		
Low	The receptor is of local importance and tolerant of change without detriment to its character (i.e. has some ability to absorb, adapt to or recover from change).	Surface water sewer, agricultural drainage ditch; non-aquifer WFD Class 'Poor' or undesignated in its own right. Low aquatic fauna and flora biodiversity and no protected species. Minimal economic or social uses.	Substantially modified by past land use, previous engineering works or flow/ water level regulation. Likely to possess an artificial cross-section would probably be deficient in bedforms and bankside vegetation. May also be realigned or channelised with hard bank protection, or culverted and enclosed. May be significantly impounded or abstracted for water resources use. Could be impacted by navigation, with associated high degree of flow regulation and bank protection, and probable strategic need for maintenance dredging. Artificial and minor drains and ditches would fall into this category.	Floodplain with limited constraints and low probability of flooding of residential and industrial properties; Flood Zone 1; Water compatible development; Local drainage network (existing private site drainage or soakaway).
Negligible	Receptor is resistant to change and is of little or no environmental value.	Not applicable.	Not applicable.	Not applicable.
Note 1: Professional judgement is applied when assigning an importance category to all water features. The WFD status of a watercourse is not an overriding factor and, in many instances, it may be appropriate to upgrade a watercourse which is currently at poor or moderate status to a category of higher importance to reflect its overall value in terms of other attributes and WFD targets for the watercourse. Likewise, a watercourse may be below Good Ecological Status, this does not mean that a poorer quality discharge can be emitted. All controlled waters are protected from pollution under the				

Importance	General Criteria	Surface Water	Hydromorphology	Flood Risk
Environmental Permitting (England and Wales) Regulations 2016 (Ref 18-25) and the Water Resources Act 1991 (as amended) (Ref 18-26), and future WFD targets also need to be considered. Note 2: Based on the water body 'Reach Conservation Status' presently being adopted for a major infrastructure project (and developed originally by Atkins) and developed from Environment Agency conservation status guidance (Ref 18-23 and 18-24) as LA113 does not provide any criteria for morphology.				

Table 18.4 Determining Magnitude of Impact on Water Receptors

Level of Magnitude	Definition of Magnitude and Examples
Major Adverse	Results in a loss of attribute and/ or quality and integrity of the attribute. For example, loss of a fishery; decrease in surface water ecological or chemical WFD status or groundwater qualitative or quantitative WFD status. Change in flood risk to receptor from low or medium to high.
Moderate Adverse	Results in impact on integrity of attribute, or loss of part of attribute. For example, partial loss of a fishery; measurable decrease in surface water ecological or chemical quality, or flow; reversible change in the yield or quality of an aquifer; such that existing users are affected, but not changing any WFD status. Change in flood risk to receptor from low to medium.
Minor Adverse	Results in some measurable change in attribute's quality or vulnerability. For example, measurable decrease in surface water ecological or chemical quality, or flow; decrease in yield or quality of aquifer; not affecting existing users or changing any WFD status. Change in flood risk to receptor from no risk to low risk.
Negligible	Results in impact on attribute, but of insufficient magnitude to affect the use or integrity. For example, negligible change discharges to watercourse or changes to an aquifer which lead to no change in the attribute's integrity.
Small Beneficial	Results in some beneficial impact on attribute or a reduced risk of negative impact occurring. For example, measurable increase in surface water ecological or chemical quality; increase in yield or quality of aquifer not affecting existing users or changing any WFD status. Change in flood risk to receptor from low risk to no risk.

Level of Magnitude	Definition of Magnitude and Examples
Medium Beneficial	Results in moderate improvement of attribute quality. For example, measurable increase in surface water quality or in the yield or quality of aquifer benefiting existing users but not changing any WFD status. Change in flood risk to receptor from medium to low.
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Water Framework Directive (WFD) Assessment

18.3.5 A WFD assessment would be undertaken to determine the potential implications of the Project on the objectives of the relevant water bodies. This assessment would be based on the information and analysis provided within the ES in relation to changes in physical processes, water and sediment quality, and impacts on marine and terrestrial ecological receptors. The WFD assessment would be provided as an appendix to the ES following the format specified in the latest *Clearing the Waters for All* guidance.

Flood Risk Assessment (FRA)

18.3.6 An FRA will be prepared in accordance with the NPSfP, NPS EN-1 and NPPF due to the size (over 1ha) and location of the Project (in Flood Zone 3). The FRA would assess the flood risk both to and from the Project and demonstrate how that flood risk would be managed over the Project's lifetime, to satisfy the requirements of the Sequential Test and Exception Test. The FRA would give due regard to climate change. This would inform the design of the Project (including finished ground and floor levels) as well as the water environment impact assessment reported in the ES.

Study Area

18.3.7 The Site location is shown on **Figure 1.1** (PEI Report, Volume III)**,** whilst **Figure 2.3** (PEI Report, Volume III) shows the Site plan for the Project, outlining the location of the West Site, Pipeline, East Site, Temporary Construction Area and Jetty sites.

18.3.8 For the purposes of the water quality assessment, a study area of approximately 1km around the Site boundary (**Figure 18.1** PEI Report, Volume III) has been considered in order to identify surface water bodies that could reasonably be affected (directly or indirectly) by the Project. However, since watercourse flow and water quality impacts may propagate downstream, where relevant, the assessment also considers a wider study area based on professional judgement.

18.3.9 As coastal protection, flood risk and drainage impacts can impact upstream and downstream, this chapter and the FRA (to be prepared and submitted with the DCO Application) considers a wider study area, where relevant. Professional judgement around hydrological linkages is being applied to identify the extent to which such features are considered in the next section.

Baseline Data Collection

18.3.10 A desk-based study has been undertaken to inform the baseline characterisation regarding water quality, coastal protection, flood risk and drainage on which the impact assessment has been based. The following key data sources have been reviewed:

a. Catchment Data Explorer website (Ref 18-28).

b. Multi-Agency Geographic Information for the Countryside (MAGIC) website (Ref 18-29).

c. Flamborough Head to Gibraltar Point Shoreline Management Plan (Ref 18-30).

d. Humber Flood Risk Management Strategy (note that this strategy is currently being updated and will be incorporated into the assessment should the update be completed and made publicly available) (Ref 18-3).

e. Environment Agency Flood Maps for Planning (https:// flood-map-for-planning.service.gov.uk) (Ref 18-4).

f. Environment Agency Long-term Information Service Check the long term flood risk for an area in England – GOV.UK (www.gov.uk) (Ref 18-5).

Stakeholder Engagement

18.3.11 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 water quality, coastal protection, flood risk and drainage assessment, the results of which are presented within the Scoping Opinion (**Appendix 1.A** of PEI Report, Volume IV).

18.3.12 Consultation will be undertaken with the following stakeholders to discuss any further potential issues relating to water quality, coastal protection, flood risk and drainage:

a. Environment Agency.

b. North-East Lindsey Internal Drainage Board.

c. Coal Authority.

d. Natural England.

e. Immingham Town Council.

f. Lincolnshire Council.

g. North East Lincolnshire Council (NELC).

h. Crown Estate.

i. The Port Authority.

j. Marine Management Organisation (MMO).

Limitations and Assumptions

18.3.13 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 extents of land required for its construction and operation, in accordance with the application of the Rochdale Envelope approach.

18.3.14 The FRA for the Project is ongoing and will be submitted with the DCO Application and referenced in the ES. The FRA will consider the Environment Agency's Coastal Hazard Mapping and the residual risk from coastal flooding. The management of surface water runoff and its disposal from the Site will be considered during the development of the drainage strategy. Water resource needs for the Project have not yet been fully quantified, but a source of water for

cooling purposes, fire water for emergencies and a source of potable water would be required. This will be assessed in the ES.

18.3.15 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.

18.4 Baseline Conditions

Current Baseline

Water Quality

18.4.1 The following key water environment receptors have been identified in the vicinity of the Project:

a. The Humber Estuary (Humber Estuary TraC Operational Catchment) and in particular the Lower Humber (GB530402609201) which forms the eastern boundary of the Site boundary. The review of this waterbody's sensitivity is considered in **Chapter 17**: **Marine Water and Sediment Quality**.

b. North Beck Drain, Middle Drain and Habrough Marsh Drain (a North East Lindsey internal drainage board (IDB) watercourse skirts the southern and western perimeters of the port estate flowing from south to north) are all located in the vicinity of the Site boundary (part of Becks Northern Operational Catchment). A summary of WFD data for 2019 for this water body is provided in **Table 18.5**.

c. On-shore WFD water bodies: North Beck Drain (GB104029067575) and North Lincolnshire Chalk Unit waterbody (GB40401G401500). The conditions of these waterbodies are Moderate ecological status and Poor overall status, respectively. These classifications by the Environment Agency are based on 'lowest' category, which for the surface water body is ecological status and for groundwater is around resources. A summary of WFD data for 2019 for North Beck Drain and North Lincolnshire Chalk Unit waterbody are provided in **Table 18.5**.

d. Various ecological sites:

   i. Humber Estuary (Ramsar, SPA and SAC). The review of these protected sites is included in **Chapter 17**: **Marine Water and Sediment Quality**.

   ii. On-shore limited conservation value apart from small patches of Priority Habitat (Coastal and Floodplain Grazing Marsh and Good quality semi-improved grassland: Non-Priority).

18.4.2 There are a number of large source protection zones (SPZ) local to the Project, including an SPZ1 (inner zone) lying very close to the edge of the Immingham Docks site. The other SPZs are located west of the coastal strip (presumably designed to minimise saline intrusion). The various abstraction licences associated with these SPZs are described in **Chapter 21**: **Ground Conditions and Land Quality**.

18.4.3 Lying further to the west of the coast (west of A180) are various Drinking Water Safeguard Zones (Groundwater) associated with catchments of the SPZs as described above. There are no Drinking Water Safeguard Zones (Surface Waters) in the vicinity of the Site. The Drinking Water Safeguard Zones (Groundwater) are considered in **Chapter 17: Marine Water and Sediment Quality**.

Table 18.5 Summary of WFD Data for On-shore Water Bodies (2019)

Classification Item	North Beck Drain (GB104029067575)
Ecological	Moderate
Biological quality elements	N/A
Invertebrates	N/A
Physico-chemical quality elements	N/A
Ammonia (Phys-Chem)	N/A
Hydromorphological supporting elements	Supports good
Supporting elements (surface water)	Moderate
Specific pollutants	High
Chromium (VI)	High
Chemical	Fail
Priority hazardous substances	Fail
Priority substances	Good
Other pollutants	Does not require assessment
Classification Item	**North Lincolnshire Chalk Unit waterbody (GB40401G401500)**
Overall Water Body	Poor
Quantitative	Poor
Quantitative Status element	Poor
Quantitative dependent surface water body status	Poor
Quantitative Groundwater Dependent Terrestrial Ecosystems (GWDTEs) test	Good
Quantitative saline intrusion	Good

Quantitative water balance	Good
Chemical (GW)	Poor
Chemical status element	Poor
Chemical dependent surface water body status	Good
Chemical drinking water protected area	Poor
Chemical GWDTEs test	Good
Chemical saline intrusion	Good
General chemical test	Poor
Supporting elements (groundwater)	N/A
Prevent and limit objective	Active
Trend assessment	Upward trend

18.4.4 The area surrounding the proposed Order Limits is drained via a network of small land drainage ditches that convey surface water from the surrounding areas located near to the Site to the Humber Estuary.

18.4.5 The smaller land drains and North East Lindsey IDB drains, whilst shown on the Digital Rivers Network Map, do not have ecological and chemical classification under the WFD.

Coastal Protection

18.4.6 Although the Site is shown as not benefitting from flood defences on the Environment Agency's flood maps, there are tidal flood defences in place along the entire south bank of the Humber Estuary. These tidal flood defences provide protection against a flood event with a 0.5% chance of occurring in any year, based on Still Water Tidal Levels.

18.4.7 Associated British Ports owns and is responsible for the flood defences along the frontage of Immingham Docks. The flood defences along the wider Humber Estuary south bank frontage are maintained by the Environment Agency. The Environment Agency is responsible for inspecting the condition of all flood defences, including those maintained by Associated British Ports and thus inspections are undertaken annually to ensure that any potential defects are identified early.

Flood Risk - Tidal and Fluvial Sources

18.4.8 The Environment Agency Flood Map for Planning for fluvial and tidal flooding on the Environment Agency website (accessed on 28 June 2022) show the Site is located entirely in Flood Zone 3 (high risk of flooding) when the presence of flood defences is not taken into account – refer to **Figure 18.2** (PEI Report, Volume III).

18.4.9 Definitions of Environment Agency flood zones (as defined in Table 1 of the National Planning Policy Guidance (NPPG) (Ref 18-6)) are presented in **Table 18.6**.

Table 18.6 Environment Agency Flood Zone Definitions

Flood Zone	Definition	Risk of flooding
Flood Zone 1	Land that has a low probability of flooding (less than 1 in 1,000 annual probability of river or sea flooding (<0.1%))	Low
Flood Zone 2	Land that has a medium probability of flooding (between 1 in 100 and 1 in 1,000 annual probability of river flooding (0.1-1%), or between 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.1-0.5%)	Medium
Flood Zone 3a	Land that has a high probability of flooding (1 in 100 year or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%)	High
Flood Zone 3b (Functional Floodplain)	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: • land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or • land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding).	Very high

18.4.10 As the Site is afforded protection from defences up to and including the 0.5% Annual Exceedance Probability (AEP) flood event still water levels, the primary risk of flooding from the Humber Estuary is a residual risk from overtopping and from a failure of flood defences.

18.4.11 Residual flood risk associated with overtopping and failure of the flood defences will be assessed in the FRA which will be submitted with the DCO application and referred to in the ES.

18.4.12 Tide-locking is a common problem in watercourses where defences occur. Habrough Marsh Drain (Ordinary Watercourse) and North Beck Drain (Main River) are both gravity drainage systems with a flapped outfall into the Humber to prevent the incoming tide from entering the channel when water levels in the estuary are high. When high tides prevent the watercourses from discharging into the Humber Estuary, water levels within the drains increase temporarily until the tidal level has decreased sufficiently to allow the outfall to operate again. Areas of the Site located directly adjacent to Habrough Marsh Drain and the North Beck Drain are at residual risk of fluvial flooding during tide-locking events.

Flooding from Artificial Sources

18.4.13 The Environment Agency has produced maps based on mathematical modelling showing the extent of flooding in the unlikely event of large reservoir breaching in England and Wales (accessed online 28 June 2022). The Environment Agency Long-Term Flood Risk Map shows the Site is not at risk of flooding from reservoir failure.

Groundwater Flooding

18.4.14 There are no historical flood records for groundwater flooding within the Site or the wider Port of Immingham area. Limited historical ground investigation (GI) records indicate the presence of perched/shallow groundwater within the study area. Therefore, given the limited information on groundwater and potential for groundwater flooding in the area, the baseline condition for the risk of flooding from groundwater sources at the existing Site is currently a medium risk. This will be assessed further when site-specific Ground Investigation data becomes available.

Surface Water (Pluvial) Flooding

18.4.15 The Environment Agency Risk of Flooding from Surface Water (RoFSW) maps (accessed online 28 June 2022) indicate areas at risk from surface water flooding when rainwater does not drain away through the normal drainage systems or soak into the ground, but instead lies on or flows over the ground.

18.4.16 The risk of surface water is defined by the Environment Agency, with these risks being defined in accordance with **Table 18.7**.

Table 18.7 Definition of Risk from Surface Water Flooding

Risk of flooding	Definition
Very low	Each year, the area has a chance of flooding of less than 1 in 1000 (0.1%).
Low	Each year, the area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%).
Medium	Each year, the area has a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%).
High	Each year, the area has a chance of flooding greater than 1 in 30 (3.3%).

18.4.17 The RoFSW for the area shows the Site is generally at very low to low risk of flooding from surface water sources.

Drainage

18.4.18 Anglian Water asset mapping shows that there is no surface water drainage infrastructure operated by them within the Site boundary and that drainage of surface water within the wider Port of Immingham is privately owned by Associated British Ports.

18.4.19 An Anglian Water rising foul sewer main runs beneath Kings Road flowing south-east then north-east beneath Queens Road and continues flowing north-east, discharging to the Humber Estuary via the Immingham Sea Outfall located at OS NGR TA2141715599, downstream of the Port of Immingham. In addition, package sewage treatment plants (owned by Associated British Ports) provide treatment of effluent on-site within the Port before being discharged to the Humber Estuary.

18.4.20 Surface water from hard standing areas is generally discharged (at a restricted flow rate) directly to North East Lindsey IDB adjacent watercourses and ultimately to the Humber Estuary or, directly to the Humber Estuary as an unrestricted discharge.

18.4.21 Given the generally undeveloped nature of the Site (albeit parts are brownfield), it is assumed that the land predominantly drains via natural infiltration processes to the land drains located within and adjacent to the Site. There is a possibility that historical drainage infrastructure is present beneath the East Site, however, it is not known whether this part of the Site drains via natural processes or via a piped system.

18.4.22 Further details for the current drainage scenario will be provided in the Drainage Strategy to be submitted as part of the ES.

Future Baseline

18.4.23 The future baseline is a prediction of baseline conditions in the future, assuming that the Project is not constructed. In the absence of the Project, it is anticipated that future baseline conditions would be similar to the existing baseline as described above, subject to the caveats detailed below.

18.4.24 Generally, there is an improving trend in water quality and the environmental health of waterways in the UK since the commencement of significant investment in sewage treatment in the 1990s, the adoption of the WFD from 2003, and the application of ever more stringent planning policies. In terms of water quality impacts, the future baseline assumes that all WFD waterbodies achieve their planned target status by 2027.

18.4.25 The future baseline will also be influenced by climate change. It is anticipated that the impact of climate change will include:

- Changes in storminess/storm surges, wave heights, and sea levels, posing an increased risk of coastal damage and tidal flooding.
- Changes in rainfall intensity increasing peak river flows, posing an increased risk of fluvial flooding and property damage.
- Changes in rainfall intensity increasing surface water runoff (overland flow), posing an increased risk of pluvial and drainage/ sewer flooding.

18.4.26 In addition, rainfall intensity will increase by up to 40% by the year 2125 placing increased pressure on drainage infrastructure and increasing the risk of surface water flooding.

18.4.27 It is likely that through the action of new legislative requirements and more stringent planning policy and regulation, that the health of the water environment will continue to improve post-2027. However, there are significant challenges

such as adapting to a changing climate (i.e. in general drier summers, wetter winters, and an increased frequency of significant storms are forecast for the UK); and the pressures of population/economic growth that could have a retarding effect on the water environment if it is not managed carefully through the design of projects, mitigation and the maintenance of mitigating solutions. However, it is difficult to forecast these changes with any certainty.

18.5 Design, Mitigation and Enhancement Measures

Embedded Mitigation Measures

18.5.1 Water environment constraints are being taken into account during the design of the Project, particularly with regard to the route of pipelines, the approach to the installation of any footings for above ground pipelines near to watercourses, and surface water drainage proposals. Best practice around water environment is being adopted through the Construction Environmental Management Plan (CEMP).

18.5.2 An appropriate surface water drainage system will be developed based on the requirements of regulatory authorities and a Drainage Strategy will be developed to accompany the ES.

18.5.3 An FRA will be produced which will assess the flood risk both to and from the Project and demonstrate how that flood risk would be managed over the Project's lifetime, giving due regard to climate change. Mitigation measures could include, but are not limited to, flood resistant and resilient design, appropriate finished floor levels and emergency evacuation.

Standard Mitigation Measures

18.5.4 Construction of the Project would be subject to measures and procedures defined within a CEMP, which would be produced prior to the commencement of construction by the Contractor and would be based on, and incorporate, the contents and requirements of the outline CEMP which will be submitted with the DCO Application.

18.5.5 The CEMP would define a range of best practice construction site practices aimed at protecting the water environment, – such standard mitigation may include:

a. Leaving buffer strips between any drains/boundary of the Site and construction activity, typically a strip of 8m is assumed to be best practice.

b. Bunding of assets that carry a risk of causing contamination to surface waters and land by the spillage of hazardous liquids. This could be used for storage vessels and chemical delivery areas. Provision of spill kits in areas where there is a risk of spillages of hazardous liquids.

c. Avoid undertaking construction activities when particularly wet conditions exist, which may cause surface runoff to be generated; or at a minimum put in place enhanced monitoring at such times.

d. Undertaking regular water quality monitoring be that by visual inspection or testing using hand-held probes.

Management of Hazardous Substances on Site

18.5.6 The use of the chemical products at the Site will follow the product-specific environmental guidelines, as well as the legislative requirements set out in the Control of Substances Hazardous to Health Regulations (COSHH (2002)) and during the operational phase Control of Major Accident Hazards (COMAH) Regulations (2015) and Environmental Permit.

18.5.7 A site Emergency Response Plan (prepared for Regulation 9 of the COMAH Regulations) will be in place for dealing with emergency situations involving loss of containment of hazardous substances. This will detail how to contain and control incidents to minimise the effects and limit danger to persons, the environment and property. The Emergency Response Plan will set out the emergency spill control procedure that will include the actions adapted from the Health and Safety Executive's Emergency Response/ Spill Control Technical Measures Document.

18.5.8 There is further guidance in References 18-44 to 18-46 that will be consulted in development of the site Emergency Response Plan that will be completed before the site will start operation.

18.5.9 Such measures may also be applicable to protect the water environment during the Project decommissioning phase.

18.6 Potential Impacts and Effects

18.6.1 The sections below consider the potential water environment impacts during Project construction, operation and decommissioning. The potential risks to the water environment may include deterioration in water quality, increased flood risk and over-whelming the drainage network. Such impacts have the potential to lead to a deterioration in water body status (Ref 18-35).

Construction

18.6.2 Potential water environment impacts associated with the construction phase of the Project include:

a. Contamination from suspended solids or other chemical contaminants that may find their way into site runoff, infiltrate to ground, or be spilt directly into waterbodies when there are works within or adjacent to them.

b. The effects of diffuse urban pollutants in surface water runoff (that may contain metals, hydrocarbons, and inert solids etc.).

c. The risk of pollution from chemical spillages or fire on the site.

d. Alteration in fluvial and overland flow paths, and potential increase in flood risk, as a result of storing construction materials.

e. Increased risk of blockage of drains as a result of increased material (sands, gravels etc.) transported in runoff from the Site.

f. Increase in flood risk (fluvial, surface water and drainage infrastructure) due to changes to the rate and volume of surface water runoff entering the identified watercourses due to earthworks and changes in land use.

g. Increase in risk to aquatic life from potential water use and discharges to the environment.

Operation

18.6.3 The potential water environment impact pathways during the Project operational phase are as follows:

a. Potential operational pollution of surface watercourses from accidental spillages.

b. Any operational impacts on surface water courses from the Site including surface water drainage.

c. Increased risk of fluvial flooding to the development and surrounding area due to loss of floodplain storage.

d. Increased risk of flooding from fluvial flooding to the development and surrounding area over its lifetime due to climate change effects (increasing peak river flows).

e. Increase in flood risk (fluvial, surface water and drainage infrastructure) due to an increase in surface water runoff from the development.

f. Increase in risk of sewer flooding due to surface water runoff from the development.

g. Increased risk of groundwater flooding (particularly to any below ground development) as a result of high water table and/ or groundwater recharge.

h. Potential pollution incident from hazardous firefighting chemicals if a fire was to occur on the Site.

Decommissioning

18.6.4 The potential water environment impacts during the Project decommissioning phase of the landside infrastructure would be the same as those for the construction phase.

18.6.5 The DCO application would not make any provision for the decommissioning of the marine infrastructure or plant or equipment on the jetty topside. 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. This is discussed further **Chapter 2: The Project**.

18.7 Preliminary Assessment of Residual Effects

18.7.1 A preliminary assessment of potential water environment effects has been undertaken. This initially identifies the sensitivity (value/importance) of each of the surface water receptors identified above (excluding those which are covered in **Chapter 17: Marine Water and Sediment Quality**). Potential impact pathways are then considered, after which potential effects are defined both with and without potential mitigation measures.

Construction

18.7.2 A preliminary qualitative assessment of the likely significant effects on surface water quality and flood risk receptors during the Project construction has been undertaken. This indicates that with the implementation of standard mitigation measures to be included in the CEMP, water environment effects are not likely to be significant. Significant flood risk effects are also not anticipated as it is considered that with the implementation of standard mitigation measures flood effects would be effectively implemented, such measures will be defined in the FRA to be submitted with the DCO Application and assessed within the ES.

Operation

18.7.3 A preliminary qualitative assessment of the likely significant effects on surface water quality and flood risk receptors during Project operation indicates that with the implementation of standard mitigation operational measures, water environment effects are not likely to be significant. Significant flood risk effects are also not anticipated as it is considered that with the implementation of standard mitigation measures flood effects would be effectively implemented. Such measures, for example flood resistant and resilient design, appropriate finished floor levels and emergency evacuation, will be defined in the FRA to be submitted with the DCO Application and assessed within the ES.

Decommissioning

18.7.4 The preliminary qualitative assessment of the likely significant effects on surface water quality and flood risk receptors during Project decommissioning of the landside infrastructure indicates that with the implementation of standard mitigation operational measures (such as those that would be implemented during the construction and phase and included in the DEMP), water environment effects are not likely to be significant. Similarly, significant flood risk effects are not anticipated as standard flood risk mitigation measures would be effectively implemented – such measures will be defined in the FRA to be submitted with the DCO Application and also assessed within the ES.

18.8 Summary of Preliminary Assessment

18.8.1 This preliminary assessment has identified that Project construction, operation and decommissioning have the potential to have adverse impacts and effects on both water quality and flood risk, but that with the implementation of embedded and standard mitigation, residual effects are not likely to be significant. The water quality and flood risk effects associated with the Project will be re-evaluated and reported within the ES following the confirmation of the Project design details and mitigation features. An outline CEMP will be developed to identify a range of best practice construction site practices aimed at protecting the water environment during the construction phase. An appropriate surface water drainage system will be developed based on a drainage strategy and an FRA will be produced.

18.8.2 The results of the preliminary water environment assessment for the Project construction phase are detailed in **Table 18.8**, whilst **Table 19.9** and **Table 18.10** present the results for the operational and decommissioning phases.

Table 18.8 Summary of Potential Impacts, Mitigation Measures and Residual Effects during Construction

Receptor (Sensitivity)	Impact Pathway	Effect	Mitigation Measure	Residual Effect	Confidence
North Beck Drain, Middle Drain and Habrough Marsh Drain **(Water quality/ Water flow – Medium)**	Direct spillage: Contamination from suspended solids or other chemical contaminants that may find their way into site runoff, infiltrate to ground, or be spilt directly into waterbodies when there are works within or adjacent to them.	Moderate/Major adverse	Bunded operations and spill kits to be used on Site (to be specified in the CEMP).	Negligible/Minor adverse	High
	Runoff contamination: The effects of diffuse urban pollutants in surface water runoff (that may contain metals, hydrocarbons, and inert solids etc.).	Minor/Moderate adverse	Bunded operations for all chemicals and fuels needed on Site (to be specified in the CEMP).	Negligible/Minor adverse	High
	Alteration in fluvial and overland flow paths, and potential increase in flood risk, as a result of storing construction materials in the floodplain	Minor/Moderate adverse	Areas for storage of construction materials to be carefully considered (to be specified in the CEMP).	Negligible/Minor adverse	High
	Increased risk of blockage of drains as a result of increased material (sands, gravels etc.) transported in runoff from Site.	Minor/Moderate adverse	Surface water runoff to be managed on site (to be specified in CEMP).	Negligible/Minor adverse	High
	Increase in flood risk (fluvial, surface water and drainage infrastructure) due to changes to the rate and volume of surface water runoff entering the identified watercourses due to earthworks and changes in land use.	Minor/Moderate adverse	Surface water runoff to be managed on Site (to be specified in CEMP).	Negligible/Minor adverse	High
Coastal and Floodplain Grazing Marsh	Direct spillage: Contamination from suspended solids or other chemical contaminants that may find their way into site runoff, infiltrate to ground,	Negligible/Minor adverse	Bunded operations and spill kits to be used on	Negligible	High

Receptor (Sensitivity)	Impact Pathway	Effect	Mitigation Measure	Residual Effect	Confidence
and Good quality semi-improved grassland **(Water quality – Low)**	or be spilt directly into non-priority habitat when there are works within or adjacent to them.		Site (to be specified in the CEMP).		
	Runoff contamination: The effects of diffuse urban pollutants in surface water runoff (that may contain metals, hydrocarbons, and inert solids etc.).	Negligible/Minor adverse	Bunded operations for all chemicals and fuels needed on Site (to be specified in the CEMP).	Negligible	High
Humber Estuary (Tidal flooding – medium)	Increase in flood risk (tidal) as a result of damage to existing tidal defences through works close to and over the existing structures.	Minor/Moderate adverse	Manage works close to and over the existing defence structures (to be specified in the CEMP).	Negligible	High
Human Health **Public and visitors to the site (Very High)**	Exposure to floodwater via flooding from predominantly tidal sources e.g. overtopping, such as surge events or breach of defences	Moderate adverse	Site induction, including evacuation routes, safe refuge, access, and egress. Provision of a flood response plan and will be registered with the Environment Agency Flood Warnings Direct Service. No visitors or access during periods of inclement weather.	Slight adverse	High
Human Health	Exposure to floodwater via flooding from predominantly tidal sources e.g. overtopping, such as surge events or breach of defences	Moderate adverse.	Construction works would be carried out in accordance with the CEMP, including the Flood Response Plan.	Slight adverse	High

Receptor (Sensitivity)	Impact Pathway	Effect	Mitigation Measure	Residual Effect	Confidence
Construction workers and operatives (High)			Site induction, including evacuation routes, safe refuge, access, and egress. Site will be registered with the Environment Agency Flood Warnings Direct Service. No work onsite during a flood warning period		

Table 18.9 Summary of Potential Impacts, Mitigation Measures and Residual Effects during the Operation

Receptor (Sensitivity)	Impact Pathway	Effect	Mitigation Measure	Residual Effect	Confidence
North Beck Drain, Middle Drain and Habrough Marsh Drain **(Water quality/ Water flow – Medium)**	Potential operational pollution of surface watercourses from accidental spillages.	Minor/Moderate adverse	Bunded operations and spill kits to be used on Site.	Negligible/Minor adverse	High
	Increased risk of fluvial flooding to the development and surrounding area due to loss of floodplain storage.	Negligible/ Minor adverse	Mitigation in accordance with the FRA - to be confirmed.	Negligible/Minor adverse	High
	Increased risk of flooding from fluvial flooding to the development and surrounding area over its lifetime due to climate change effects (increasing peak river flows).	Negligible/ Minor adverse	Mitigation in accordance with the FRA - to be confirmed.	Negligible/Minor adverse	High
	Increase in risk of surface water flooding due to surface water runoff from the development.	Negligible/ Minor adverse	Mitigation in accordance with the FRA and Drainage Strategy - to be confirmed.	Negligible/Minor adverse	High
	Potential run off of hazardous firefighting	Major adverse	Bunded operational area with spill kits to be used	Negligible/Minor adverse	High

Receptor (Sensitivity)	Impact Pathway	Effect	Mitigation Measure	Residual Effect	Confidence
	chemicals to surface water course		and treatment/removal of liquids		
Coastal and Floodplain Grazing Marsh and Good quality semi-improved grassland **(Water quality – Low)**	Potential operational pollution of surface watercourses from accidental spillages.	Negligible/ Minor adverse	Bunded operations and spill kits to be used on Site.	Negligible	High
Human Health Public and visitors to the site (Very High)	Exposure to floodwater via flooding from predominantly tidal sources e.g. overtopping, such as surge events or breach of defences	Moderate adverse	Site induction, including evacuation routes, safe refuge, access, and egress. Site registered with the Environment Agency Flood Warnings Direct Service	Slight adverse	High
Human Health **Site operatives and future workforce**	Exposure to floodwater via flooding from predominantly tidal sources e.g. overtopping, such as surge events or breach of defences	Moderate adverse	Flood Response Plan. Site induction, including evacuation routes, safe refuge, access, and egress. Site registered with the Environment Agency Flood Warnings Direct Service. No work onsite during a flood warning period.	Slight adverse	High

Table 18.10 Summary of Potential Impacts, Mitigation Measures and Residual Effects during Decommissioning

Receptor (Sensitivity)	Impact Pathway	Effect	Mitigation Measure	Residual Effect	Confidence
North Beck Drain, Middle Drain and Habrough Marsh Drain **(Water quality/ Water flow – Medium)**	Direct spillage: Contamination from suspended solids or other chemical contaminants that may find their way into site runoff, infiltrate to ground, or be spilt directly into waterbodies when there are works within or adjacent to them.	Moderate/Major adverse	Bunded operations and spill kits to be used on Site (to be specified in the DEMP).	Negligible/Minor adverse	High
	Runoff contamination: The effects of diffuse urban pollutants in surface water runoff (that may contain metals, hydrocarbons, and inert solids etc.).	Minor/Moderate adverse	Bunded operations for all chemicals and fuels needed on Site (to be specified in the DEMP).	Negligible/Minor adverse	High
Coastal and Floodplain Grazing Marsh and Good quality semi-improved grassland **(Water quality – Low)**	Direct spillage: Contamination from suspended solids or other chemical contaminants that may find their way into site runoff, infiltrate to ground, or be spilt directly into non-priority habitat when there are works within or adjacent to them.	Negligible/Minor adverse	Bunded operations and spill kits to be used on Site (to be specified in the DEMP).	Negligible	High
	Runoff contamination: The effects of diffuse urban pollutants in surface water runoff (that may contain metals, hydrocarbons, and inert solids etc.).	Negligible/Minor adverse	Bunded operations for all chemicals and fuels needed on Site (to be specified in the DEMP).	Negligible	High
Human Health Construction workers and operatives (High)	Exposure to floodwater via flooding from predominantly tidal sources e.g. overtopping, such as surge events or breach of defences	Moderate adverse	Construction works would be carried out in accordance with the CEMP, including the Flood Response Plan. Site induction,	Slight adverse	High

Receptor (Sensitivity)	Impact Pathway	Effect	Mitigation Measure	Residual Effect	Confidence
			including evacuation routes, safe refuge, access, and egress. Site will be registered with the Environment Agency Flood Warnings Direct Service. No work onsite during a flood warning period		

18.9 References

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18.10 Abbreviations and Glossary of Terms

Term	Acronym	Meaning
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.
Annual Exceedance Probability	AEP	The chance or probability of a natural hazard event (usually a rainfall or flooding event) occurring annually and is usually expressed as a percentage.
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.
Development Consent Order	DCO	The consent for a Nationally Significant Infrastructure Project required under the Planning Act 2008.
Department of Environment and Rural Affairs	DEFRA	The Government department responsible for policy and regulations on environmental, food and rural issues.
Environment Agency	EA	Government agency established to protect and improve the environment and contribute to sustainable development in England. Responsibilities include: water quality and resources, flooding and coastal risk management and contaminated land.
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 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	Supranational political and economic union of 27 member states primarily located in Europe.
Flood Risk Assessment	FRA	The process of assessing potential flood risk to a site and identifying whether there are any flooding or surface water management issues that may warrant further consideration or may affect the feasibility of a project.
Ground Investigation	GI	An intrusive investigation to establish the soil and rock profile and parameters for Geotechnical and Environmental purposes.
Hectares	Ha	A unit of surface area (symbol ha) equal to 100 acres, used for measuring the areas of geographical features such as land and bodies of water.
Internal Drainage Board	IDB	A public body that manages water levels in an area, known as an internal drainage district, where there is a special need for drainage.
Local Planning Authority	LPA	Local government body that is empowered by law to exercise urban planning functions for a particular area.
Multi-Agency Geographic Information Service	MAGIC	A website which provides geographic information about the natural environment.
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.
North-East Lincolnshire Council	NELC	Local authority of North-East Lincolnshire.
National Planning Policy Framework	NPPF	A planning framework which sets out the government's planning policies for England and how these are expected to be applied.

National Planning Practice Guidance	NPPG	This is a web-based resource used to support the National Planning Policy Framework.
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 Project	NSIP	Major infrastructure developments in England and Wales that bypass normal local planning requirements.
Outline Environmental Management Plan	OEMP	Outlines how actions might impact on the natural environment in which they occur and sets out commitments from the person taking the actions on how those impacts will be avoided, minimised, and managed.
Preliminary Environment Information Report	PEIR	A report that compiles and presents the Preliminary Environmental Information gathered for a project.
Risk of Flooding from Surface Water Maps	RoFSW	Mapping of the long-term flood risk for areas in England from surface water.
Source Protection Zone	SPZ	Zones which show the level of risk to the source from contamination.
Sustainable Drainage Systems	SuDS	Drainage solutions that are considered to be environmentally beneficial, causing minimal or no long-term damage.
Water Framework Directive	WFD	Water Framework Directive is an EU directive which commits European Union member state to achieve good qualitative and quantitative status of all water bodies.