

# IMMINGHAM EASTERN RO-RO TERMINAL



Environmental Statement: Volume 1  
Chapter 21: Impact Assessment Summary  
Document Reference: 8.2.21

APFP Regulations 2009 – Regulation 5(2)(a) and 5(2)(e)  
PINS Reference – TR030007

December 2022



# Immingham Eastern Ro-Ro Terminal

Environmental Statement: Volume 1  
Chapter 21: Impact Assessment Summary

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## Document Information

Document Information	
<b>Project</b>	Immingham Eastern Ro-Ro Terminal
<b>Document title</b>	Environmental Statement: Volume 1 Chapter 21: Impact Assessment Summary
<b>Commissioned by</b>	Associated British Ports
<b>Document ref</b>	8.2.21
<b>APFP Reg 2009</b>	Regulation 5(2)(a) and 5(2)(e)
<b>Prepared by</b>	ABPmer

Date	Version	Revision Details
12/12//2022	1	

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# 21 Impact Assessment Summary

## 21.1 Introduction

21.1.1 This chapter summarises the key outcomes of the assessment of potential impacts associated with the Immingham Eastern Ro-Ro Terminal (IERRT) project on all relevant (scoped-in) topics/receptors. Consultation with key stakeholders has been undertaken prior to and throughout the Environment Impact Assessment (EIA) process in order to discuss environmental issues and agree the scope of and approach to the assessment.

## 21.2 Environmental impacts

21.2.1 Table 21.1 presents a summary of the key potential impacts associated with the proposed development that have been assessed in the Environmental Statement (ES). The significance of each potential impact is presented, along with the proposed mitigation measures considered at this stage, and the significance of the residual impact (i.e., the impact remaining following the implementation of mitigation measures).

21.2.2 Standard best practice procedures and impact reduction measures have been identified to avoid and/or minimise significant adverse impacts as far as practicable. Some of these mitigation measures are recommendations arising from the initial impact assessment process (secondary measures), whilst others have been considered in the current design of the proposed development (primary or embedded measures) or are required to meet existing legislative requirements and are considered standard practices to manage commonly occurring environmental effects (tertiary measures).

21.2.3 With the adoption of appropriate mitigation where and when required, it is considered that all significant adverse impacts can be avoided and/or minimised to acceptable levels. The residual impacts identified in this ES have been assessed to be at worst of minor/slight adverse significance following the application of best practice procedures and appropriate mitigation measures.

**Table 21.1. Summary of all potential impacts, mitigation measures and residual impacts associated with the proposed development**

Impact pathway	Impact significance		Mitigation measures	Residual impact
Major beneficial				
Moderate beneficial				
Minor beneficial				
Insignificant / Negligible / Neutral / Low				
Minor adverse / Slight adverse				
Moderate adverse / potentially significant				
Major adverse / Significant / Large adverse				
<b>Physical processes</b>				
	Exposure to change <sup>1</sup>	Significance		
<i>Construction phase</i>				
Increased suspended sediment concentration (SSC) and potential sedimentation over the extent of the disturbance plume as a result of the construction of the new piers (piling) and capital dredging works	Low	N/A	N/A	N/A
Increased SSC and potential sedimentation as a result of the deposit of capital dredge material at a licensed offshore disposal site	Low	N/A	N/A	N/A
Changes in seabed bathymetry and composition as a result of deposition of dredged/disposal material within the area of the respective plumes	Low	N/A	N/A	N/A

<sup>1</sup> As explained in more detail in Section 7.3 of the Physical Processes chapter (Chapter 7) of this ES, the methods adopted for the physical processes assessment are slightly different to those adopted for other environmental topics. This is because the proposed development has the potential to cause changes to hydrodynamic and sedimentary processes, which in turn can potentially impact other receptors, e.g. nature conservation features. These changes in physical processes are, therefore, assessed as a potential 'exposure to change'.

Impact pathway	Impact significance		Mitigation measures	Residual impact
Construction vessel activity – impacts on local hydrodynamics and sediment transport arising from ship wash and vessel propulsion	Low/negligible	N/A	N/A	N/A
<i>Operational phase</i>				
Local changes to hydrodynamic regime (flow speed and direction) as a result of the piers (piling) and capital dredging	Low	N/A	N/A	N/A
Local changes to the wave regime, as a result of the piers (piling) and capital dredging	Low	N/A	N/A	N/A
Associated local changes to the sediment transport pathways, as a result of localised changes to the driving hydrodynamic (and wave) forcing	Low	N/A	N/A	N/A
Potential impact on existing features, including marine infrastructure, outfalls and estuary banks and channels	Low/negligible	N/A	N/A	N/A
Increased SSC and potential sedimentation in the area of dispersal plume as a result of maintenance dredging	Low	N/A	N/A	N/A
Increased SSC and potential sedimentation as a result of deposition of maintenance dredge material at a licensed disposal site	Low	N/A	N/A	N/A
Changes in seabed bathymetry and composition as a result of deposition of dredged/disposed maintenance dredge material	Low	N/A	N/A	N/A



Impact pathway	Impact significance	Mitigation measures	Residual impact
<b>Water and sediment quality</b>			
<i>Construction phase</i>			
Changes to dissolved oxygen concentrations as a result of increased SSC during piling, capital dredging and disposal activities	Insignificant to minor adverse	N/A	Insignificant to minor adverse
Changes to chemical water quality as a result of potential sediment-bound contaminants being released during piling, capital dredging and disposal activities	Insignificant	N/A	Insignificant
Redistribution of sediment-bound contaminants during piling, capital dredging and disposal activities	Insignificant	N/A	Insignificant
<i>Operational phase</i>			
Changes to dissolved oxygen concentrations as a result of increased SSC during the maintenance dredging and disposal activities	Minor adverse	N/A	Minor adverse
Changes to chemical water quality as a result of potential contaminants in the seabed sediment being released during maintenance dredging and disposal activities	Insignificant	N/A	Insignificant
Redistribution of sediment-bound contaminants during maintenance dredging and disposal activities	Insignificant	N/A	Insignificant

Impact pathway	Impact significance	Mitigation measures	Residual impact
<b>Nature conservation and marine ecology</b>			
<i>Construction Phase</i>			
<i>Benthic habitats and species</i>			
Direct loss of intertidal habitat as a result of capital dredging and piles	Insignificant	N/A	Insignificant
Direct loss of subtidal habitat as a result of the piles	Insignificant	N/A	Insignificant
Changes to benthic habitats and species as result of the removal of seabed material during dredging	Insignificant to minor adverse	N/A	Insignificant to minor adverse
Changes to habitats and species as a result of sediment deposition during dredging and dredge disposal	Insignificant	Target disposal loads in the central/ deeper area of the disposal sites to reduce depth reductions	Insignificant
Indirect loss or change to seabed habitats and species as a result of changes to hydrodynamic and sedimentary processes during capital dredging and dredge disposal	Insignificant	N/A	Insignificant
Changes in water and sediment quality during capital dredging and dredge disposal	Insignificant	N/A	Insignificant
Underwater noise and vibration during piling, capital dredging and dredge disposal	Insignificant	N/A	Insignificant
Introduction and spread of non-native species	Insignificant to minor adverse	Include biosecurity control measures within the Construction	Insignificant to minor adverse

Impact pathway	Impact significance	Mitigation measures	Residual impact
		Environmental Management Plan (CEMP)	
<i>Fish and shellfish</i>			
Direct loss or changes to fish populations and habitat as a direct result of dredging and dredge disposal	Insignificant to minor adverse	N/A	Insignificant
Changes in water and sediment quality as a result of dredging and dredge disposal	Insignificant	N/A	Insignificant
Underwater noise disturbance and vibration during piling, capital dredging and dredge disposal	Minor to moderate (migratory fish during piling)	Apply soft start procedures during piling Use vibro piling where possible Seasonal piling restrictions Night time working restriction	Insignificant to minor adverse
	Insignificant to minor (other fish species during piling)	Apply soft start procedures during piling Use vibro piling where possible Seasonal piling restrictions Night time working restriction	Insignificant to minor adverse
	Insignificant to minor (dredge and dredge disposal)	N/A	Insignificant to minor adverse

Impact pathway	Impact significance	Mitigation measures	Residual impact
<i>Marine mammals</i>			
Underwater noise disturbance and vibration during piling, capital dredging and dredge disposal	Minor to moderate adverse (piling)	Apply soft start procedures during piling Use vibro piling where possible Marine Mammal Observer will follow Joint Nature Conservation Committee (JNCC) protocol to minimise the risk of injury to marine mammals during percussive piling	Minor adverse
	Insignificant (dredge and dredge disposal)	N/A	Insignificant
<i>Coastal waterbirds</i>			
Loss or change to coastal waterbird habitat	Insignificant	N/A	Insignificant
Noise and visual disturbance	Inner finger pier and approach jetty: Minor adverse (low sensitivity species)	Winter marine construction restriction for certain aspects of the inner pier and approach jetty works (1 October to 31 March)	Minor adverse
	Inner finger pier and approach jetty: Moderate to major adverse (high sensitivity species)		
	Outer finger pier: Minor adverse (low sensitivity species)		
	Outer finger pier:		

Impact pathway	Impact significance	Mitigation measures	Residual impact
	<p>Moderate adverse (high sensitivity species)</p> <p>Capital dredge: Negligible (all species).</p>	<p>Noise suppression system for piling on the outer finger pier</p> <p>Acoustic barrier/visual screen on approach jetty from 1 October to 31 March</p> <p>Acoustic barrier/screening on marine construction barges</p> <p>Apply soft start procedures during piling</p> <p>Cold weather construction restriction (all construction activity)</p>	
<b>Operational Phase</b>			
<i>Benthic habitats and species</i>			
Changes to benthic habitats and species as result of seabed removal during maintenance dredging	Insignificant to minor adverse	N/A	Insignificant to minor adverse
Direct changes to benthic habitats and species beneath marine infrastructure due to shading	Insignificant	N/A	Insignificant
Changes to intertidal habitats and species as a result of the movement of Ro-Ro vessels during operation	Insignificant	N/A	Insignificant
Non-native species transfer during vessel operations	Insignificant to minor adverse	N/A	Insignificant to minor adverse

Impact pathway	Impact significance	Mitigation measures	Residual impact
<i>Coastal waterbirds</i>			
Direct changes to foraging and roosting habitat as a result of the presence of infrastructure	Minor adverse	N/A	Minor adverse
Disturbance of waterbirds during operation	Minor adverse	Screening of the linkspan and approach jetty	Minor adverse
<b>Commercial and recreational navigation</b>			
<i>Construction Phase</i>			
Person overboard during dredge and construction works	Significant	Designated safety craft Constructor Risk Assessment Method Statements (RAMS)	Insignificant
Allision of dredger/construction vessel with Immingham Oil Terminal (IOT) infrastructure	Significant	Tidal restrictions Marking construction area (exclusion zone) Site specific dredge plan	Insignificant
Allision of commercial vessel with marine works	Significant	Guard (support) vessel Project specific adaptive procedures Marking construction area (exclusion zone)	Insignificant
Collision of two craft associated with marine works	Significant	Contractor RAMS Marking construction area (exclusion zone)	Insignificant
Collision/allision of commercial vessel entering construction area	Significant	Marking construction area (exclusion zone)	Insignificant

Impact pathway	Impact significance	Mitigation measures	Residual impact
		Project specific adaptive procedures Personnel management during tanker berthing Guard (support) vessel	
Collision of dredger or barge with vessel at 'F' anchorage when disposing of dredge material	Significant	Project specific adaptive procedures Closure of 'F' anchorage	Insignificant
Dredger grounding whilst engaged in operations	Significant	Project specific adaptive procedures	Insignificant
Hazardous chemical spill from construction vessels	Significant	Contractor RAMS Control of contractors through management	Insignificant
Construction vessel mooring failure	Significant	Guard (support) vessel	Insignificant
Component (equipment, material) dropped during construction	Significant	Incident Reporting - Dropped component Post Construction Hydrographic Survey	Insignificant
Construction vessel takes on water from excessive wash	Significant	Marking construction area (exclusion zone)	Construction vessel takes on water from excessive wash
Payload related incidents	Significant	Loading/Unloading Plan Contractor RAMS Harbour Master's consent of works	Insignificant

Impact pathway	Impact significance	Mitigation measures	Residual impact
<i>Construction and Operational Phase</i>			
Collision of construction vessel with Ro-Ro vessel	Significant	Contractor RAMS Port Liaison Officer Special Instructions issued to Ro-Ro not to berth unless area is clear of marine works craft	Insignificant
Ro-Ro vessel mooring failure in vicinity of marine construction works	Significant	Berth specific weather parameters	Insignificant
Component (equipment, material) dropped during construction preventing Ro-Ro operations	Significant	Incident Reporting - Dropped component Post Construction Hydrographic Survey	Insignificant
Construction vessel takes on water from excessive wash from Ro-Ro vessel	Significant	Additional measures to ensure separation of marine works from Ro-Ro vessels proceeding to or departing IERRT Special Instructions issued to Ro-Ro not to berth unless area is clear of marine works craft	Insignificant
Allision of Ro-Ro vessel with IERRT infrastructure	Significant	Additional training to Pilot Exemption Certificate (PEC) and Pilots on manoeuvring during	Insignificant



Impact pathway	Impact significance	Mitigation measures	Residual impact
		the operation- construction phase Berthing criteria specific to operation- construction	
Construction vessel mooring failure	Significant	Guard Support Vessel Barges cannot be moored in the vicinity of a berthing Ro-Ro	Insignificant
Ro-Ro vessel arriving/departing IERRT berth 2 with a tanker berthed on Eastern Jetty	Significant	Specific berthing criteria for each of the three berths Chartered safety area, berthing procedures Additional pilotage training/ familiarisation	Insignificant
<i>Operational Phase</i>			
Allision of Ro-Ro vessel arriving/departing IERRT with tanker moored at IOT finger pier	Significant	Project specific adaptive procedures Chartered safety area, berthing procedures Specific berthing criteria for each of the three berths	Insignificant
Allision of tanker manoeuvring on/off IOT finger pier with IERRT on flood tide	Significant	Project specific adaptive procedures	Insignificant
Allision of barge manoeuvring on/off IOT finger pier with IERRT of flood tide	Significant	Project specific adaptive procedures	Insignificant

Impact pathway	Impact significance	Mitigation measures	Residual impact
Allision of Ro-Ro vessel with IOT trunk way	Significant	Specific berthing criteria for each of the three berths Project specific adaptive procedures	Insignificant
Allision of Ro-Ro vessel with IERRT infrastructure	Significant	Additional Training Specific berthing criteria for each of the three berths	Insignificant
Collision of Ro-Ro vessel on passage to/from IERRT with another vessel	Insignificant	Risk assessed against relevant MSMS' (HES/IMM) ALARP with embedded controls	Insignificant
Ro-Ro vessel grounding whilst manoeuvring to IERRT berth 3	Significant	Specific berthing criteria for each of the three berths Marking safe water with AtoN Additional Training	Insignificant
Ro-Ro vessel mooring failure	Significant	Berth specific weather parameters	Insignificant
Allision of Ro-Ro vessel arriving/departing IERRT berth 2/3 with a tanker berthed on Eastern Jetty	Significant	Specific berthing criteria for each of the three berths Chartered safety area, berthing procedures Additional pilotage training/ familiarisation	Insignificant

Impact pathway	Impact significance	Mitigation measures	Residual impact
<b>Coastal protection, flood defence and drainage</b>			
<i>Construction phase</i>			
Human health (public and visitors): 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 will be included in the current Port of Immingham 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
Human health (Construction workers and operatives): 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, including evacuation routes, safe refuge, access, and egress. Site will be included in the current Port of Immingham flood response plan and will be registered with	Slight adverse

Impact pathway	Impact significance	Mitigation measures	Residual impact
		the Environment Agency Flood Warnings Direct Service. No work onsite during a flood warning period.	
Flood defences (on-site along the IERRT project site frontage): Changes in tidal regime e.g., wave heights, water levels, erosion/ deposition due to dredging/ construction activities.	Neutral	No mitigation measures are proposed beyond the ongoing inspection and maintenance programme undertaken by the Environment Agency	Neutral
Flood defences (off-site around wider Port of Immingham frontage): Changes in tidal regime e.g., wave heights, water levels, erosion/deposition due to dredging/ construction activities.	Neutral	No mitigation measures are proposed beyond the ongoing inspection and maintenance programme undertaken by the Environment Agency.	Neutral
Existing development (on-site and wider Port of Immingham): Floodplain inundation from tidal flooding, overland flow from fluvial/surface water sources.	Neutral	Flood resilience and resistant measures embedded in design. Overland flow paths maintained and temporary drainage to control surface water discharge.	Neutral

Impact pathway	Impact significance	Mitigation measures	Residual impact
Existing development (off-site (neighbouring sites)): Floodplain inundation from tidal flooding, impedance of overland flow routes, from fluvial/surface water sources.	Neutral	Overland flow paths maintained and temporary drainage to control surface water discharge.	Neutral
Surface waterbodies (Habrough Marsh Drain): Changes in flow regime/water level due to surface water discharge.	Slight adverse	Temporary drainage facilities (swales etc) provided during the construction phase to control discharge of surface water run-off.	Neutral
Drainage infrastructure: Increased rate and volume of surface water runoff due to impermeable surfacing/ compaction.	Slight adverse	Temporary drainage facilities (swales etc) provided during the construction phase to control discharge of surface water run-off.	Neutral
<b>Operational phase</b>			
Human health (public and visitors to the site): Exposure to floodwater via flooding from predominantly tidal sources e.g., overtopping 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
Human health (site operatives and future workforce): Exposure to floodwater via flooding from predominantly tidal sources e.g., overtopping or breach of defences.	Moderate adverse	Flood Response Plan. Site induction, including evacuation routes, safe refuge,	Slight adverse

Impact pathway	Impact significance	Mitigation measures	Residual impact
		access, and egress. Site registered with the Environment Agency Flood Warnings Direct Service. No work onsite during a flood warning period.	
Flood defences (On-site around the site frontage): Changes in tidal regime e.g., wave heights, water levels, erosion/deposition due to dredging/ construction activities.	Slight adverse	No mitigation measures are required beyond the continuation of the current inspection and maintenance regime undertaken by the Environment Agency.	Slight adverse
Flood defences (off-site around wider Port of Immingham frontage): Changes in tidal regime e.g., wave heights, water levels, erosion/deposition due to dredging and offshore development.	Slight adverse	No mitigation measures are required beyond the continuation of the current inspection and maintenance regime undertaken by the Environment Agency.	Slight adverse
Existing development (on-site and wider Port of Immingham): Floodplain inundation from tidal flooding, overland flow from fluvial/surface water sources.	Slight adverse	No additional mitigation is required beyond the flood resilience and	Slight adverse

Impact pathway	Impact significance	Mitigation measures	Residual impact
		resistant measures embedded in design. Drainage infrastructure designed in line with the Drainage Strategy includes attenuation storage to manage climate change over the operation of the development.	
Existing development (off-site (neighbouring sites)): Floodplain inundation from tidal flooding, new overland flow routes, flooding from fluvial/surface water sources.	Neutral	Drainage infrastructure designed in line with the Drainage Strategy includes attenuation storage to manage climate change over the operation of the development.	Neutral
Surface waterbodies (Habrough Marsh Drain): Changes in flow regime/water level due to increases in surface water discharge.	Moderate adverse	Drainage infrastructure designed in line with the Drainage Strategy includes attenuation storage to manage climate change over the operation of the development and provides betterment	Slight beneficial

Impact pathway	Impact significance	Mitigation measures	Residual impact
		over the current baseline drainage.	
Drainage infrastructure: Increased rate and volume of surface water runoff from impermeable surfaces.	Moderate adverse	Drainage infrastructure designed in line with the Drainage Strategy including attenuation storage to manage climate change over the operation of the development	Moderate beneficial
<b>Ground conditions, including land quality</b>			
<i>Construction phase</i>			
Human Health-Contamination (onsite workers, site visitors): Direct contact with contamination (e.g., in soils)	Moderate adverse (significant)	Construction works would be carried out in accordance with the CEMP and environmental good practice on site.	Slight adverse (not significant)
Human Health-Contamination (off-site workers, site visitors): Inhalation of dust and/or soil derived vapours	Moderate adverse (significant)	Construction works would be carried out in accordance with the CEMP and environmental good practice on site.	Slight adverse (not significant)
Human Health -Ground Gas (onsite workers, site visitors): Migration and accumulation of ground gas	Moderate/ large adverse (significant)	Entry into excavations or any other enclosed space on a construction site will comply with confined space legislation and	Slight adverse (not significant)



Impact pathway	Impact significance	Mitigation measures	Residual impact
		be assessed prior to entry.	
Property (temporary buildings erected on site during construction): Migration and accumulation of ground gas (onsite workers, site visitors)	Moderate/ large adverse (significant)	Ground gas protection measures will be implemented into design and build of temporary structures.	Neutral/ slight adverse (not significant)
Geology: Lateral and vertical migration (including as a result of piling) of contamination through leachate, groundwater or surface run off	Neutral/ slight adverse (not significant)	Construction works would be carried out in accordance with the CEMP. Location specific Piling Risk Assessments and environmental good practice on site.	Neutral (not significant)
Soils: Lateral and vertical migration (including as a result of piling) of contamination through leachate, groundwater or surface run off	Neutral/ slight adverse (not significant)	A Ground Investigation (GI) has been undertaken in May 2022 to confirm baseline conditions. A confirmatory GI – to inform the detailed design - is being undertaken and will be completed soon after submission of the DCO application. The findings of the confirmatory GI will be assessed and	Neutral (not significant)

Impact pathway	Impact significance	Mitigation measures	Residual impact
		<p>detailed in an interpretative report. In the event that any geo-environmental risks are identified following receipt of the final factual report, which will include the results of the final round of monitoring, as well as the conclusion of the assessment then in accordance with guidance in LC:RM (Environment Agency, 2021), appropriate mitigation measures as necessary will be incorporated in the final remediation strategy for the project, the outline for which is provided as Appendix 12.4.</p> <p>All earthworks operations will be undertaken in accordance with</p>	

Impact pathway	Impact significance	Mitigation measures	Residual impact
		BS6031:2009 'Code of Practice for Earthworks', BS16907-1 to 7:2018 Earthworks and Highways England (HE) guidelines including Design Manual for Roads and Bridges (DMRB) Series 600 'Earthworks'. Development will actively work towards achieving an earthworks balance.	
Groundwater (Bedrock Contamination): Lateral and vertical migration (including as a result of piling) of contamination through leachate, groundwater or surface run off	Moderate/ large adverse (significant)	A GI has been undertaken in May 2022 to confirm baseline conditions and a risk assessment has been undertaken based on the GI data. A confirmatory GI – to inform the detailed design – is being undertaken and will be completed soon after submission of the Development	Neutral/ slight adverse (not significant)

Impact pathway	Impact significance	Mitigation measures	Residual impact
		<p>Consent Order (DCO) application. The findings of the confirmatory GI will be assessed and detailed in an interpretative report. In the event that any geo-environmental risks are identified following receipt of the final factual report, which will include the results of the final round of monitoring, as well as the conclusion of the assessment then in accordance with respective guidance, appropriate mitigation measures as necessary will be incorporated in the final remediation strategy for the project, the outline for which is provided as Appendix 12.4.</p>	

Impact pathway	Impact significance	Mitigation measures	Residual impact
		<p>Construction works would be carried out in accordance with the CEMP.</p> <p>Piling works would be planned in accordance with best practice guidance. Piling operations would be subject to foundation works risk assessment and any potential to cause pollution to the aquifer would be covered by measures to be detailed in piling method statements.</p>	
<p>Groundwater (Superficial Contamination): Lateral and vertical migration (including as a result of piling) of contamination through leachate, groundwater or surface run off</p>	<p>Slight adverse (not significant)</p>	<p>A GI has been undertaken in May 2022 to confirm baseline conditions. A confirmatory GI – to inform the detailed design – is being undertaken and will be completed soon after submission of the DCO application. The findings of the</p>	<p>Neutral/ slight adverse (not significant)</p>

Impact pathway	Impact significance	Mitigation measures	Residual impact
		<p>confirmatory GI will be assessed and detailed in an interpretative report.</p> <p>Piling works will be assessed in accordance with best practice guidance. Piling operations would be subject to foundation works risk assessment and any potential to cause pollution to the aquifer would be covered by measures to be detailed in piling method statements.</p> <p>Construction works would be carried out in accordance with the CEMP.</p>	
<p>Surface Water-Contamination (Humber Estuary): Lateral and vertical migration of contamination through leachate, groundwater or surface run off</p>	<p>Moderate adverse (significant)</p>	<p>Specific guidance relating to the control of water pollution from construction sites is discussed within Chapter 8</p>	<p>Neutral/ slight adverse (not significant)</p>

Impact pathway	Impact significance	Mitigation measures	Residual impact
Surface Water-Contamination (North Beck Drain Catchment and associated Habrough Marsh Drain): Lateral and vertical migration (including as a result of piling) of contamination through leachate, groundwater or surface run off	Moderate/ large adverse (significant)	Water and Sediment Quality of this ES.  Specific guidance relating to the control of water pollution from construction sites is discussed within Chapter 8 Water and Sediment Quality of this ES.	Neutral/ slight adverse (not significant)
<i>Operational phase</i>			
Human Health-Contamination (future on-site workers): Direct contact with contamination and inhalation of dust and/ or soil derived vapours	Slight adverse (not significant)	Maintenance workers will be required to adopt safe working practices under relevant health and safety legislation. Therefore, the significant effects are unlikely to arise.	Neutral/ slight adverse (not significant)
Human Health-Contamination (future site visitors, off-site workers): Direct contact with contamination and inhalation of dust and/ or soil derived vapours	Slight adverse (not significant)	No mitigation measures are required as operation of the development is not likely to cause significant effect on offsite receptors with regards to geology and soils.	Neutral/ slight adverse (not significant)

Impact pathway	Impact significance	Mitigation measures	Residual impact
Property (building and services): Direct contact with contamination in soil, leachate and groundwater	Moderate/ large adverse (significant)	Buildings and services risks will be mitigated by using pipe material appropriate for any aggressive ground conditions.	Neutral/ slight adverse (not significant)
Property (building and services): Migration of ground gas	Moderate/ large adverse (significant)	Ground gas protection measures appropriate to the site conditions will be implemented into design and build of structures.	Neutral/ slight adverse (not significant)
Soils (Contamination): Lateral and vertical migration of contamination through leachate, groundwater or surface run-off	Neutral/ slight adverse (not significant)	The IERRT project will be operated in accordance with existing environmental legislation, regulations and good practice.	Neutral/ slight adverse (not significant)
Groundwater (Superficial Contamination): Lateral and vertical migration of contamination through groundwater and surface run-off	Neutral/ slight adverse (not significant)	The IERRT project will be operated in accordance with existing environmental legislation, regulations and good practice.	Neutral/ slight adverse (not significant)



Impact pathway	Impact significance	Mitigation measures	Residual impact
Groundwater (Bedrock Contamination): Lateral and vertical migration of contamination through groundwater and surface run-off	Slight adverse (not significant)	The IERRT project will be operated in accordance with existing environmental legislation, regulations and good practice.	Slight adverse (not significant)
Controlled Waters (Contamination): Lateral and vertical migration of contamination through groundwater and surface run-off	Slight adverse (not significant)	The IERRT project will have a managed surface drainage system and operated in accordance with existing environmental legislation, regulations and good practice.	Slight adverse (not significant)
<b>Air quality</b>			
<i>Construction phase</i>			
Human health and amenity sensitive receptors: Onsite emissions sources (marine vessels, site plant and construction dust)	Potentially significant due to effect of unmitigated dust impacts	Standard practice dust mitigation as recommended by the Institute of Air Quality Management (IAQM)	Insignificant
Human health and amenity sensitive receptors: Offsite emissions sources (road traffic movement emissions on local roads and SRN)	Insignificant	Standard trip and emissions reduction measures typically set out within a Construction Travel Plan and/or CEMP	Negligible

Impact pathway	Impact significance	Mitigation measures	Residual impact
Nature conservation receptors: Onsite emissions sources (marine vessels, site plant and construction dust)	Potentially significant due to effect of unmitigated dust impacts	Standard practice dust mitigation as recommended by the IAQM	Negligible
Nature conservation receptors: Offsite emissions sources (road traffic movement emissions on local roads and Strategic Road Network (SRN))	Insignificant	Standard trip and emissions reduction measures typically set out within a Construction Travel Plan and/or CEMP	Negligible
<i>Operational phase</i>			
Human health and amenity sensitive receptors: Onsite emissions sources (marine vessels, land-tugs and Heavy Goods Vehicle (HGV) movement emissions)	Insignificant	Marine Vessels: <ul style="list-style-type: none"> <li>- Compliance with appropriate emission standards</li> <li>- Sulphur dioxide (SO<sub>2</sub>) scrubbers on main engine emissions</li> </ul> Land-tugs: <ul style="list-style-type: none"> <li>- Prohibit the unnecessary idling of engines</li> <li>- Selective Catalytic Reduction</li> <li>- Onsite speed limits</li> </ul> HGVs: <ul style="list-style-type: none"> <li>- Operational travel plan</li> <li>- Onsite speed limits</li> </ul>	Insignificant

Impact pathway	Impact significance	Mitigation measures	Residual impact
		<ul style="list-style-type: none"> <li>- Prohibit the unnecessary idling of engines</li> </ul>	
<p>Human health and amenity sensitive receptors: Offsite emissions sources (road traffic movement emissions on local roads and SRN)</p>	<p>Insignificant</p>	<ul style="list-style-type: none"> <li>- Indirect evolution of the vehicle fleet with introduction of modernised vehicles and better emissions technology</li> </ul>	<p>Insignificant</p>
<p>Nature conservation receptors: Onsite emissions sources (marine vessels, land-tugs and HGV movement emissions)</p>	<p>Insignificant</p>	<p>Marine Vessels:</p> <ul style="list-style-type: none"> <li>- Compliance with appropriate emission standards</li> <li>- SO<sub>2</sub> scrubbers on main engine emissions</li> </ul> <p>Land-tugs:</p> <ul style="list-style-type: none"> <li>- Prohibit the unnecessary idling of engines</li> <li>- Selective Catalytic Reduction</li> <li>- Onsite speed limits</li> </ul> <p>HGVs:</p> <ul style="list-style-type: none"> <li>- Operational travel plan</li> <li>- Onsite speed limits</li> </ul>	<p>Insignificant</p>

Impact pathway	Impact significance	Mitigation measures	Residual impact
		Prohibit the unnecessary idling of engines	
Nature conservation receptors: Offsite emissions sources (road traffic movement emissions on local roads and SRN)	Insignificant	Indirect evolution of the vehicle fleet with introduction of modernised vehicles and better emissions technology	Insignificant
<b>Airborne noise and vibration</b>			
<i>Construction phase</i>			
Residential Noise Sensitive Receptors (NSRs) on Queens Road and Kings Road: Construction noise	Negligible adverse (not significant)	Standard construction mitigation as set out in the CEMP. Section 61 application for construction works outside the standard construction hours.	Negligible adverse (not significant)
Residential NSRs on Queens Road and Kings Road: Construction traffic	Minor adverse (not significant)	Construction traffic management plan included in the CEMP.	Minor adverse (not significant)
The People Asset Management Ltd (PAM) building, (adjacent to the IERRT project site): Construction noise	Minor adverse (not significant)	Embedded mitigation includes the screening and crusher plant being located a minimum of 250 m away from NSRs and temporary acoustic screening	Minor adverse (not significant)

Impact pathway	Impact significance	Mitigation measures	Residual impact
		<p>around construction plant or PAM building during construction works in the vicinity of the PAM building. These measures have been included within the assessment in Section 14.8 of Chapter 14.</p> <p>In addition, measures will include standard construction mitigation as set out in Section 14.9 of Chapter 14 (and to be included in the CEMP), and also include the ability for the external windows and doors facing the construction works to remain closed and alternative means of cooling/ ventilation used.</p>	

Impact pathway	Impact significance	Mitigation measures	Residual impact
<p>PK Construction Office and Nippon Gas Office buildings (on-site NSRs): Construction noise</p>	<p>Up to moderate adverse (significant) external to the office building</p>	<p>Embedded mitigation includes the screening and crusher plant being located a minimum of 250 m away from NSRs. This measure has been included within the assessment in Section 14.8 of Chapter 14.</p> <p>In addition, measures will include standard construction mitigation as set out in Section 14.9 of Chapter 14 (and to be included in the CEMP), and also include the ability for the external windows and doors facing the construction works to remain closed and alternative means of cooling/ ventilation used.</p>	<p>Minor adverse or less (not significant).</p>

Impact pathway	Impact significance	Mitigation measures	Residual impact
IOT Jetty and PAM Building: Construction vibration.	Minor adverse or less (not significant)	Pre-construction condition surveys on nearby buildings and structures to be undertaken. Liaison protocol with local businesses/ occupiers to be established. Verification of the construction vibration predictions once the piling methods and piling rig are known to confirm that there are no significant effects expected. Monitoring to verify the thresholds are not exceeded.	Minor adverse or less (not significant)
<i>Operational phase</i>			
Residential NSRs on Queens Road: On-site activities	Minor adverse (not significant)	Standard best practice for operational activities.	Minor adverse or less (not significant)
Residential NSRs on Kings Road: On-site activities	Minor / negligible / no change (not significant)	Standard best practice for operational activities.	Minor/ negligible adverse (not significant)
PAM Building: On-site activities	Up to major adverse (significant)	Standard best practice for operational activities, together with keeping	Minor adverse or less (not significant)

Impact pathway	Impact significance	Mitigation measures	Residual impact
		all PAM building external windows and doors facing the IERRT closed.	
PK Construction Office building: On-site activities	Minor adverse (not significant)	Standard best practice for operational activities.	Minor adverse or less (not significant)
Nippon Gas Office building: On-site activities	Moderate adverse (significant)	Standard best practice for operational activities, together with keeping all Nippon Gas Office external windows and doors facing the IERRT closed.	Minor adverse or less (not significant)
Residential NSRs on Queens Road: Road traffic noise	Up to moderate/ major adverse (significant)	Offer noise insulation to affected residential NSRs	Minor adverse or less (not significant).
<b>Cultural heritage and marine archaeology</b>			
<i>Construction phase</i>			
Direct impacts on known and potential marine heritage receptors from construction activities	Major adverse	Offsetting by means of geoarchaeological assessment of geotechnical surveys.	Major positive (as long as data are retained, analysed, and reported on by a qualified geo-archaeologist)
Direct impacts on known and potential marine heritage receptors from dredging	Major adverse	Avoidance via implementation of Archaeological Exclusion Zones	Negligible



Impact pathway	Impact significance	Mitigation measures	Residual impact
		(AEZs) were deemed appropriate; WSI (Written Scheme of Investigation) and any supporting activity-specific Method Statements) and reduction via a Protocols for Archaeological Discoveries (PAD).	
Indirect impacts to marine heritage receptors due to altered sediment or hydrological processes	Negligible	No mitigation is necessary as a result of negligible adverse significance of impact.	Negligible
<i>Operational phase</i>			
Direct impacts on known and potential marine heritage receptors from maintenance dredging	Negligible	No mitigation is necessary as a result of negligible adverse significance of impact.	Negligible
Indirect effects such as changes in local scouring and sedimentation patterns	Negligible	No mitigation is necessary as a result of negligible adverse significance of impact.	Negligible
Impacts to setting of cultural heritage receptors.	Negligible	No mitigation is necessary as a result of negligible adverse	Negligible

Impact pathway	Impact significance	Mitigation measures	Residual impact
		significance of impact.	
<b>Socio-economic</b>			
<i>Construction phase</i>			
Employment	Moderate beneficial (significant)	N/A	Moderate beneficial (significant)
Gross Value Added (GVA)	Moderate beneficial (significant)	N/A	Moderate beneficial (significant)
Impact on local services and infrastructure	Negligible (not significant)	N/A	Negligible (non-significant)
Temporary accommodation	Negligible (not significant)	N/A	Negligible (non-significant)
Effects on existing businesses and activities	Negligible (not significant)	N/A	Negligible (non-significant)
<i>Operational Phase</i>			
Employment	Moderate beneficial (significant)	N/A	Moderate beneficial (significant)
GVA	Minor beneficial (not significant)	N/A	Minor beneficial (not significant)
Impact on local services and infrastructure	Negligible (not significant)	N/A	Negligible (not significant)
Effects on existing businesses and activities	Negligible (not significant)	N/A	Negligible (not significant)
<b>Traffic and transport</b>			
<i>Construction phase</i>			
Severance during construction – pedestrians	Insignificant	N/A	Insignificant

Impact pathway	Impact significance	Mitigation measures	Residual impact
Driver delay during construction – road users	Insignificant	N/A	Insignificant
Pedestrian delay and amenity during construction – pedestrians	Insignificant	N/A	Insignificant
Accidents and safety during construction – road users	Insignificant	N/A	Insignificant
Hazardous or abnormal loads during construction – road users and pedestrians	Insignificant	N/A	Insignificant
Fear and intimidation during construction – pedestrians	Insignificant	N/A	Insignificant
<i>Operational phase</i>			
Severance during operation – pedestrians	Insignificant / minor	N/A	Insignificant/ minor
Driver delay during operation – road users	Insignificant / minor	N/A	Insignificant/ minor
Pedestrian delay and amenity during operation – pedestrians	Insignificant / minor	N/A	Insignificant/ minor
Accidents and safety during operation – road users	Insignificant	N/A	Insignificant
Hazardous or abnormal loads during operation – road users and pedestrians	Insignificant	N/A	Insignificant
Fear and intimidation during operation – pedestrians	Insignificant / minor	N/A	Insignificant/ minor

Impact pathway	Impact significance	Mitigation measures	Residual impact
<b>Land use planning</b>			
Major accidents at major hazard sites, pipelines, and explosives sites in the vicinity of proposed development	Not significant	Maximum number of members of the public who may be present in the waiting area of the Terminal will not exceed 100 at any one time	Not significant
<b>Climate change</b>			
<i>Construction phase</i>			
Greenhouse gas emissions: Demolition	Low	Not applicable	Minor adverse (not significant)
Greenhouse gas emissions: Land clearance	Low	Not applicable	Minor adverse (not significant)
Greenhouse gas emissions: Enabling works	Low	Not applicable	Minor adverse (not significant)
Greenhouse gas emissions: Products	Low	Not applicable	Minor adverse (not significant)
Greenhouse gas emissions: Transport of products	Low	Not applicable	Minor adverse (not significant)
Greenhouse gas emissions: Fuel use/energy consumption	Low	Not applicable	Minor adverse (not significant)
Greenhouse gas emissions: Water consumption and wastewater treatment	Low	Not applicable	Minor adverse (not significant)
Greenhouse gas emissions: Transportation of workers	Low	Not applicable	Minor adverse (not significant)
Greenhouse gas emissions: Freight and vessel transport	Low	Not applicable	Minor adverse (not significant)
Greenhouse gas emissions: Waste	Low	Not applicable	Minor adverse (not significant)

Impact pathway	Impact significance	Mitigation measures	Residual impact
Climate change resilience	Not significant	Climate adaption measures which are integrated into design	Not significant
<i>Operational Phase</i>			
Greenhouse gas emissions: Fuel use/ energy consumption	Low	Not applicable	Minor adverse (not significant)
Greenhouse gas emissions: Water consumption and wastewater treatment	Low	Not applicable	Minor adverse (not significant)
Greenhouse gas emissions: Transportation of workers	Low	Not applicable	Minor adverse (not significant)
Greenhouse gas emissions: Freight and vessel transport	Low	Not applicable	Minor adverse (not significant)
Greenhouse gas emissions: Waste – emissions related to waste production during the operational phase	Low	Not applicable	Minor adverse (not significant)
Climate change resilience	Not significant	Climate adaption measures which are integrated into design	Not significant

## 21.3 Abbreviations/Acronyms

<b>Acronym</b>	<b>Definition</b>
AEZs	Archaeological Exclusion Zones
CEMP	Construction Environmental Management Plan
DCO	Development Consent Order
DMRB	Design Manual for Roads and Bridges
EIA	Environment Impact Assessment
ES	Environmental Statement
GI	Ground Investigation
GVA	Gross Value Added
HE	Highways England
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
IERRT	Immingham Eastern Ro-Ro Terminal
IOT	Immingham Oil Terminal
JNCC	Joint Nature Conservation Committee
N/A	Not Applicable
NSRs	Noise Sensitive Receptors
PAD	Protocols for Archaeological Discoveries
PAM	The People Asset Management Ltd
PEC	Pilot Exemption Certificate
RAMS	Risk Assessment Method Statement
RO-RO	Roll-on/roll-off
SO <sub>2</sub>	Sulphur dioxide
SRN	Strategic Road Network
SSC	Suspended Sediment Concentration
WSI	Written Scheme of Investigation

Cardinal points/directions are used unless otherwise stated.

SI units are used unless otherwise stated

## Contact Us

ABPmer

Quayside Suite,  
Medina Chambers  
Town Quay, Southampton  
SO14 2AQ

T +44 (0) 23 8071 1840

F +44 (0) 23 8071 1841

E [enquiries@abpmer.co.uk](mailto:enquiries@abpmer.co.uk)

