Immingham Green Energy Terminal

9.2 Applicant's Responses to Relevant Representations

Infrastructure Planning (Examination Procedure) Rules 2010

Volume 9

March 2024

Planning Inspectorate Scheme Ref: TR030008

Document Reference: TR030008/EXAM/9.2

Table of contents

1 Introduction

Overview

1.1 This document has been prepared to accompany an application made to the Secretary of State for Transport (the Application") under section 37 of the Planning Act 2008 ("PA 2008") for a development consent order ("DCO") to authorise the construction and operation of the proposed Immingham Green Energy Terminal ("the Project").

1.2 The Application is submitted by Associated British Ports ("the Applicant"). The Applicant was established in 1981 following the privatisation of the British Transport Docks Board. The **Funding Statement [APP-010]** provides further information.

1.3 The Project as proposed by Applicant falls within the definition of a Nationally Significant Infrastructure Project ("NSIP") as set out in Sections 14(1)(j), 24(2) and 24(3)(c) of the PA 2008.

The Project

1.4 The Applicant is seeking to construct, operate and maintain the Immingham Green Energy Terminal, comprising a new multi-user liquid bulk green energy terminal located on the eastern side of the Port of Immingham (the "Port").

1.5 The Project includes the construction and operation of a green hydrogen production facility, which would be delivered and operated by Air Products (BR) Limited ("Air Products"). Air Products will be the first customer of the new terminal, whereby green ammonia will be imported via the jetty and converted on-site into green hydrogen, making a positive contribution to the UK's net zero agenda by helping to decarbonise the United Kingdom's (UK) industrial activities and in particular the heavy transport sector.

1.6 A detailed description of the Project is included in **Environmental Statement** ("ES") **Chapter 2: The Project [APP-044]**.

Purpose and Structure of this Document

1.7 The first section of this document provides the Applicant's responses to the Relevant Representations. These are categorised by Interested Party and ordered ascendingly in relation to designated "RR" number. The second section contains appendices to these responsesA fourth section annexes the "A180 / A1173 – Junctions 10 Report" is affixed to the end of the document.

1.8 The Applicant welcomes the representations from Captain Andrew Firman, Harbour Master, Humber **[RR-003]**, Corporation of Trinity House of Deptford Strond **[RR-006]**, Hull City Council **[RR-013]**, and the Maritime and Coastguard Agency **[RR-017]** but has opted not to provide a specific response to them.

1.9 The Applicant likewise welcomes the representation from North Lincolnshire Council **[RR-023]**. Although a specific response is not provided in this case, the Interested Party's confirmation that it has no objections to the Project is gratefully acknowledged.

2 Applicant's Responses to Relevant Representations

RR-001 – Anglian Water Services

The Applicant welcomes the engagement with Anglian Water Services ("Anglian Water") to date on the Project.

Table 18-1 of **Environmental Statement ("ES") Chapter 18: Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage [APP-060]** submitted as part of the DCO Application explains how the Environmental Impact Assessment has addressed the response to the Scoping Report and further consultation responses by Anglian Water. Following the submission of the Application, there has been significant and productive engagement between the Applicant, Air Products and Anglian Water. This response to Anglian Water provides an update on that engagement.

Water supply

The main water demand for the Project is non-potable water for the hydrogen production facility for cooling purposes. Air Products has now received a commercial offer from Anglian Water to commit to supplying 3,456m^3/day of non-potable water for the Project.

This offer will meet the entire needs of the Project; it will satisfy normal demand and allow some flexibility to meet the needs for periods of higher demand. Whilst previous requests have been submitted for higher volumes of non-potable water, further design work has been undertaken on the recirculation of cooling water and other measures to reduce the water needs of the facility.

Reference is made by Anglian Water to the potential re-use of final effluent from the Pyewipe Water Recycling Centre ("WRC") at Grimsby. Through discussions with Anglian Water, this option was discounted for this Project for a number of reasons. First, it could not be delivered to suit the schedule for the Project. This is partly because it is not proven technology nor approved by the Environment Agency to date. Second, the required infrastructure is not cost effective for the volume of water demand required for the Project (a larger volume of water demand is required).

The Applicant and Air Products also note and welcomes Anglian Water's inclusion within its Water Resources Management Plan ("WRMP")[1] for the AMP8 (2025–2030) period of a significant non-potable water supply to serve projects on the South Humber. The Applicant and Air Products confirm that private water supplies known to those parties in the vicinity of the Project, including the borehole referred to, do not meet the needs of this Project.

Anglian Water has requested an updated Water Resources Assessment (for the purposes of its water resource planning) based on the information provided within **ES Chapter 18 [APP-060]**. AECOM has initiated a Water Resources Assessment for the Project. The assessment considers the water resources implications on the Project brought on by the need to supply water for both process and cooling water demands. Its outline structure is as follows: i) a review of Strategic Resource Options for the East Region, ii) consideration of likely scheme costs (as proposed in WRMP) and additional costs of transfers, and iii) consider benefits/costs of Strategic Resource Options with local sources available at the Project. A draft will be issued internally in March, with the aim of being shared with Anglian Water by the end of March.

The Applicant and Air Products confirm that the information contained in **ES Chapter 18** (particularly **Paragraphs 18.7.2 and 18.7.6 to 18.7.9**) remains valid and up to date. It is expected that Phase 1 of the hydrogen production facility will be served through the existing infrastructure in Laporte Road.

The Applicant and Air Products do not consider that a pre-commencement Requirement is necessary or appropriate in light of the commitment from Anglian Water to supply non-potable water to the Project. The 'water management plan' referred to in the **Outline Construction Environmental Management Plan [APP-222]** addresses water management during construction.

It is noted that Anglian Water has suggested that the **ES** considers the National Policy Statement for Water Resources Infrastructure designated on 18 September 2023.[2] However, the Applicant considers that it would only be in circumstances where the supply, treatment and/or transfer of water supply for the Project required separate planning consent and authorisations that the aforementioned National Policy Statement would need to be taken account of as necessary within any overall planning assessment of those separate proposals.

[1] Anglian Water (2023). Our Water Resources Management Plan 2024. [Online] (accessed February 2024).
[2] Department for Environment, Food and Rural Affairs (2023). National Policy Statement for Water Resources Infrastructure.

Water recycling

Following discussions with Anglian Water and further detailed design work following submission of the DCO Application, it has been agreed that the water treatment equipment included within Work No. 7 will treat a volume of trade effluent from the hydrogen production facility before it passes through the adjacent Immingham WRC. Anglian Water has also agreed that there is existing capacity for treatment of trade effluent at Immingham WRC. Accordingly, the parties are in agreement that the trade effluent can be addressed through an appropriate combination of on-site treatment and through treatment at Immingham WRC.

Flooding and surface water

The Applicant and Air Products notes Anglian Water's comments regarding the planned update to the Environment Agency's flood models in 2024 which will include revised climate change allowances. The Applicant and Air Products do not anticipate that the public sewer network will be used to manage additional surface water flows.

Existing AWS assets

The Applicant and Air Products agree that the protection of existing assets can be secured through Protective Provisions. Draft Protective Provisions for the benefit of Anglian Water were included in **Part 4** of **Schedule 14** of the **draft DCO [PDA-004]**. The Applicant and Air Products will continue to engage with Anglian Water with respect to those Protective Provisions.

RR-002 – Cadent Gas

The Applicant welcomes the engagement with Cadent Gas Limited ("Cadent") to date on the Project.

The Applicant notes and understands that Cadent's duties require it to be able to operate its network effectively and, as part of that, it must seek appropriate protection for and access to its retained apparatus within the Order Limits as described below.

The Applicant therefore acknowledge that appropriate protective provisions for the benefit of Cadent are required. The **draft DCO [PDA-004]** includes draft protective provisions in **Schedule 14, Part 7**. The Applicant and Air Products are in discussions with Cadent's representative in this regard with the intention that an agreed set of protective provisions can be submitted during the DCO Examination process.

Following submission of the DCO Application, there has been further engagement between the Applicant, Air Products and Cadent regarding the retention and protection of the existing Cadent infrastructure, including the existing Cadent high pressure gas pipeline that crosses the West Site. As a result of that engagement, the likely detailed design of the hydrogen production facility on the West Site (which is not for approval at this stage) has been adjusted to ensure that activities that would typically be permitted in proximity to high pressure pipelines are no longer proposed. This will require minor changes to the DCO Application as indicated within the Applicant's response to the Rule 6 letter and at the Preliminary Meeting. There has also been engagement in respect of the medium pressure pipeline on Queens Road that is within proximity of the proposed Horizontal Direction Drilling associated with Work No. 6 and it has been confirmed by Cadent that no diversion of the pipework is required.

As a result of the above engagement, it is considered that there is no requirement for any Cadent apparatus to be diverted and decommissioned as a result of the Project. The Applicant and Air Products will continue to engage with Cadent representatives to reach agreement on the protective provisions and ensure that any of Cadent's residual concerns are addressed.

RR-004 – Chrysaor Production (U.K.) Limited

The Applicant welcomes the positive representation from Chrysaor Production (UK) Limited and notes the last two paragraphs, which state:

"*One of the stated objectives of the IGET is to provide capacity to support the import and export of a range of liquid bulk energy products including CO2, to facilitate carbon capture and storage to assist the UK's transition towards net zero.*

Harbour supports, in principle, the development of the IGET and welcomes any contribution it would make towards the decarbonisation of UK industrial activities and the export of storage services."

The Applicant looks forward to continued engagement with Chrysaor Production (UK) Limited on the Project.

RR-005 – CLdN Ports Killingholme Limited

The Applicant welcomes CLdN Ports Killingholme Limited's ("CLdN") Relevant Representation and notes, for the record, that the Port of Killingholme is around 6.5km upstream of the IGET site.

No in-principle objection

The Applicant acknowledges that CLdN do not have an in-principle objection to the Project.

Exclusion zone and speed restrictions

The Applicant notes that CLdN wish to understand the full extent of the exclusion zone and speed restrictions. As noted by CLdN in their Relevant Representation, the restrictions will be "*an extension of those restrictions that currently apply for the Immingham Oil Terminal*".

As set out in **Section 2.2: Project Design Overview** in the **Environmental Statement ("ES") Appendix 12.A: Navigational Risk Assessment [**APP-191**]**, "*The berth has been aligned with IOT to the west and includes a planned 150m exclusion zone extending from the berth line*".

Table 12-6 in **ES Chapter 12: Marine Transport and Navigation [**APP-054**]** sets out a list of mitigation measures and with regard to the speed limits it states: "*A maximum speed limit of 5 knots will apply to vessels passing the Project berth when a vessel is mooring, moored or unmooring. (the same as at IOT). VTS will monitor for unsafe speeds, including during construction work. Sanctions may be used against repeat offenders, e.g., removal of PEC*".

The Applicant has proposed a speed restriction of 5 knots for vessels passing the IGET jetty head when a vessel is present, which is the same speed restriction required for the three Immingham Oil Terminal ("IOT") jetty heads. Equally, the identified mitigation includes a 150m exclusion zone to passing vessels from the berth line around the IGET jetty head when a vessel is present, which is the same exclusion zone as the three IOT berths. Therefore, IGET's jetty head will effectively resemble – at least for passing mariners – an additional jetty head extension to the IOT.

CLdN have concerns that the extension of the slow-steaming requirement from the IOT jetty heads to encompass the IGET jetty head would affect their transit times. The Applicant has therefore commissioned a report looking at AIS track data of vessels carrying out this

manoeuvre. A copy of this report (IGET Speed Restriction Analysis produced by Anatec, dated 5 February 2024) will be submitted to the Examination at Deadline 2**.** The slight extension of the slow-steaming requirement amounts to an additional two minutes of passage time, which the Applicant considers to be insignificant in the context of a journey which spans the North Sea.

The Applicant notes that there is an existing exclusion zone and sailing speed restriction of 5 knots for Immingham Oil Terminal which has three berths. The additional time spent slow steaming past the IGET single berth will be minimal, particularly when considering that a motor vessel's acceleration and deceleration responses will be much more gradual than those of land-based vehicles.

The Applicant understands CLdN's comments regarding its sustainability policies in relation to slow steaming in order to reduce fuel consumption and CO_2 emissions and participate in emissions trading schemes, but would not expect the two minute increase in passage time as a result of the speed restriction passing the IGET jetty head to require vessels to increase sailing speeds on other segments of the vessel's passage as suggested by CLdN in their Relevant Representation.

CLdN have indicated a concern to ensure that scheduled vessel sailings to and from Killingholme are not impacted by the construction and operation of the Project. The Applicant would like to make clear at the outset that vessels moving to and from the Port of Immingham are managed by the Port of Immingham Statutory Harbour Authority and Humber Statutory Harbour Authority (operating as Humber Estuary Services, "HES"). Both authorities have a legal duty to carefully manage all marine movements to facilitate the safe and efficient functioning of the harbour areas. The marine scheduling activities for the Port of Immingham, and all other port facility harbour authorities on the Humber have to dovetail with the overarching marine scheduling role of HES. The process of arranging and managing shipping movements seeks to ensure the equitable use of available port infrastructure and revolves around the efficient timetabling and scheduling of vessel movements.

Assessment of vessel calls

The Applicant notes CLdN's concerns regarding the assessment of the maximum estimated capacity of the jetty of 292 vessel calls per annum.

The Applicant confirms that the maximum theoretical capacity of the marine infrastructure of 292 vessels per annum has been assessed.

Paragraph 2.6.3 in **ES Chapter 2: The Project [**APP-044**]** sets out the justification for the total vessel numbers.

As noted in **ES Chapter 2: The Project [APP-044]**, "*The Terminal would operate 24 hours a day, seven days a week and 365 days a year*. *The Terminal would have capacity of approximately 11 million tonnes per annum and so be able to accommodate up to 292 vessel calls per year* ".

The **ES Appendix 12.A: Navigational Risk Assessment [APP-191]** states that "*Once operational, the Project would operate 24 hours a day, 365 days a year. The maximum capacity of the Terminal would be 292 vessel calls per year, [...]. This number has been assessed as the worst-case scenario*".

The Applicant can confirm that the maximum forecast throughput for the jetty of the full 292 vessel calls has been assessed in the **Environmental Statement**, and appropriate mitigation identified where necessary. The Environmental Impact Assessment ("EIA") has also assessed the impacts of import and export of ammonia and CO_2 across the jetty.

The Project has been designed, as far as possible, to avoid and minimise impacts and effects to marine transport and navigation through the process of design development, and by embedding mitigation measures into the design. Embedded mitigation also includes controls which are already active and applied by the Harbour Authority within the Port of Immingham or by HES in relation to marine operations in the study area. The mitigation measures are set out in **Table 12-6** in **ES Chapter 12: Marine Transport and Navigation [APP-054]**.

The Applicant acknowledges that the impacts of specific landside infrastructure to handle liquified CO_2 have not been assessed in this application and will therefore be the subject of further applications for separate consents through the relevant consenting and permitting process in the future and subject to further environmental assessment at that stage. However, the navigational impact of the new jetty working to a reasonable worst-case full capacity level has been assessed. Therefore, the **Navigational Risk Assessment** is considered to have adequately assessed the navigational risk of the new facility's construction and operation.

If another liquid bulk product were proposed to be handled across the jetty in the future, then this would similarly require some form of landside infrastructure and potentially further marine-side infrastructure changes triggering the need for further necessary consents and approvals, along with associated assessment of impacts through the EIA process as necessary. The acceptability of any such future proposal would be considered through the relevant statutory process against the relevant policy and material considerations applicable at that time.

Marine Safety Management Plan

The Applicant notes CLdN's query with regards to the Marine Safety Management Plan and the Port Marine Safety Management Plan and how they will be updated for future use.

The Applicant can confirm that in **ES Chapter 12: Marine Transport and Navigation [**APP-054**]** the application states in **Table 12-6** that "*The Marine Safety Management Plan and Port Marine Safety Management Plan will be updated to take into account the Project*".

The Port Marine Safety Plan, or Marine Safety Plan, is a strategic level document which lays out the Marine Safety Policy for the port. It fulfils requirement 1.8 of the Port Marine Safety Code (Department for Transport, 2016) for the Duty Holder to publish a marine safety plan and reporting performance against the objectives and targets set, and to report compliance with the Code to the Maritime Coastguard Agency ("MCA") every three years. It is not dynamic and does not include updates to the operational status of the port/harbour; this is the function of the Marine Safety Management System ("MSMS").

Both Humber and Immingham have functional/audited and Port Marine Safety Code ("PMSC") compliant MSMSs in place. The MSMS is made up by integrating the policy, process and risk assessment/management of the marine operations for each port or Statutory Harbour Authority ("SHA"). The MSMS is a dynamic by its nature and is in a constant state of review, update and improvement. The port's formal risk assessment ("FRA") for marine operations forms the backbone of the MSMS, and new or changing marine or navigational situations or operations are implemented as required to ensure that the MSMS is kept current and fit for purpose.

The Applicant has an appointed Designated Person ("DP"), as required by the PMSC. The DP provides assurance by way of internal and external auditing of the MSMS and reporting its functionality and compliance with the PMSC to the Applicant's Duty Holders. This in turn allows the Applicant to state PMSC compliance to the UK Government every three years as required.

The MSMS system will be updated to reflect the construction and operation of IGET. This will include updating the processes, policy and procedures, and will also include the integration of relevant sections of the **Navigational Risk Assessment** into the FRA for the SHA/port as required.

The system (MSMS) is not in the public domain as it is the Applicant's own operational system; however, the top-level strategic document, the Marine Safety Plan, is publicly accessible as a policy document on the Applicant's website.

Updating the MSMS is an ongoing, iterative process.

Statutory duties of the Statutory Harbour Authority ("SHA")

CLdN note that the Applicant is both the owner and operator of the Port of Immingham, and the SHA for the Port. To avoid any conflict between the two roles, which carry with them distinct statutory duties and obligations, the Applicant has created an independent Board, known as the Harbour Authority and Safety Board ("HASB"). The HASB meets separately from the Applicant's main Board and has its own remit, which in the context of the proposed IGET development is to:

- Enable the Applicant acting in its capacity as SHA to take decisions independently from the Applicant's consideration as a commercial port operator
- Provide a forum for the Board to consider detailed group health and safety matters
- Oversee the Applicant's compliance with its obligations as Duty Holder under the PMSC

The statutory harbour authorities are together required to ensure the safety of navigation and marine operations and in accordance with the requirements of the PMSC, have a duty to review and approve current and proposed controls and processes to ensure that the safety of navigation is maintained.

RR-007 – The Davey Family

The Applicant notes the respondent's objection to the Project and responds to the issues raised in this Relevant Representation below.

Both the Applicant and Air Products (as existing local businesses and employers) welcome continued local stakeholder engagement. The Davey family can contact the Project team by calling 08081753233 or emailing enquiries@imminghamget.co.uk should they wish to obtain further information about the Project.

1. Decision by the Secretary of State

The Secretary of State has not made a decision or entered into any agreement in relation to the Application. The Application will be subject to examination by the Examining Authority. The Examining Authority will then send a report on the examination to the Secretary of State, who will then make a decision as to whether to grant the development consent order for the Project.

The views of local residents expressed through the consultation undertaken by the Applicant prior to submission of the Development Consent Order ("DCO") Application (summarised in **Appendices P** and **Q** of the **Consultation Report [APP-040 and APP-041]**), in Relevant Representations and during examination will be taken into account by the Secretary of State. They were also taken into account by the Applicant in the finalisation of the application.

2. The impact of the Project on traffic in the area

The highway network in the vicinity of the site is, as has established through numerous recent reviews, operating well within capacity. The traffic generated by the construction and operation of the Project has been appropriately assessed as explained in **Environmental Statement ("ES") Chapter 11: Traffic and Transport (Section 11.8) [APP-053]**. The assessment concludes that the impact of traffic during construction is not significant, with the appropriate embedded and standard mitigation measures to be put in place during the construction stage to manage traffic impacts associated with the Project which are set out in the **Outline Construction Traffic Management Plan [APP-223]**. The **draft DCO [PDA-004]** requires the submission of one or more final Construction Traffic Management Plan(s) for approval by the local planning authority. As set out in ISH2, National Highways (NH) have asked for additional modelling of the A160 / A180 junction and this work demonstrates that the proposed development will have no material impact in terms of junction capacity, operation, or safety.

The traffic generated during the operation of the facility is significantly lower that during construction with levels of traffic forecast to be within daily variations in flow. The increase in the volume of operational traffic arising from the Project is below the threshold for requiring more detailed assessment. It will not have any material impact. This is confirmed by NH who have agreed more detailed operational junction assessments should be scoped out of the assessment on the A180 corridor.

In addition, an Operational Travel Plan will be implemented in order to further reduce any impact during the operational phase.

3. Existing public transport services

The respondent's concerns regarding existing public transport services and the limited scope for workers to benefit from such services is noted. A Construction Worker Travel Plan will be produced, as part of the Construction Traffic Management Plan. The Construction Worker Travel Plan will be designed to promote and encourage the use of sustainable transport modes including shared transport modes. An Outline Construction Worker Travel Plan included as **Appendix A** to the **Outline Construction Traffic Management Plan [APP-223]**, was submitted as part of the DCO Application. One or more final Construction Worker Travel Plan(s) will be submitted to the local planning authority for approval in association with the final Construction Traffic Management Plan.

4. Noise and pollution during construction and operation

Noise arising from the construction of the Project is assessed in **ES Chapter 7: Noise and Vibration [APP-049]**. At the closest residential properties (approximately 460m – 500m from the Site Boundary), it is predicted that, taking account of mitigation measures, the effects of construction noise would not be significant.

Noise arising from the operation of the Project is also assessed in **ES Chapter 7: Noise and Vibration [APP-049]**. With the implementation of noise-specific mitigation measures to be contained in a noise management scheme to be submitted to and approved by the local planning authority (as outlined within the **Schedule of Mitigation and Monitoring [APP-234]**), the assessment demonstrates that the effects of noise during operation would not be significant.

The potential for changes to air quality as a result of the construction and operation of the Project and the implications of such changes are considered within **ES Chapter 24: Human Health and Well-being (Section 24.8) [APP-066]**, with reference to the findings of the air quality assessment within **ES Chapter 6: Air Quality (Section 6.8, Paragraphs 6.8.37 to 6.8.42) [APP-048]**. The effects on human health from changes in air quality and noise emissions due to construction and operational traffic would not be significant.

5. Climate change

The respondent's opinion in relation to the evidence for climate change is noted. The Secretary of State's decision will, to the extent relevant, take into account Government policy on sustainability and climate change.

6. Local services including schools, GPs and hospitals

As identified within **ES Chapter 23: Socio-economics [APP-065]**, the construction workers required to build the Project may place some demand on healthcare services temporarily if they move to the area during the construction phase, and permanently if they move to the area for the operational phase, or if emergency treatment is required. Workers who reside locally are already likely to be registered at a practice and will not be expected to place additional demand on local GP services. **ES Chapter 23: Socio-economics [APP-065]** concludes that additional demand arising from the Project would not be likely to significantly affect local healthcare provision.

Similarly, workers required to build the Project may place some demand on educational services temporarily if they move to the area for the construction phase or permanently if they move to the area for the operational phase. Workers who reside locally are already likely to be registered at a school and will not be expected to place additional demand on local educational services.

7. Concerns about property values

The Applicant notes the respondent's concern about house prices. As explained in **ES Chapter 2: The Project [APP-044]**, the area surrounding the Port is already industrial in nature, being dominated by chemical manufacturing, oil processing and power generation facilities, and beyond this the wider area is largely agricultural.

8. Not the right development for the area and not mentioned in 2020 search

The Applicant notes the respondent's opinion on the suitability of the location. **Paragraph 5.4.8** of the **Planning Statement [APP-226]** explains that the Project provides additional port capacity in the right place. It is well located in the Humber, one of the UK's main industrial clusters which is in need of decarbonisation. It is well located for hydrogen production due to, amongst other things, its close proximity to the strategic road network and the potential to supply customers located nearby. Furthermore, **Section 2** of **Appendix D** of the **Planning Statement [APP-230]** provides details of the relevant allocations of the East Site and West Site for development within

the North East Lincolnshire Local Plan 2018. Both the East and West Sites are allocated for employment development related to the port and logistics sector. The Applicant's evidence clearly demonstrates that the development is appropriate both for the area generally and the specific sites proposed to be developed.

The proposals for the Project were introduced in August 2022, beginning with a consultation with North East Lincolnshire Council ("NELC") on the draft Statement of Community Consultation. The Applicant is not able to comment on whether the Project should have been mentioned in a particular search.

9. Substances being stored

It is assumed that the respondent is referring to emissions from the Site – that matter has already been responded to under point 4 above. As explained in the **Planning Statement [APP-226]**, the new terminal would initially be used for the import and export of green ammonia to be converted to green hydrogen. A separate application for hazardous substances consent has been made to NELC and has not yet been determined.

Safety during the construction and operational phases of the Project has been considered in **ES Chapter 22: Major Accidents and Disasters [APP-064]** and **ES Chapter 24: Human Health and Well-being [APP-066]**. **ES Chapter 22: Major Accidents and Disasters [APP-064]** concluded that all risk events identified during construction and operation have been reduced to as low as reasonably practicable with the implementation of mitigation as outlined in **Tables 22-5 and 22-6** within the chapter. The Project will comply with all relevant safety and environmental legislation for the management of risks throughout the construction and operational phases. **ES Chapter 24: Human Health and Well-being [APP-066]** concluded that there are no significant effects on human health and well-being.

10. Second World War ammunition

A desktop study was undertaken for the whole Site prior to the geotechnical work which indicated the Site is at low risk for unexploded ordnance ("UXO"). Construction Environmental Management Plan(s) ("CEMP(s)") will be submitted to and approved by NELC based on the **Outline CEMP [APP-221]** submitted as part of the Application. The CEMP(s) will require a further review of UXO potential to be undertaken which will reduce the risk of encountering UXO and any remedial activities will be completed before construction commences.

11. Local environment and animals

The Applicant has conducted wide-ranging ecological surveys and the results of these are presented in **ES Chapter 8: Nature Conservation (Terrestrial Ecology) [APP-050]**. Appropriate mitigation for impacts on breeding birds, water vole and bats is covered in **Table 5** and **Table 7** of the **Outline CEMP [APP-221]**. **ES Chapter 8: Nature Conservation (Terrestrial Ecology) [APP-050]** concludes that during construction, with the implementation of the mitigation measures set out in the **Outline CEMP [APP-221]**, there will be no significant effects on bats and water voles.

RR-008 – DFDS SEAWAYS PLC

The Applicant welcomes DFDS Seaways PLC's (DFDS) Relevant Representation.

In-principle non-objection

The Applicant notes that DFDS does not have an in-principle objection to the Project. The Applicant acknowledges DFDS's concern around particular elements of the Project application documents, and these points are responded to under points 3 and 4 below.

Concerns in respect of marine navigational safety

Navigational Risk Assessment (NRA)

The Applicant can confirm that the likelihood and consequence tables in Appendix B Hazard Log of the **NRA [APP-191]** are from the Applicant's MarNIS risk management tool and are standard across the company. MarNIS is risk management software currently installed in more than 55 ports. This software is used across the 21 ports owned and operated by the Applicant – and indeed more widely by a further 74 ports in the UK and 7 overseas – and is the primary risk management tool used by the Statutory Harbour Authorities ("SHAs"), such as Humber and Immingham, for day-to-day management of marine risk. The software holds details of the formal risk assessment for port marine operations, and accident/incident reports. This forms the backbone of the SHA's Marine Safety Management System. Data from MarNIS was used to inform the baseline for the NRAs for both Immingham Eastern Ro-Ro Terminal ("IERRT") and the Project. Tolerability is set by the Applicant's Duty Holder as required by the **Department for Transport's Port Marine Safety Code 2016** and the associated **Guide to Good Practice for Port Marine Operations 2018**.

Navigational risks associated with the Project are considered tolerable and as low as reasonably practicable ("ALARP"), as was determined by the Duty Holder at the meeting of the Harbour and Safety Board (HASB) on 24 August 2023. During this meeting, the HASB confirmed and approved the tolerability limits, approved the use of likelihood and consequence tables for the **NRA [APP-191]**, and approved the risk assessment in principle, agreeing that key risks have been reduced to an ALARP and tolerable state. This is explained in the **NRA [APP-191]**.

Tidal direction

The flow models used in the navigation simulation used a more sophisticated assessment of the flows than admiralty tidal diamonds. The flow data was verified against 6 months of AWAC data as described in the navigation simulation report. Furthermore, to take

account of anecdotal variation of the flow direction compared to the model, the direction and speed were scaled on some runs for sensitivity.

Concerns in respect of marine and onshore congestion and disruption

Tug availability

With regards to towage provision, the Applicant notes the position set out in **Environmental Statement ("ES") Chapter 12: Marine Transport and Navigation [APP-054]** that tug provision is not provided or guaranteed by it as the SHA. The UK ports and marine sector is a freely trading marketplace and therefore subject to market forces. If demand for a particular service increases, then those service providers should increase their supply to match demand. DFDS says that relying on tug providers to provide additional resource would "not guarantee sufficient towage". Currently, towage is not guaranteed albeit it makes commercial sense for the towage providers to make sufficient tugs available to service the current market needs.

Onshore transport

The concerns raised by DFDS in respect of Onshore Transport are unfounded. The application has been subject to appropriately detailed assessment of both the construction and operational phases of the development.

The traffic generation forecasts (and basis of them) for both construction and operation are fully set out in the application (cf APP-053 section 11.8). It is clear that operational traffic flows are very modest and for that reason traffic assessment scoped out (as agreed with NH and NELC) of ES. Overall flows are likely to be within daily variation in flows and will have no material impact on highway safety or operation. The scheme is therefore in full accordance with the tests and requirements of Section 5.4 of the NPSfP.

More detail on the construction phase traffic generation is provided in APP-223 Sections 2.2 and 2.3. The methodology adopted is clear, appropriately justified and agreed with the Highway Authorities (NELC and NH).

In relation to the specific potential impact at Laporte Road, APP-223 confirms at Table 6 that only 60 HGVs per day (less than 6 per hour) are forecast on this part of the network and access for 447 staff movements per day (Table A-2). Peak hour flows will be less than 70 vehicles. These are at peak construction period and likely to be for a period of less than 2 years.

The impacts are clearly and demonstrably not material in the context of the tests and requirements of Section 5.4 of the NPSfP.

The cumulative assessment as set out in **ES Chapter 25: Cumulative Effects and In-Combination Assessment [APP-067]** provides a detailed assessment of the potential for cumulative effects associated with the Project and the IERRT scheme. The traffic and transport cumulative effects are presented in **Section 1.8** within **ES Appendix 25.C [APP-220]**. **Table 1** in **ES Appendix 11.B: Traffic**

and Transport Cumulative Effects Assessment [APP-190] provides a list of cumulative development, and **Tables 2 to 14** provide details of the construction traffic for each development. Details of the IERRT scheme are in **Table 6**.

RR-009 – Elvans Family

The Applicant notes this representation from Mr and Mrs Elvans. It is understood that Mrs Elvans is the registered owner of the property on Queens Road but is not currently in occupation of the property (which is occupied by tenants).

The **Statement of Reasons [AS-008]** submitted with the Application sets out in detail the compelling case in the public interest to support the acquisition of the property (see Section 6, in particular Paragraph 6.42, which describes how the public benefits will outweigh the private loss) and explains how the powers are appropriate and proportionate in the context of human rights (see Section 8, Paragraphs 8.1 to 8.12).

Air Products is seeking to acquire the relevant residential properties at Queens Road by agreement, with the assistance of its land agent, Gateley Hamer. Air Products has provided undertakings to meet the costs of a surveyor and a solicitor to act for Mrs Elvans in the negotiations, which are ongoing.

RR-010 – Environment Agency

The Applicant would like to thank the EA for its detailed and constructive engagement with the Application and welcomes the EA's confirmation that it does not have an in-principle objection to the Project and that the issues raised by the EA are capable of resolution. The Applicant has responded to those issues below and will work with the EA to resolve any outstanding concerns during the Examination.

Reference	Relevant Representation	Applicant's Response
3.0 – 3.1	**3.0 – 2.1 Draft Development Consent Order [APP-006]** **Article 3: Application, disapplication and modification of legislative provisions** The Environment Agency has not been consulted on text for the Protective Provisions that have been included in the draft DCO. These provisions are not in a format that is acceptable to us and therefore we do not currently agree to the disapplication of Regulation 12 (the requirement for environmental permit) of the Environmental Permitting (England and Wales) Regulations 2016(c) in respect of flood risk activities. We will work with the Applicant to try and agree on a form of Protective Provisions that is acceptable during the examination.	The Applicant has prepared a set of bespoke protective provisions in favour of the EA which reflect the particular circumstances of the proposals pursuant to the DCO for Work No. 1 to cross over existing flood management infrastructure maintained by the EA pursuant to licences from the Applicant as long leaseholder in this location. These protective provisions are based on relevant wording adopted from protective provisions in favour of the EA on the face of recently made DCOs. The EA has since provided its template protective provisions to the Applicant, and the Applicant will consider whether it is appropriate to include any further wording and work with the EA to reach agreement on the form of protective provisions to be included in the draft DCO ("**dDCO**").
3.2	**Article 18: Discharge of Water** We request that this Article includes two additional clauses, similar to those included in the Immingham	The Applicant is content with the principle of such monitoring and will revise the proposed protective provisions appropriately.

	Eastern RoRo Terminal draft DCO, in respect of the Habrough Marsh Drain outfall. These should read: (i) The Undertaker must monitor the path of the Habrough Marsh Drain outfall channel and report to the Board annually for a period of 10 years whether any substantial changes to the path of the Habrough Marsh Drain outfall channel have occurred as a result of the authorised development, such monitoring to be based on appropriate methods. (ii) The Undertaker must monitor the path of the Stallingborough North Beck outfall channel and report to the Environment Agency annually for a period of 10 years whether any substantial changes to the flow and/or path of the Stallingborough North Beck outfall channel have occurred as a result of the authorised development, such monitoring to be based on appropriate methods.	
3.3	These additional clauses are required to secure monitoring to ascertain if the proposed development has a negative impact on the function of these outfalls over time. In addition to this, it will be necessary for us to secure an appropriate mechanism under the DCO to agree on remediation works to clear any obstruction resulting from the authorised development and the timescales within which this needs to be carried out. We will discuss this with the Applicant as part of our negotiations for the Protective Provisions	The Applicant will liaise further with the EA regarding the area to which the EA refers for such remediation/obstruction removal works and its proposed duration of the obligation.

	but reserve the right to request an additional Requirement within the DCO regarding this, if necessary.	
3.4	**Schedule 2 Interpretation 1: "commence"** The definition of commence seeks to exclude the 'remedial work in respect of any contamination' from being a material operation. Including this phrase in the interpretation is at odds with Requirement 15, which seeks to prevent such remedial work from commencing until an appropriate contamination remediation strategy has been submitted to, and approved by, the relevant planning authority. Accordingly, we request that 'remedial work in respect of any contamination' be deleted from this interpretation.	The Applicant can confirm that **Requirement 15** of the **dDCO [PDA-004]** is not at odds with the definition of "commence". **Requirement 15** prohibits any below ground works comprised in any part of Work No. 1 outside of the UK marine area, Work No. 2, Work No. 3, Work No. 4, Work No. 5, Work No. 6 or Work No. 7 being "undertaken" until a written remediation strategy applicable to that part to deal with any contamination of that part which is likely to cause significant harm to persons or pollution of controlled waters or the environment has, following consultation with the EA, been submitted to and approved by the relevant planning authority. Any remediation required must be carried out in accordance with the approved remediation strategy. The requirement therefore applies to all below ground works and remedial work, in respect of any contamination, cannot be carried out prior to written remediation strategies being approved and, where so approved, implemented.

3.5	**Requirement 6: Construction environmental management plan** The Environment Agency believes there is an error in the drafting of this requirement as the MMO (Marine Management Organisation) does not have a remit outside of the UK marine area, and therefore would not be an appropriate consultee for this Requirement. The appropriate consultee to Work No. 1 outside of the UK marine area will be the Environment Agency due to its remit with respect to flood risk management and the water environment. Accordingly, we request that we are included as the consultee to Requirement 6(1) for Work No. 1.	The Applicant agrees and will ensure the EA is a consultee under **Requirement 6** for Work No. 1 outside of the UK marine area.
3.6	**Requirement 13: Flood risk assessment** Requirement 13 only requires the project 'outside of the UK marine area' to be carried out in accordance with the flood risk assessment (FRA) – UK marine area has the meaning given to it in section 42 of the Marine and Coastal Access Act 2009. The wording of this requirement limits the implementation of the FRA to the landward side of mean high water springs, which is not acceptable as many of the works discussed in this FRA will take place within the UK marine area. In addition, we are of the view that the project should be in full (not general) accordance with the approved FRA and the tailpiece should be deleted. We request the words 'outside of the UK marine area', 'general' and 'unless otherwise	The Applicant is content for the word 'general' to be deleted in this instance. "Unless otherwise approved by the relevant planning authority" provides the appropriate flexibility required by a nationally significant infrastructure project and the Applicant notes that such relevant planning authority approvals are limited in the usual manner, according with established case law for such wording, by **Article 63(2)(b)** which states *'When any consent, agreement or approval is required of, or with, the relevant planning authority pursuant to a requirement set out in Schedule 2 (requirements) such consent agreement or approval must not be given if it would […] give rise to any materially new or materially different significant effects on the environment that have not been assessed in the ES or in any updated environmental information supplied under the 2017 Regulations".* The Applicant is considering the remaining point further and will discuss its position with the EA in due course.

	approved by the relevant planning authority' be deleted from this requirement.	
3.7	**Requirement 15: Contaminated land** We are satisfied that Requirement 15 is sufficient to manage the risks from contamination at the site, in so far as it relates to controlled waters, providing the phrase 'remedial work in respect of any contamination' is deleted from the interpretation section as requested in paragraph 3.4 above. We welcome our inclusion as a specific consultee to the discharge of Requirement 15.	The Applicant welcomes the EA's conclusion that **Requirement 15** is sufficient to manage the risks of contamination on site in relation to controlled waters.
3.8	**Requirement 18: Decommissioning Environmental Management Plan** The Environment Agency requests its inclusion as a specific consultee to the discharge of the Requirement for all issues within its remit.	The Applicant agrees that the EA should be included as a consultee on the Decommissioning Environmental Management Plan ("DEMP").
3.9	**Schedule 3: DEEMED MARINE LICENCE Condition 8: Construction environmental management plan** We welcome our inclusion as a consultee to this condition, which will allow us to comment on matters within our remit.	The Applicant can confirm this comment has been noted and will continue to liaise with the EA.

3.10 – 3.11	**Schedule 8: Part 1: Temporary Restriction or Alteration, etc. of the Use of Streets or Public Rights of Way** The temporary diversion of Bridleway Number 36, (as previously consulted on during the Section 42 consultation as change No. 7), took the bridleway close to the flood defence assets on Stallingborough North Beck – it is not clear from the submitted plans if this is still the intention. Appropriate mitigation measures should be put in place to ensure that no access can be gained to the flood defence. We would require a 1m buffer from the landward toe to enable maintenance to be carried out on the flood defence, therefore any fencing constructed should be 1m away from the landward toe of the flood defence. Details of these mitigation measures need to be provided. Any use of motor vehicles on the bridleway should also not gain access to the flood defence assets on Stallingborough North Beck, similar mitigation of fencing off 1m away from the landward toe is required and should ensure access is restricted. It was also previously stated that the temporary Public Rights of Way diversion may mean that a temporary bridge could be needed over the channel behind the sea wall. We would welcome conversations about this structure as part of our continuing engagement with the Applicant.	The Applicant agrees with the principle of securing the mitigation measures proposed by the EA. These measures will be captured in the updated **Outline Construction Environmental Management Plan ("CEMP") [APP-221]** submitted at Deadline 2 **[TR030008/APP/6.5 (2)]**.

3.12	**Schedule 14, Part 2: Protective Provisions for the Environment Agency** As mentioned in paragraph 3.1 above, we have not been consulted on text for the Protective Provisions that have been included in the draft DCO. These provisions are not in a format that is acceptable to us. However, we will work with the Applicant during the examination to try to reach an agreement on acceptable wording and update the Examining Authority on progress in due course.	As noted above, the Applicant has prepared a set of bespoke protective provisions in favour of the EA which reflect the particular circumstances of the proposals pursuant to the DCO for Work No. 1 to cross over existing flood management infrastructure maintained by the EA pursuant to licenses from the Applicant as long leaseholder in this location. These protective provisions are based on relevant wording adopted from protective provisions in favour of the EA in the face of recently made DCOs. The EA has since provided its template protective provisions to the Applicant, which will consider whether it is appropriate to include any further wording and work with the EA to reach agreement on the form of protective provisions to be included in the **dDCO [PDA-004]**.
3.13 – 3.16	**Schedule 17: Procedure regarding certain approvals etc. Article 63: – Further information and consultation** The Environment Agency is of the view that the provisions in this article will not provide sufficient time for adequate consultation to take place for the discharge of Requirements. In particular, Condition 3(3) requires the discharging authority to notify the Applicant in writing of any further information it needs within 10 business days of receipt of the application. This would not provide sufficient time for the discharging authority to request a consultee's comments or for the consultee to adequately consider and respond to the consultation request. The Environment Agency requests that this is amended to 20 business days to provide sufficient	The Applicant notes that **Paragraph 3(3)** of **Schedule 17 (Procedure regarding certain approvals, etc.)** of the **dDCO [PDA-004]** mirrors the Riverside Energy Park Order 2020, which reflects the imperative of expeditious decision-making for nationally significant infrastructure projects. However, further to the EA's request, the Applicant is content to increase the period within which the relevant planning authority must notify the undertaker in writing specifying any additional further information requested by the requirement consultee to within 20, rather than the previous 10, business days of receipt of the application. This is reflected in the dDCO submitted at Procedural Deadline A.

	consultation timescales that align with those in the Development Management Procedure Order 2015, i.e. 21 days (equivalent to 15 business days) in addition to the 5 business days allocated for the relevant discharging authority to issue the consultation. We also request that the term 'business days' is included in Condition 1 (Interpretation) for this Schedule as meaning a day other than a Saturday or Sunday, Good Friday, Christmas Day or a bank holiday in England and Wales under section 1 of the banking and Financial Dealings Act 1971. We note that the Applicant's justification for including these procedural requirements takes the form of wording that mirrors that of a number of recently made DCOs, particularly Schedule 12 of the Riverside Energy Park Order 2020. However, the practical application of the 10 business day timescale will not facilitate adequate consultation.	
4.0 – 4.1	**Book of Reference [APP-008]** The Environment Agency is listed as a Category 2 person with respect to the sea wall for various plots. We are currently in discussion with the Applicant regarding the reconstruction, future ownership, operation and maintenance of the flood defense that will be impacted by this project. We will require the Applicant to enter into a bespoke legal agreement to ensure that the proposed works will be carried out in	The Applicant notes that it is currently the responsibility of the EA to maintain its flood defence works at the Immingham foreshore, including within the Order Limits pursuant to licences granted by the Applicant in 1980 and 1999. The Applicant is content with the principle that the width of flood defence works crossed by permanent works comprised in the authorised development should be maintained by the Applicant following construction. The Applicant is content that a further legal agreement is necessary to secure this but

	a way that ensures an appropriate level of flood protection is maintained both now and into the future. We will provide updates on our progress with this during the examination period. However, until this matter is resolved to our satisfaction, we object to the application as it does not pass the flood risk exception test, as set out in paragraph 5.2.16 of the National Policy Statement for Ports (January 2012). In particular, without such an agreement being in place there is the potential for the project to increase flood risk elsewhere, if the defence is not constructed and maintained to the required standard.	considers that there is no necessity for the scope of such an agreement to be any wider given matters already secured by the protective provisions. The Applicant will continue liaising with the EA on these matters.
5.0 – 5.1	**Chapter 6: Air Quality [APP-048]** We have undertaken a high-level review of this chapter, which appears satisfactory for planning purposes. The assessment appears to assess the risk in line with Environment Agency guidance and relevant methodologies. Please note that we have not undertaken a detailed review of the air quality modelling as the proposed hydrogen production facility will require an operating permit – the Applicant has identified this as falling under Schedule 1, Part 2, Section 4.2, Part A(1)(a)(i) of the Environmental Permitting Regulations 2016. A detailed review of air quality modelling will be undertaken when we determine the permit application to operate the site. To date, we have not received a permit application for this proposal, but the Applicant has been engaged in	The Applicant notes that the EA has reviewed the submission version of **Environmental Statement ("ES") Chapter 6: Air Quality [APP-048]** and is pleased the EA agrees with the methodology and conclusions of that chapter.

	pre-application discussions with our National Permitting Service.	
6.0 – 6.1	**Chapter 8: Nature Conservation (Terrestrial Ecology) [APP-050]** Unfortunately, we have been unable to undertake a review of this chapter and its related appendices due to limited staff resources in this field of expertise. We will endeavor to review this chapter during the course of the examination, but we are unable to offer any comments at this time.	The Applicant would welcome any comments from the EA on **ES Chapter 8: Nature Conservation (Terrestrial Ecology) [APP-050]** and would like to reach agreement with the EA on the methodology and assessment conclusions. Appropriate mitigation measures to be implemented during construction have been set out within the **Outline CEMP [APP-221]** (and its appendices) and **Outline Landscape and Ecology Management Plan ("LEMP") [APP-225]**. Final versions of these management plans will be secured through **Requirements 6 and 10** of **Schedule 2** of the **dDCO [PDA-004]**.
7.0 – 7.2	**Chapter 9: Nature Conservation (Marine Ecology) [APP-051]** We have reviewed the assessment contained in this chapter, together with the relevant figures and Appendix 9.A for issues within our remit (marine ecology and fish receptors) and consider these are satisfactory. Please note that due to resource issues we have not been able to review the assessment in respect of noise impacts on migratory fish (Appendix 9.B, Underwater Noise Assessment) and defer to any	The Applicant notes that the EA has reviewed the submission version of **ES Chapter 9: Nature Conservation (Marine Ecology) [APP-051]** and is pleased the EA agrees with the methodology and conclusions of that chapter.

	views provided by the MMO on this topic. We understand that the MMO is to provide comments in respect of the proposed time restrictions included in the Deemed Marine Licence (DML) for percussive piling, which are relevant for the protection of migratory salmon.	
8.0 – 8.1	**Chapter 16: Physical Processes [APP-058]** We have reviewed this chapter and are generally satisfied with the assessment and conclusions carried out with respect to physical processes. The modelling of wave patterns and sediment transport has been carried out and the assessment presented in Section 16.8 appears to show a change in flow speeds adjacent to the flood defences. There appears to be no assessment of the impact of these changes on the accretion or erosion of the toe of the flood defences. We would like to see an assessment made of these impacts.	The Applicant notes that the EA has reviewed the submission version of **ES Chapter 16: Physical Processes [APP-058]** and is pleased the EA generally agrees with the methodology and conclusions of that chapter. The Applicant's assessment of the Project detailed in **ES Chapter 16: Physical Processes [APP-058]** includes assessment of 'Marine facilities (approach jetty, jetty head and dredge pocket) – potential impact on sediment transport' within **Paragraphs 16.8.49 to 16.8.56**. This assessment is informed by the numerical sediment transport modelling undertaken and is based on the outputs of the hydrodynamic modelling to assess potential changes to erosion and accretion patterns across the near- and far-field. Whilst not specifically referred to within this section, the assessment findings in **Paragraph 16.8.54** indicate that the marine elements of the Project will have no impact on accretion or erosion along the toe of the existing flood defences. It is therefore considered that no further assessment is required.

9.0 – 9.2	**Chapter 17: Marine Water and Sediment Quality [APP-059]** We have reviewed this chapter and have no comments on it, other than those connected to Appendix 17.A outlined below. **Appendix 17.A: Water Framework Directive Compliance Assessment [APP208]** We have reviewed the Water Framework Directive (WFD) assessment and request additional information/clarification in respect of Section 3.4 (Water Quality), which refers to 'intermittent' timescales over which water quality might be affected. The assessment does not explain what is meant by this term. The concerns from a WFD point of view are different if we are considering, for example, 2 days per year, versus 10 days per month.	The Applicant notes that the use of the term 'intermittent' in **Table 6** in **Section 3.4** of **ES Appendix 17.A: Water Framework Directive Compliance Assessment [APP-208]** was used to describe the risk posed by construction activities to the water quality of the Humber Lower and North Beck Drain water bodies. This term was used as the effects associated with dredging and disposal activities will be temporary and short-term and any changes to water quality will not persist beyond a single tidal cycle. The impact assessment is set out in **Section 4: Impact Assessment** of **ES Appendix 17.A [APP-208]** (for example, see **Paragraphs 4.2.2, 4.4.23 and 4.4.29**). Further, the construction area adjacent to North Beck Drain will be used for laydown and parking and will be in use during the Phase 1 construction period but is not expected to be used for subsequent phases. The use of this area will vary during that period depending on the construction workload, hence describing the potential to affect the water quality of North Beck Drain as intermittent.
10.0 – 10.1	**Chapter 18: Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage [APP-060]** We have reviewed this chapter and have the following comments to make on it. Page 18-35 Table18-1: this consultation summary table states that the Environment Agency no longer requires a 1m buffer for maintenance. This is incorrect as we do not require a buffer for the sea defence, but we will still need the buffer for the fluvial defences at	The Applicant notes that the revised text will be included in the table of errata table of errata to clarify that the buffer is no longer required is for the sea defence.

	Stallingborough for the duration of the Bridleway diversion.	
10.2	Paragraph 18.6.1 references the Humber Flood Risk Management Strategy as 18-35 – this appears to be a typo as the Strategy is reference 18-30.	The Applicant can confirm this comment has been noted and the amendment will be recorded in the table of errata.
10.3	Paragraph 18.6.30 refers to 'The initial draft Humber Flood Risk Management Strategy (2021 – 2027)'. This paragraph should actually be referring to the Humber River Basin District Flood Risk Management Plan 2021-2027. We would also point out that the 'improvements to the Humber Estuary modelling' are ongoing as part of the developing Humber 2100+ project – they have not yet been completed.	Revised text will be included in the table of errata to clarify that the relevant reference is to the Humber River Basin District Flood Risk Management Plan 2021-2027 and to highlight that the 'improvements to the Humber Estuary modelling' are currently ongoing as part of the developing Humber 2100+ project.
10.4	Paragraph 18.6.50 considers the potential for fluvial flooding at the site and uses the North East Lincolnshire Preliminary Flood Risk Assessment to provide some indication of fluvial flood zones, suggesting the site is located in Flood Zone 1. This is not entirely correct as there is a small area of fluvial flood risk adjacent to the Stallingborough North Beck (also referred to as the North Beck Drain), which impacts the Work No. 9 area.	The Applicant confirms that the assessment of flood risk from fluvial sources uses the information in the North East Lincolnshire Preliminary Flood Risk Assessment to provide some indication of fluvial flood zones. However, as noted in **Paragraph 18.6.55** of **ES Chapter 18: Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage [APP-060]**, the 0.1% Annual Exceedance Probability ("AEP") modelled flood water levels for Stallingborough North Beck Drain are referred to and show a small area of Work No. 9 is located in Flood Zone 2. Further assessment, based on information provided by the EA, is outlined in **ES Appendix 18.A: Flood Risk Assessment [APP-209]**, **Paragraphs 4.4.8 to 4.4.9** and **Plate 4: Modelled Flood Extents for Stallingborough North Beck Drain**. No additional assessment is therefore required.

10.5	Table 18-11: Importance of Receptors - this states that the North Beck Drain is 'a non-WFD surface waterbody with limited…biodiversity'. This is incorrect and elsewhere it is shown that the North Beck Drain is a high certainty chalk river, part of CaBA catchment 40, Lincolnshire Chalk Streams. Chalk rivers are listed as Priority Habitat under the UK Biodiversity Action Plan. The North Beck Drain (unique WFD waterbody identifier GB104029067575) is designated as a Heavily Modified waterbody due to its uses for Flood Protection, Land Drainage and Urbanisation. It was classified as Moderate (2019).	The Applicant confirms that the reference in **Table 18-11: Importance of Receptors** of **ES Chapter 18: Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage [APP-060]** is incorrect and this will be included in the table of errata. The description of North Beck Drain in **Table 2: North Beck Drain river water body summary** in **ES Appendix 17.A: Water Framework Directive Compliance Assessment [APP-208]** is correct (as per the EA's comments above).
10.6 – 10.9	18.7.6 Water Use: Non-potable Water – we note the project is estimated to require approximately 3,640m3/day of non-potable water to support the hydrogen production facility. The Environment Agency recently carried out work to explore the needs of industry and the impacts on the water environment of proposed technologies for carbon capture, storage, and hydrogen production in the net zero industrial clusters. The Humber Industrial Cluster was chosen for a pathfinder project and the results of this showed that water resources need to be recognised as a limiting factor. Paragraph 18.7.8 records that "Agreement has been reached in principle with Anglian Water for the provision of non-potable water to the required standards suitable for use in the site cooling towers for the hydrogen production facility". We are pleased to see that the Applicant is working closely with	In relation to Paragraphs 10.6 to 10.9 (inclusive), the Applicant notes the EA's position on this matter and continues to work with Anglian Water regarding the required water supply. The Applicant has made good progress in these discussions and has received a commercial offer/commitment from Anglian Water for supply of 3,456m^3/day which will satisfy normal demand and allow some flexibility for periods of higher demand. No requirement is therefore considered necessary. The Applicant will update the EA on these discussions as the Examination progresses.

	Anglian Water on this issue, and we are aware that the latter has incorporated proposals to include 60 mega litres per day of additional water supply in its draft Water Resource Management Plan (WRMP) for net zero transition projects. However, this still needs to be approved and the final determination on this is unlikely to be known until December 2024. In terms of potable water, the operational project will also require a limited potable water supply for offices, welfare facilities etc. Accordingly, if additional information is not forthcoming during the examination period to confirm how the additional water supply will be secured, we request that an appropriate Requirement is included in Schedule 2 to secure that no development commences until a scheme to demonstrate that an adequate supply can be provided, without causing an impact on the water environment. We will work with the Applicant and Anglian Water Services on the wording of such a Requirement if this is needed.	
10.10	The North Beck Drain was discussed with the Applicant during the preapplication consultation when it was pointed out there was a potential for this project to make future river restoration of the chalk stretch upstream of the development more difficult. It was suggested that the Applicant's consultants consider whether some Biodiversity Net Gain could be provided as mitigation for this potential impact. However, we are disappointed to see that although	The Applicant notes the comment regarding biodiversity net gain. Whilst mandatory biodiversity net gain is not required, the Applicant is promoting biodiversity through other means including the **Outline LEMP [APP-225]** which defines the opportunities which are available within the operational site boundaries to provide landscape and ecological measures to enhance the operational layout.

	mandatory biodiversity net gain is not required for this project, only opportunities within the limits of the operational site boundaries have been considered.	The Final LEMP would be approved by North East Lincolnshire Council ("NELC") through **Requirement 10** of **Schedule 2** of the **dDCO [PDA-004]**. Further, the **Outline Woodland Compensation Strategy [APP-224]** sets out the approach to off-site planting of trees in the Immingham area, as well as enhancement of existing retained on-site woodland, to ensure that the tree loss from the Long Strip is appropriately compensated.
10.11	Paragraph 18.8.49 refers to temporary uncontrolled discharges to Stallingborough North Beck. This issue has not been previously discussed and we would need further detail on these discharges and volumes and method of discharge. Also see comments in respect of Appendix 18.B: Drainage Strategy below.	The Applicant has progressed the Drainage Strategy for the jetty access road, to which the reference to uncontrolled discharges related (Work No. 1 and 2), since DCO submission. An uncontrolled discharge into the Stallingborough North Beck is no longer proposed. Surface water runoff is being attenuated to a rate that has been agreed with North East Lindsay Drainage Board ("NELDB"). The final Drainage Strategy would be approved by NELC, following consultation with the EA and NELDB, through **Requirement 12** of **Schedule 2** of the **dDCO [PDA-004]**.

10.12	Paragraph 18.8.74 – we would point out that there is no 'Hold the Line' management policy in the Humber Flood Risk Management Plan. Instead, the most appropriate Flood Risk Area Measure in the Immingham, Humber (Risk of Flooding from Rivers and Sea) Flood Risk Area that could be referred to is – "Between 2021 and 2027, the Environment Agency will progress the Halton Marshes Phase 2 flood alleviation scheme taking an adaptive approach in Immingham to provide appropriate flood resilience to existing port development in line with predicted sea level rise in the Immingham, Humber Flood Risk Area."	The Applicant can confirm that text will be included in the table of errata to reference the most appropriate Flood Risk Area Measure in the Immingham, Humber (Risk of Flooding from Rivers and Sea) Flood Risk Area to: "*Between 2021 and 2027, the EA will progress the Halton Marshes Phase 2 flood alleviation scheme taking an adaptive approach in Immingham to provide appropriate flood resilience to existing port development in line with predicted sea level rise in the Immingham, Humber Flood Risk Area*."
10.13	The reference to the Shoreline Management Plan (SMP) is correct, as per Section 9.1.32 in the SMP, "This management intent will be achieved through a Hold the Line policy in all epochs. Defences will prevent erosion and will be maintained and upgraded to continue the present standard of protection against flooding despite sea level rise."	The Applicant can confirm this comment has been noted.
10.14	Paragraphs 18.8.87-8 (Changes to flow regimes and/or water levels) refer to areas of land raising falling outside of the main river extent. However, no assessment appears to have been made as to the impact on the local drainage systems from the land raising.	The Applicant can confirm that the **ES Appendix 18.A: Flood Risk Assessment [APP-209]** has assessed the impact on local drainage systems from the proposed land raising. The Flood Risk Assessment states that the areas of ground raisings are in Flood Zone 1 and therefore will not impact flood risk from local drainage systems. Diversions of existing drains will be secured where required. Topographic levels show ground levels for the areas of the site where land raising is proposed (the West Site (Work No. 7) and East Site (Work No. 3 and Work No. 5)) are predominantly higher than the surrounding small drainage ditches. No areas of significant flooding from

		the NELDB systems have been identified via discussions with the NELDB, and as noted in **Paragraph 4.4.28** in **ES Appendix 18.A: Flood Risk Assessment [APP-209]** the drainage system managed by the NELDB is understood to be able to accommodate events with 0.1% AEP by a combination of storage and pumping, without flooding the surrounding area. As demonstrated in **Paragraphs 4.5.3 to 4.5.9** together with **Plate 5:** Environment Agency Risk of Flooding from Surface Water Mapof **ES Appendix 18.A: Flood Risk Assessment [APP-209]**, there are no concerns with regards to flood risk from the local drainage system in proximity to the East and West Sites. **Paragraph 4.5.9** states that "*The risk to the Site from overland flow of surface water generated adjacent to the Site, or from waterbodies located within the Site is considered to be 'low, medium and high' in small areas, as shown on Plate 6, but largely 'very low'. Once the site is developed these areas of surface water flooding within the red line boundary will be managed by the surface water drainage system.*" In addition, a **Drainage Strategy [APP-210]** has been developed for the Site in consultation with the NELDB with attenuation provided up to and including the 1% AEP plus 40% climate change event. Surface water runoff will be discharged at a restricted rate from the site to the local drainage systems and will therefore provide betterment when compared to the current scenario. The **Drainage Strategy [APP-210]** will therefore reduce peak flows/water levels within the local drainage system comprising small drainage ditches which predominantly drain surface water runoff from these site areas.

		Compensatory storage is not needed to mitigate flood risk due to land raising and no further assessment is required. The final Drainage Strategy would be approved by NELC, following consultation with the EA and NELDB, through **Requirement 12** of **Schedule 2** of the **dDCO [PDA-004]**.
10.15	Paragraph 18.8.97 (Changes in Tidal Regime) states that the development has the potential to change the rates of erosion and/ or accretion on the foreshore in proximity to the flood defences over the operation of the project. We would like to see further assessment of this in the Physical Processes Chapter (as mentioned in paragraph 8.1 above). Any impacts on the existing flood defences will need to be mitigated by the undertaker, rather than during the Environment Agency maintenance programme.	The Applicant's assessment of the Project, as detailed in **ES Chapter 16: Physical Processes [APP-058]**, includes assessment of 'Marine facilities (approach jetty, jetty head and dredge pocket) – potential impact on sediment transport' within **Paragraphs 16.8.49 to 16.8.56**. This assessment is informed by the numerical sediment transport modelling undertaken and is based on the outputs of the hydrodynamic modelling to assess potential changes to erosion and accretion patterns across the near- and far-field. Whilst not specifically referred to within this section, the assessment findings in **Paragraph 16.8.54** indicate that the marine elements of the Project will have no impact on accretion or erosion along the toe of the existing flood defences. It is therefore considered that no further assessment is required.
10.16	**Appendix 18.A: Flood Risk Assessment [APP-210]** We have reviewed the FRA, which we have found to contain some inaccuracies, which are highlighted below. Additional information on some aspect of flood risk is also requested, as outlined below.	The Applicant has responded to the points raised in Paragraphs 10.17 to 10.26 of the EA response below.

10.17	Paragraph 1.2.2 appears to attribute the site's Flood Zone 3a designation as being "due to the presence of flood defences along the Port of Immingham and estuary frontage". For clarity, it should be noted that the Flood Zones do not take into account the presence of defences and represent the undefended scenario.	Revised text will be included in the table of errata to clarify that the Flood Zones do not take into account the presence of defences and represent the undefended scenario.
10.18	Paragraph 2.7.6 contains an inaccurate reference to the 'Humber Flood Risk Management Strategy (2021 – 2027)' – this should read 'Humber River Basin District Flood Risk Management Plan 2021 to 2027'. Also see paragraph 10.3 above in respect of the Humber Estuary modelling being ongoing, as opposed to having been completed.	Revised text will be included in the table of errata to clarify the reference to the Humber River Basin District Flood Risk Management Plan 2021-2027 and to highlight that the 'improvements to the Humber Estuary modelling' are currently ongoing as part of the developing Humber 2100+ project.
10.19	Paragraphs 3.3.10 to 3.3.12 contain out of date information. The current position is that: In parallel with ongoing investment on the ground, the Humber 2100+ partnership, made up of 11 local authorities and the Environment Agency, is working together to safeguard the future of the Humber in the face of climate change, setting the direction for the next 100 years.	Revised text will be provided in the table of errata to clarify the current position of the Humber 2100+ project.
10.20	To help manage an uncertain future, plans to manage tidal risk will need to be able to adapt and flex to a whole range of challenges that lie ahead. The partnership is working together to understand both current and future risks including the impacts of sea level rise, before agreeing on what different approaches will be needed to manage that risk and	The Applicant can confirm that the comment regarding the plans to manage tidal risk, the Humber 2100+ partnership and the development of a plan for adaptation, based on the partnership's work, has been noted.

	this will lead to the development of a plan for adaptation.	
10.21	Paragraph 4.4.16 states that "Flood levels within the Temporary Construction Area (Work No. 9) and surrounding land from a fluvial defence breach scenario, equalling those contained within Table 14, are unlikely to occur due to the spread of the fluvial volume across the wider flood plain. So, flood levels within the Temporary Construction Area and surrounding land due to a fluvial defence breach would be lower than those presented within Table 14". We do not agree with this statement as the proximity of Work No. 9 to the embankments of the Stallingborough North Beck is such that there would be limited spreading of the fluvial flood water over the floodplain during any initial flooding. When the temporary work area (Work No. 9) is in use, it is recommended that this is considered. Also, this needs to be considered when drafting the emergency plan, particularly in respect of a place for the safety of the people using the area.	**Paragraph 4.4.15** of **ES Appendix 18.A: Flood Risk Assessment [APP-209]** acknowledges that should a breach of the fluvial flood defences along Stallingborough North Beck occur in the location of Work No. 9, the work area could potentially be inundated by flood water to a depth of 0.52m to 1.05m. Based on topography, flood water would flow north, into Work No. 9, and towards the west towards land between the watercourse and the Project. As detailed in **Paragraphs 18.7.29 to 18.7.30** and **Paragraphs 18.7.39 to 18.7.42** of **ES Chapter 18: Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage [APP-060]**, mitigation measures will be put in place during the construction phase (Work No.9 is a temporary work site), including stopping work in the event of extreme weather and a flood warning being in place, construction plant being removed from the Site for the duration of the flood warning event and an Emergency Response Plan, to be developed by the contractor as part of the Final CEMP and approved under **Requirement 6** of **Schedule 2** of the **dDCO [PDA-004]**. The Emergency Response Plan (and site induction training) would detail the actions the contractor would take, in the event of a possible flood event, including the location of safe refuge, if required.
10.22	Paragraph 5.4.5 focuses on the predominant risk from fluvial and tidal sources (the West Site is not within an area of risk from these sources). However, the site may be at risk from local ordinary watercourses for which other risk management authorities, such as the	The Applicant can confirm that **ES Appendix 18.A: Flood Risk Assessment [APP-209]** has assessed the impact of land raising on the displacement of flood water from non-main river

	Lead Local Flood Authority or Internal Drainage Board, have responsibility. The FRA should assess the impacts of land raising on the displacement of flood water from non-main river sources and whether any floodplain compensatory storage is required. The FRA has currently only assessed the floodplain compensation from main river flooding.	sources and that floodplain compensatory storage is not required. Topographic levels show ground levels for the areas of the site where land raising is proposed (the West Site (Work No. 7) and East Site (Work No. 3 and Work No. 5)) are predominantly higher than the surrounding small drainage ditches. No areas of significant flooding from the NELDB systems have been identified via discussions with the NELDB, and as noted in **Paragraph 4.4.28** the drainage system managed by the NELDB is understood to be able to accommodate events with 0.1% AEP by a combination of storage and pumping, without flooding the surrounding area. As demonstrated in **Paragraphs 4.5.3 to 4.5.9** together with **Plate 5: Risk of Flooding from Surface Water** of **ES Appendix 18.A: Flood Risk Assessment [APP-209]**, there are no concerns with regards to flood risk from the local drainage system in proximity to the East and West Sites. In addition, a **Drainage Strategy [APP-210]** has been developed for the Site in consultation with the NELDB with attenuation provided up to and including the 1% AEP plus 40% climate change event. Surface water runoff will be discharged at a restricted rate from the site to the local drainage systems and will therefore provide betterment when compared to the current scenario. The Drainage Strategy will therefore reduce peak flows/water levels within the local drainage system, comprising small drainage ditches which predominantly drain surface water runoff from these site areas. It is therefore considered that compensatory storage is not needed to

		mitigate flood risk due to land raising and no further assessment is required. The final Drainage Strategy would be approved by NELC, following consultation with the EA and NELDB, through **Requirement 12** of **Schedule 2** of the **dDCO [PDA-004]**.
10.23	Section 6.6 – Place of Safe Refuge: we support the use of areas of safe refuge and note that the number of areas being provided has been increased from the preliminary proposal. This will provide more and safer options for employees. However, it is still worth noting that the flood refuge areas would only serve the buildings themselves and the immediate vicinity. The occupants of the rest of the site could have to get through deep flood water to reach the areas, which could pose a risk to life.	**Paragraph 6.6.2** of **ES Appendix 18.A: Flood Risk Assessment [APP-209]** notes that the following safe refuge areas will be provided: the control room buildings within the West Site (Work No. 7) and East Site (Work No. 5), and within the safe haven building located within the West Site (Work No. 7), close to Queens Road. The East Site (Work No. 3) is normally an unoccupied site. Specific flood emergency response procedures and contingencies will be covered in the detailed Flood Emergency Response plan required by **Paragraph 6.7.3** of the **Flood Risk Assessment** to be prepared in consultation with the EA and Lead Local Flood Authority.
10.24	Section 6.7 – Flood Warning and Emergency Plan: it should be noted that we do not normally comment on or approve the adequacy of flood emergency response procedures accompanying development proposals, as we do not carry out these roles during a flood. Our involvement with this development during an emergency will be limited to delivering flood warnings to occupants/users covered by our flood warning network. However, we would provide advice on the level of flood risk to an area, should the relevant planning authority request it.	The Applicant notes the comment regarding **Section 6.7: Flood Warning and Emergency Plan in ES Appendix 18.A: Flood Risk Assessment [APP-209]**.

10.25	Throughout the FRA it states that the site will be shut down on receipt of a Tidal Flood Warning. We support the intention to shut down the facility during periods when there are flood warnings in place. We also welcome the fact that the site can be shut down in situ and remotely. However, paragraph 6.7.4 states that "the Site will only be evacuated when it is really necessary", which seems to contradict the plans outlined elsewhere in the FRA. We would request that any future flood emergency response plan makes it very clear what procedures will be followed and what the specific triggers and actions will be.	The Applicant can confirm that the Hydrogen Production Facility would be shut down if a tidal flood warning was received. The Flood Emergency Response Plan (reference **Paragraph 6.7.3** of **ES Appendix 18.A: Flood Risk Assessment [APP-209]**) which will be prepared in consultation with the EA and Lead Local Flood Authority, will cover the procedures to be followed and what the specific triggers and actions will be.
10.26	Paragraph 6.9.7 states that "contingency measures will be put in place, as necessary, for the construction of the proposed the ramps and new section of flood defence to ensure the continuity of the flood defence throughout the works". This is welcomed and we look forward to reviewing these measures in due course.	The Applicant notes this comment regarding **Paragraph 6.9.7** and further information regarding contingency measures for the construction of the proposed ramps and new section of flood defence will be provided to the EA for review as the design of the development progresses, the mechanism for which is being discussed with the EA.
10.27	**Appendix 18.B: Drainage Strategy [APP-211]** We request further information and consultation on the water discharge into the Stallingborough North Beck. The drainage strategy (and paragraph 18.8.49 of Chapter 18) indicates that there will be "uncontrolled discharges to North Beck Drain". This will not be acceptable as this main river is currently up to capacity and we are unlikely to permit any increase in flow to it.	The Applicant has progressed the Drainage Strategy for the jetty access road, to which the reference to uncontrolled discharges related (Work Nos. 1 and 2), since DCO submission. Uncontrolled discharges into the Stallingborough North Beck are no longer proposed. Surface water runoff is being attenuated to a rate that has been agreed with NELDB. The final Drainage Strategy will be approved through Schedule 2, Requirement 12 of the DCO.

10.28	The plan on page 25 (ref: 0673509-ACM-XX-XX-0001) shows the ditch that runs behind the sea defence discharging into the Stallingborough North Beck. We believe this ditch discharges directly into the Humber via an outfall. We are not aware of who owns and operates the outfall and therefore we cannot comment on its condition and levels of siltation.	Photos from the site show the culvert outlet into Stallingborough North Beck from the location of the ditch. Based on this information, the Applicant does not believe the ditch connects directly to the Humber. The Applicant is in discussions with the Internal Drainage Board and the EA about the ownership of the structure. Please see the photo below: 
11.0 – 11.1	**Chapter 20: Materials and Waste [APP-062]** We have reviewed this chapter together with Appendix 2.A (Waste Hierarchy Assessment) [APP-172] and we have no comments to make on these.	The Applicant notes the EA has reviewed the submission version of **ES Chapter 20: Materials and Waste [APP-062]** and is pleased the EA agrees with the methodology and conclusions of that chapter.
12.0 – 12.1	**Chapter 21: Ground Conditions and Land Quality [APP-063]** We have reviewed Chapter 21 and the associated Appendices 21.B Phase II Ground Investigation	The Applicant notes the EA has reviewed **ES Chapter 21: Ground Conditions and Land Quality [APP-063]** and the associated appendices and is pleased that the EA agrees with the methodology and conclusions of those documents.

	Interpretative Report and 21.C Outline Remediation Strategy. Based on the findings of the site investigations undertaken to date, potential controlled waters pollution risks have been identified. We agree with the recommendations of the Interpretative Report that further groundwater monitoring is recommended to fully characterise groundwater conditions below the site. Based on the findings of the additional groundwater monitoring, further risk assessment, site investigation and/or remediation may be required. We are satisfied that Requirement 15 in Schedule 2 of the draft DCO is sufficient to manage the risks from contamination at the site, in so far as it relates to controlled waters.	The final remediation strategy(ies) detailing the programme of groundwater and surface water monitoring will be approved through Schedule 2, Requirement 15 of the DCO.
13.0 – 13.1	**Chapter 22: Major Accidents and Disasters [APP-064]** This chapter discusses the potential domino effect with nearby COMAH sites. For information, we would highlight that several other sites (in the table below) in the locality hold an Environmental Permit but do not fall under COMAH and may be impacted by major accidents at the site, leading to escalating consequences.	The Applicant can confirm that any site within the vicinity of the Project that has the potential to be impacted by the Project has been considered in **ES Chapter 22: Major Accident and Disasters [APP-064]** (**section 22.6**) including sites which hold an Environmental Permit.
14.0 – 14.1	**Chapter 25: Cumulative and In-Combination Effects [APP-067]** We have reviewed Chapter 25 together with Figures 25.1 and 25.2 and we have no comments to make on these.	The Applicant can confirm this comment has been noted.

15.0 – 15.1	**6.6 Outline Construction Environmental Management Plan [APP-222]** We are satisfied that this plan outlines all the relevant and necessary environmental protection measures (relevant to our remit) that will be implemented. We look forward to reviewing the final plan secured via Requirement 6 in due course.	The Applicant notes that the EA is satisfied with the **Outline CEMP [APP-221]** and that it will be consulted in due course on the Final CEMP.
15.2	We welcome the acknowledgement on page 55 that within Work Area 9, no temporary buildings, plant or materials will be located within the area of the fluvial floodplain or within 8m from the landward toe of the fluvial flood defence, whichever is further. A note to this effect should also be included in Section 4.2 of the Soil Management Plan to ensure floodplain storage and flood flows are not impacted.	The Applicant notes the comment, and the outline Soil Management Plan will be updated accordingly.
16.0 – 16.1	**6.7 Outline Decommissioning Environmental Management Plan [APP223]** We have reviewed the contents of this plan, which are satisfactory and request that we be included as a specific consultee to Requirement 18 (as mentioned in paragraph 3.8 above) to enable us to review and comment on any final plan.	The Applicant agrees that the EA should be included as a consultee on the DEMP. This is reflected in the dDCO that was submitted at Procedural Deadline A.
17.0 – 17.1	**6.9 Outline Landscape and Ecology Management Plan [APP-226]** As per paragraph 6.1 above, we have been unable to review this document at the current time and will provide comments at a later date if possible.	The Applicant notes that the EA has not reviewed this plan and would be happy to engage with the EA to address comments or concerns.

18.0 – 18.1	**7.2 Schedule of Mitigation and Monitoring [APP-235]** We have reviewed the contents of this schedule and have no comments to make on it at the current time.	The EA's response is noted.
19.0 – 19.1	**7.4 Consents and Agreements Position Statement [APP-237]** We have reviewed this statement and concur with the identification of possible permits that will be required from the Environment Agency for the construction and operation of the development.	The EA's response is noted.
20.0 – 20.2	**Further representations** In summary, we can confirm that we have no objection to the principle of the proposed development, as submitted. The issues and holding objection outlined above are capable of resolution and we look forward to receiving additional information to resolve our outstanding concerns. We will also continue to work with the Applicant to agree the wording of the Protective Provisions and the required legal agreement in respect of the future operation and maintenance of the flood defence. We reserve the right to add or amend these representations, including requests for DCO Requirements and Protective Provisions should further information be forthcoming during the examination on issues within our remit.	The Applicant acknowledges that the EA does not have an in-principle objection to the Project, as submitted. The Applicant looks forward to continued engagement with the EA to resolve the issues and holding objection set out above.

RR-011 – Health and Safety Executive

The Applicant welcomes the engagement with the Health and Safety Executive ("HSE") to date on the Project.

The Applicant and Air Products have had engagement with HSE since the Project was formally launched in August 2022, including on the matters raised in HSE's representation. The consultation to submission of the DCO Application is documented in the **Consultation Report [APP-022]** and the **Environmental Statement ("ES")** (particularly in **ES Chapter 22: Major Accidents and Disasters [APP-064]**).

Consultation

The Applicant and Air Products agree that the application site for the Project falls into the consultation zones of several major accident hazard ("MAH") sites. The Applicant and Air Products have consulted neighbouring operators, including those operating the MAH sites, through the statutory consultation undertaken before submission of the DCO Application. In addition, the Applicant and Air Products have engaged with neighbouring operators that could potentially be impacted by MAH scenarios identified through the preliminary risk analysis work undertaken.

The outcome of the above engagement has been taken into account in assessing whether the Project is vulnerable to a possible major accident, as covered in **ES Chapter 22: Major Accidents and Disasters [**APP-064**]**. Consultation with neighbouring facilities will continue as part of the process under the Control of Major Accident Hazards ("COMAH") Regulations 2015.

It is noted that Edward Nicolson is no longer present in the vicinity; the new occupier of the relevant site is Woodbridge, who has been consulted.

Major accident hazard pipeline

The Applicant and Air Products have engaged with Cadent Gas about the MAH gas pipeline which runs through the West Site. It has been agreed that the pipeline can be retained within the Project and does not need to be diverted. The parties are in the process of agreeing appropriate protective provisions to ensure that the pipeline will be safely retained and maintained during the construction and operation of the Project, together with a Statement of Common Ground on those issues.

Land use planning

The Applicant and Air Products confirm that, as set out in ES Chapter 22: Major Accidents and Disasters [APP-064], the risk assessment for the Project has considered all the major hazards associated with its proposed operations, including the impact on surrounding hazardous installations and how those installations may impact on the MAHs arising from the Project's operations. As identified above, there has been engagement with the operators of nearby COMAH regulated sites where the potential for a domino effect has been identified.

Hazardous substances consent

The hazardous substance consent was submitted to North East Lincolnshire Council by Air Products on 30 March 2023 and validated on 5 April 2023. Air Products received notification on 22 November 2023 that the HSE was proceeding with the public safety risk assessment and an assessor would be allocated no earlier than 22 February 2024.

The position regarding the proposed compulsory acquisition of residential and part-residential properties on Queens Road is addressed in the responses to Q1.17.5.1 submitted at Deadline 1 **[TR030008/EXAM/9.3]**.

Air Products notes and agrees that the hydrogen production facility will become an upper-tier site under the COMAH Regulations 2015, that the COMAH Regulations 2015 would apply in full and that the DCO would not be expected to include additional matters relating to health and safety.

Consideration of risk assessments

The representation from HSE states that it is not clear from the DCO Application whether there was consideration of risk assessments arising from the Project's vulnerability to major accidents.

The Applicant and Air Products note Advice Note Eleven Annex G (as referred to in HSE's representation), which states: "*it may be beneficial for applicants to undertake a risk assessment as early as possible to satisfy themselves that their design and operation will meet the requirements of relevant health and safety legislation as design of the Proposed Development progresses*". HSE's representation notes that this may be important as any change in design required as a result of the risk assessment process may materially change the planning application (e.g. change in scale such as increased height of process equipment).

The Applicant and Air Products confirm that appropriate risk assessments were undertaken and the outcomes considered before submission of the DCO Application to inform the design and operation of the Project and ensure that the final design would meet the requirements of relevant health and safety legislation.

The Application for the Project, including the hydrogen production facility, is based on maximum and certain minimum parameters (the Rochdale envelope approach) as set out in **Requirement 4 (Schedule 2)** of the **draft DCO [PDA-004]**. This gives flexibility for the final design and layout to come forward within those parameters. The Environmental Impact Assessment was undertaken on the basis of those parameters.

ES Chapter 22: Major Accidents and Disasters [APP-064] addresses the assessments undertaken before submission of the DCO Application. A number of studies and risk assessments were undertaken to inform the Project layout and design. These included studies by external consultants, such as DNV and Baker Risk, who are industry recognised specialists in the field. Additional risk assessments have also been undertaken for jetty operations including a **Navigational Risk Assessment [APP-191]**.

Introduction to COMAH

The Applicant and Air Products note and understand the requirements of the COMAH process. Air Products submitted a pre-construction COMAH notification on 5 April 2023. There has been ongoing engagement with the Competent Authority (HSE and Environment Agency) including an in-person meeting on the content of the pre-construction COMAH safety report on 29 January 2024. This is anticipated to be submitted to the Competent Authority in or around April 2024 (on a confidential basis as is usual for these reports).

The Applicant and Air Products look forward to continued engagement with HSE on the above matters.

RR-012 – Historic England

The Applicant welcomes Historic England's Relevant Representation.

The Applicant notes that Historic England's Relevant Representation initially describes the Application as a '*Solar photovoltaic array and electrical storage and connection infrastructure, with a generation capacity of greater than 50 MW*'. Please note that this is incorrect. The development is, as Historic England goes on to describe, - '*A multi-user liquid bulk terminal which would be located on the eastern side of the Port of Immingham ("the Port"), as well as associated development (collectively termed "the Project"). The associated development would comprise the construction and operation of a green hydrogen facility and landside works for the production of green hydrogen from imported green ammonia on site*'.

The Applicant welcomes the acknowledgement by Historic England that they have already had constructive pre-application engagement regarding the Project with the Applicant.

With regards to '*impacts upon potentially sensitive peat deposits and similar (which may span the current shore line)*', the Applicant has agreed with North East Lincolnshire Council (NELC) that no further archaeological fieldwork is required on these deposits, as agreed in a meeting with the NELC Heritage Officer on 26 July 2023. Laboratory analysis of the peat and organic alluvium collected by the recent geoarchaeological evaluation will, however, be undertaken to mitigate against direct impact of the Project on these underlying deposits (as outlined within the Outline Construction Environmental Management Plan **[APP-222]**) as secured by Requirement 6 of the draft Development Consent Order [APP-006].

With regards to marine geoarchaeology (i.e. appropriate consideration of peat deposits and palaeolandscape features below Mean High Water Springs) and '*interaction with unknown wrecks etc in the marine environment*', including securing the investigation of these through suitable DCO requirements, and the undertaking of this work to agreed methods including reporting, archiving and dissemination – appropriate mitigation strategies have been proposed by the Applicant, as set out in the Outline Marine Written Scheme of Investigation ("Marine WSI") **[APP-205]**. Agreement with Historic England on the final form of the Marine WSI will be obtained prior to construction phase commencement, in accordance with Condition 13 of the Deemed Marine Licence set out in Schedule 3 of the draft Development Consent Order **[APP-006]**. The final form of the Marine WSI will include methods agreed with Historic England including; reporting, archive and dissemination, which will inform subsequent phases of work.

RR-014 – The IOT Operators

Both the Applicant and Air Products have an ongoing relationship with the IOT Operators which is important to both parties (the IOT Operators being a tenant of the Applicant's, and the owners of the IOT Operators (Phillips 66 Limited and Prax Lindsey Oil Refinery Limited) being commercial customers of Air Products) and have a good understanding of the nature of their operations in the area (as summarised in Paragraphs 1.3 and 1.4 of the Relevant Representation).

There has been considerable engagement to date with the IOT Operators in terms of the relationship between the Project and the IOT. That engagement will continue – there are statutory responsibilities on Air Products (as proposed operator of the hydrogen production facility) and Associated Petroleum Terminals (Immingham) Limited ("APT") (as operator of the IOT), both upper tier COMAH sites, to co-operate and share relevant information. In light of the ongoing working relationship between all parties, the Applicant and Air Products provided a bespoke response to the IOT Operators to their statutory consultation feedback which primarily raised issues relating to safety.

Concerns with the Project

The Applicant notes that in Paragraph 2.2 of the Relevant Representation the IOT Operators have raised concerns with regards to "*site safety issues relating to the construction, operation and decommissioning phases of the IGET Development, including the risk of major fire, explosion or release of toxic gas*".

Paragraph 2.2 of the Relevant Representation lists five potential scenarios of concern relating to hydrogen or ammonia leakages from pipelines, ammonia storage tank, hydrogen production units or liquefiers. In relation to Paragraph 2.2(e), it is confirmed that no hydrogen liquefiers are proposed on the East Site.

Potential major accident scenarios and possible consequences are set out in **Table 22-4: Identification of Major Accident & Disaster Categories** and **Table 22-5: Assessment of Major Accident & Disaster Risk Event Scenarios** in **Environmental Statement ("ES") Chapter 22: Major Accidents and Disasters [APP-064]**. The proposed mitigation identified in **ES Chapter 22** is summarised below.

Consultation and engagement have been carried out in respect of the Application including the **ES**, and a summary of the comments raised within the **ES Appendix 1.B: Scoping Opinion [APP-168]**, those returned in response to the formal consultations and other pre-application engagement is contained in **Table 22-1** in **ES Chapter 22 [APP-064]**.

Applicant's Proposed Mitigation

At Paragraph 3.2 of the Relevant Representation, the IOT Operators state that the response by the Applicant to their concerns (as set out in **ES Chapter 22 [APP-064]**) largely refers to proactive engagement, regulatory compliance, safety assessment and a collaborative approach. It notes that the measures are not included in the proposed requirements or protective provisions.

The safety regime embodied in the Control of Major Accident Hazards ("COMAH") Regulations 2015 operates independently of the regime under the Planning Act 2008 concerning applications for development consent, and (as noted in **ES Chapter 22 [APP-064]** at **Table 22-1, Page 22-18**) provides an appropriate framework for ensuring the safe and suitable construction, operation and decommissioning of the hydrogen production facility. The joint Competent Authority under that regime (the Health and Safety Executive ("HSE") and Environment Agency) is responsible for ensuring regulatory compliance and that risks are reduced to As Low As Reasonably Practicable ("ALARP"). Additionally, the Environmental Permit (regulated by the Environment Agency) will require the application of 'Best Available Techniques' in relation to the operation of the facility to minimise environmental impacts. Hazardous substances consent will also be required (issued by North East Lincolnshire Council), with the HSE as the main consultee.

The National Policy Statement for Ports states that the Secretary of State should assume that such other regulatory regimes will be properly applied and enforced. Aside from the need to acquire the residential properties at Queens Road, the Applicant is not aware of any good reason to believe that any necessary consents and permits will not be granted. The requirements of the COMAH Regulations (including the preparation of safety assessments and reports and major accident prevention policies and emergency planning requirements) do not need to be secured or duplicated through the DCO. Indeed, the HSE note in its Relevant Representation that HSE would not expect the DCO to include additional matters relating to health and safety and that it expects the COMAH Regulations 2015 to apply in full and for nothing in the DCO to impact on this legislation (Paragraphs 14 and 17 of HSE Relevant Representation **[RR-011]**).

Engagement and collaboration between the parties is continuing, in line with their responsibilities under the COMAH Regulations 2015.

Adequacy of risk management controls

The IOT Operators note at Paragraph 4.1 their disappointment that the DCO Application was submitted without certain safety studies (those set out in **Table 22-1, Page 22-16 onwards**, of **ES Chapter 22 [APP-064]**). **Table 22-1** explains that the outcome of the studies

will be shared with key stakeholders, including the IOT Operators (as explained below), and, critically, will be contained within the safety report submitted to the HSE and Environment Agency under the COMAH Regulations 2015. Such assessments are not generally disclosed to the public (and will not be submitted to the Examination) due to the sensitive nature of the material they contain in terms of public safety, which is often also commercially sensitive.

However, the Applicant, in agreement with APT, has commissioned process safety consultants (namely DNV and Baker Risk) in order to provide initial assessments of the impact of certain scenarios on APT. The results have been shared by the Applicant with APT. Following in-person meetings at the Applicant's office in Immingham on 23 January 2024 and 6 February 2024 and subsequent correspondence, the parties have agreed the outline of measures to address APT's concerns as presented by them to the Applicant and are working together to agree the details and an appropriate securing mechanism outside of the terms of the DCO with a view to the IOT Operators being able to withdraw their objections to the Application in light of the agreed mitigation outcome.

The IOT Operators state at Paragraph 4.2 that all safety measures should be appropriately secured in the DCO. As explained above, the relevant safety measures will be set out in the safety reports submitted pursuant to the COMAH Regulations 2015 and it is neither necessary nor appropriate for the DCO to duplicate those matters. The Applicant and Air Products look forward to continued engagement with the IOT Operators on these matters.

In respect of the points set out at Paragraph 4.3 of the Relevant Representation:

- The Applicant does not consider that any changes are required to the Application arising out of any previous or current safety assessments.
- As noted above, the DCO is not the appropriate mechanism to secure safety measures.

The Applicant is committed to continued discussions with the IOT Operators to seek to address their concerns, but does not consider that there is a need for protective provisions to be included in the DCO to ensure the protection of the IOT, its staff or existing infrastructure.

The Applicant looks forward to continuing to work with the IOT Operators to reach an agreed position in accordance with Paragraph 4.4 of their Relevant Representation.

RR-015 – Knauf

The Applicant welcomes the representation made by Knauf and in particular the identification of an anticipated positive impact of the Project in relation to the decarbonisation of the Knauf plant at Immingham.

RR-016 – Marine Management Organisation

Reference	Relevant Representation	Applicant's Response
dDCO and DML – Provision 46 Benefits of the order		
3.1.1	There are a number of provisions in this section which could apply to the MMO. However, the MMO cannot accept any restrictions of the operation of our statutory powers. Section 72(7)(a) of the Marine and Coastal Access Act (MCAA) already permits a licence holder to make an application for a marine licence to be transferred, and where such an application is approved for the MMO to then vary the licence accordingly (s. 72(7)(b)). This power should be retained and used in relation to the DML granted under the DCO. Any attempt to create a parallel or hybrid transfer regime in its place should be strongly resisted as it creates legal uncertainty and undermines the MMO's statutory powers. For this reason the following additional wording should be added: "(8) For the avoidance of doubt sections 72(7) and (8) of the 2009 Act shall continue to apply to all parts of the deemed marine licence".	It is well established in Development Consent Orders ("DCOs") made pursuant to the Planning Act 2008, where there is to be transfer of a marine licence deemed to be granted by the Secretary of State pursuant to such an order, that approval is needed from the Secretary of State, who deemed the grant, with the MMO often specified as a consultee on the matter. This approach has evolved because of the imperative for limiting the number of duplicated regimes engaged in the context of nationally significant infrastructure projects. It may also be because, it appears to the Applicant, that there is no scope for appealing an MMO decision not to issue a notice under section 72(7) of the Marine and Coastal Access Act 2009 to transfer a marine licence (as no notice will have been issued to appeal to the First-tier Tribunal, and in any event the Secretary of State is the more appropriate arbiter of such matters having determined the original application for development consent). The Applicant has therefore incorporated paragraphs 3 and 5 of article 6 (Benefit of the Order) of the Norfolk Vanguard Offshore Wind Farm Order 2020 into article 46 (Benefit of the Order) of the **draft DCO [PDA-004]**, which provide for Secretary of State approval of transfers of the benefit of the deemed marine licence, following consultation with the MMO. The Applicant has also included clarification that the deemed marine licence may also, as an alternative, be transferred pursuant to a variation notice under section 72(7) of the Marine and Coastal Access Act 2009:

		"*(12) An undertaker with the benefit of any provision of the deemed marine licence may pursuant to this sub-paragraph, with the consent of the Secretary of State—* *(a) transfer to any person any or all of the benefit of the provision and such related statutory rights as may be agreed between the undertaker and that person;* *(b) grant to any person for a period agreed between the undertaker and that person any or all of the benefit of the provision and such related statutory rights as may be so agreed between the undertaker and that person,* *but the Secretary of State must consult the MMO before giving such consent to the transfer or grant to another person of the benefit of the provision and such related statutory rights.* *(13) Paragraph (12) does not prevent an application to the MMO pursuant to section 72(7) of the 2009 Act to transfer the deemed marine licence to another person and vary it accordingly*."
dDCO and DML – Provision 62 Arbitration		
3.1.2 – 3.1.3	The DML states "Subject to article 63 (procedure regarding certain approvals, etc.) and except where otherwise expressly provided for in this Order or unless otherwise agreed between the parties, any difference under any provision of this Order must be referred to and settled in arbitration in accordance with the rules set out in Schedule 16 (arbitration rules) of this Order, by a single arbitrator to be agreed between the parties, within 14 days of receipt of the notice of arbitration, or if the parties fail to agree within the time period stipulated, to be appointed on	The principle is accepted and article 62 (Arbitration) of the **draft DCO [PDA-004]** has been revised to state: "*(2) This article does not apply to* […] *any matter for which the consent or approval of the Secretary of State* […] *or the MMO is required under any provision of this Order*."

	the application of either party (after giving notice in writing to the other) by the Secretary of State". An exclusion should be provided here to ensure that the MMO is not bound by arbitration provisions. Therefore the following should be added: (2) For the avoidance of doubt, any matter for which the consent or approval of the Secretary of State or the MMO is required under any provision of this Order is not to be subject to arbitration.	
dDCO and DML – Schedule 3 Part 1		
3.2.1	With regards to par 1 "capital dredge", the MMO considers that this definition should be updated to: "capital dredge" means the dredging to a depth not previously dredged, or to a depth not dredged within the last 10 years and is generally undertaken to create or deepen navigational channels, berths or to remove material deemed unsuitable for the foundation of a construction project and "capital dredging" shall be construed accordingly"	Paragraph 1 (Interpretation) of the deemed marine licence in the **draft DCO [PDA-004]** has been updated accordingly.
3.2.2	With regards to the part 1 'consolidated' "*dredged materials include glacial clay with a diameter of less than 31.25 micrometres and gravel with a diameter of at least 2 and less than 64 millimetres*;" The MMO would suggest amending as follows: *"consolidated dredged materials" means materials including glacial clay with a diameter of less than 31.25 micrometres and gravel with a diameter of at least 2 and less than 64 millimetres*;	Paragraph 1 (Interpretation) of the deemed marine licence in the **draft DCO [PDA-004]** has been updated as follows: "'*consolidated dredged materials' mean materials including glacial clay with a diameter of less than 31.25 micrometres and gravel with a diameter of at least 2 and less than 64 millimetres*"

3.2.3	With regards to part 1 'the environmental statement' - the MMO suggests removing 'the' for consistency with other definitions, e.g. "environmental statement means […]". The MMO notes that there is no further details about what this is intended to contain, either in the DCO or the DML. Therefore, further details would be helpful here to aid interpretation of the DML.	This instance of 'the' has been deleted in the revised **draft DCO [PDA-004]**. The definition of 'environmental statement' mirrors that in made DCOs. It is not necessary for the definition to set out what this includes because the definition is by reference to the exact documents comprising it listed in the table at Schedule 15 (Documents and plans to be certified) of the **draft DCO [PDA-004]** and which will be certified by the Secretary of State pursuant to article 64 (Certification of documents, public register, etc.) in the usual manner ensuring these are the correct relevant documents.
3.2.4	The MMO notes that the following terms are included in Part 2 Conditions, however are not currently defined in Part 1: Environment Agency, Health and Safety Executive, Historic England and Natural England. The MMO requests that these are defined.	It appears following consideration of a number of recently made DCOs that these bodies are not defined in the main body of the DCO or in deemed marine licences because it is sufficiently clear who they are, and article 2(8) of the **draft DCO [PDA-004]** specifies in the usual manner that references to any statutory body include that body's successor bodies. Please could the MMO provide preferred definitions from its template marine licences or confirm their inclusion is not necessary.
3.2.5	With regards to part 1 'licence holder' "means has the meaning given to "undertaker" in article 2 (interpretation) of the Order and any agent, contractor or sub- contractor acting on its behalf;" The MMO suggest that 'means' is removed. The MMO has moved away from the phrase 'licence holder' and consider that the term 'undertaker' should be used here and throughout the DML.	 This amendment has been made. These amendments have been made.

	This definition includes agent, contractor and sub-contractors of the undertaker, which therefore conflicts with conditions 7(3), 10(1), 14(1), 14(2), 15(1)(b), 25(1)(d) and 25(4). It is strongly recommended that the reference to agents, contractors and subcontracts is removed from this definition to avoid confusion in these later clauses e.g. "undertaker" means Associated British Ports with company number ZC000195 and registered at 25 Bedford Street, London, WC2E 9ES";	Reference to agents, contractors and subcontractors has been removed as the remaining terms of the deemed marine licence make it sufficiently clear that they are authorised to carry out works on behalf of the undertaker. However, it is important that the term "undertaker" in paragraph 1 of the deemed marine licence within Schedule 3 of the **draft DCO [PDA-004]** remains consistent with the term in article 2 (Interpretation) of the main body of the **draft DCO**.
3.2.6	With regards to part 1 'marine written scheme of investigations' the MMO request that more detail be added to this definition, including whether this is an outline document or not. If so, this should be amended to "outline marine written scheme of investigation".	The definition of "marine written scheme of investigation" in Part 1 of the deemed marine licence in the **draft DCO [PDA-004]** has been amended as follows: "*'outline marine written scheme of investigation' means the outline marine archaeological written scheme of investigation contained in appendix 15.B to the environmental statement*" Condition 13 has also been amended as follows*:* "*Marine written scheme of archaeological investigation* *13. Archaeological method statements, together with a written report on any consultation carried out with Historic England and the relevant planning authority on matters related to their respective functions in their preparation, must be submitted to and approved by the MMO in writing in accordance with the provisions of the **outline** marine written scheme of investigation and a subsequent update must be provided to the MMO six*

		weeks before commencement of any licensed activity to which the method statement relates."
3.2.7	With regards to part 1 'sediment sampling' "means the document of that name identified in the table at Schedule 15 (documents and plans to be certified) of the Order and which has been certified by the 62 Secretary of State as the sediment sampling plan for the purposes of the Order and any consequent approval by the MMO of sediment sampling analyses;" – The MMO requires a more detailed definition, for example: The SSP must include, but is not limited to— (a) location of the area to be dredged; (b) name of the disposal site; (c) details of the material type proposed for dredging and disposal; (d) volume of the material proposed for dredge and disposal; (e) type and dredging methodology (including whether it is a capital dredge or maintenance dredge, dredge depth and proposed programme for the dredge and disposal activities); (f) the location and depth of any supporting samples; and (g) analysis results which must not exceed 3 years in age."	The following amendments have been made to the **draft DCO [PDA-004]**. In Part 1 of the deemed marine licence, the definition of 'sediment sampling' has been amended to: "*'2023 sediment sampling plan' means—* *(a) the document of that name identified in the table at Schedule 15 (documents and plans to be certified) of the Order and which has been certified by the Secretary of State as the 2023 sediment sampling plan for the purposes of the Order, which sets out —* *(i) a detailed dredging methodology;* *(ii) dredge locations;* *(iii) dredge amounts (total and annual, if applicable);* *(iv) dredge depths;* *(v) duration of dredging activities;* *(vi) whether the dredge is a capital dredging activity or a maintenance dredging activity; and* *(vii) specific gravity of the material or material type; and* *(b) any sediment sampling analyses submitted to the MMO related to the plan to which sub-paragraph (a) refers prior to its expiry*" A definition for 'further sediment sampling plan' has been added. "*'further sediment sampling plan' means—*

		(a) any further sediment sampling plan approved by the MMO in accordance with condition 9(2) which of this schedule which sets out *(i) a detailed dredging methodology;* *(ii) dredge locations;* *(iii) dredge amounts (total and annual, if applicable);* *(iv) dredge depths;* *(v) duration of dredging activities;* *(vi) whether the dredge is a capital dredging activity or a maintenance dredging activity; and* *(vii) specific gravity of the material or material type; and* *(b) any sediment sampling analysis submitted by the MMO related to the plan to which sub-paragraph (a) refers prior to its expiry*" Condition 9 as also been amended to read: "*9.—(1) Any sediment sampling analyses undertaken by a laboratory validated by the MMO and approved by the MMO as part of either the 2023 sediment sampling plan or any further sediment sampling plan are valid for a period of 3 years from the date when those analyses were undertaken.* *(2) Where the validity period for sediment sampling analyses set out in sub-paragraph (1) above expires, the undertaker must submit a further sediment sampling plan request to the MMO for its approval and any sediment sampling analyses from such further sediment sampling plan must be submitted to the MMO.*"
3.2.8	With regards to part 1 "unconsolidated" "dredged materials include alluvial sand with a diameter of at least 62.5 micrometres and less than two millimetres, alluvial silt with a diameter of at least 31.25 and less	The **draft DCO [PDA-004]** has been updated with this amendment.

	than 62.5 micrometres and gravel with a diameter of at least 2 and less than 64 millimetres;" – The MMO suggests amending as follows: "*unconsolidated dredged materials" means materials including alluvial sand with a diameter of at least 62.5 micrometres and less than two millimetres, alluvial silt with a diameter of at least 31.25 and less than 62.5 micrometres and gravel with a diameter of at least 2 and less than 64 millimetres;*	
3.2.9	With regards to part 1 (7) 'Notifications regarding licensed activity' 7(6) Any changes to details supplied under sub paragraph (2) must be notified to the MMO in writing prior to the agent, contractor or vessel engaging in the licenced activity in question. – The MMO advises that the timeframe for notifications under 7(2)(b) is 24 hours, and we would consider also including a similar time frame for this (e.g. within 24 hours). Therefore, MMO suggests the wording is updated to the following: *7(6) Any changes to details supplied under sub paragraph (2) must be notified to the MMO in writing no less than 24 hours prior to the agent, contractor or vessel engaging in the licenced activity in question*.	The **draft DCO [PDA-004]** has been updated with this amendment.
dDCO and DML – Schedule 3 Part 2 – Conditions applying to all licensable activities		
3.3.1	Condition 8.—(1) Construction environmental management plan i) The MMO request further clarity regarding the interrelation between the outline and final construction environmental management plan	The DCO Application includes an **Outline CEMP [APP-221]** at this stage. The Applicant intends to progress negotiations with MMO and other relevant stakeholders of the Final CEMP(s) now in order to reach a position where the content of the Final CEMP(s) is advanced as far as possible and agreed with the

	(CEMP). For example, its welcomed that consultation with the MMO is required on the CEMP. However, the MMO requests clarity on whether there is a CEMP or an outline CEMP at this stage. j) As with the Cold Weather construction restriction (11), the MMO requests that more detail is included in this provision, for example what it will contain.	relevant parties prior to the end of the Examination for the Project. This approach would allow for an efficient approval of the CEMP(s) for the landside works by North East Lincolnshire Council ("NELC") (in consultation with the MMO in relation to Work No. 1) secured under Requirement 6 of the **draft DCO [PDA-004]** and for the works in the marine area by the MMO (in consultation with NELC) secured by Condition 8 of the deemed marine licence and enable site works to commence at the earliest opportunity, which is a necessity of the programme for delivery of the Project. It is intended at present that the Final CEMPs will form at least three separate documents: CEMP relating to all works in the UK marine area (i.e. all works below Mean High Water Spring "MHWS") which would be for the MMO to approve. CEMP relating to that part of Work No. 1 which is landward of MHWS and Work No. 2 which would be approved by NELC. CEMPs relating to the other landside works which would be phased and would also be approved by NELC In response to point j), Condition 11 of the deemed marine licence in the draft DCO has been updated as follows: "*11.—(1) No construction operations for any licensed activity are to commence until a cold weather construction restriction is submitted to and agreed by the MMO in consultation with Natural England. The strategy must include the following—* *(a) A provision that no construction operations (other than to finish driving any pile that is in the process of being driven at the point that the cold weather restriction comes into force) within 200 metres of exposed intertidal foreshore may take place following*

		seven consecutive days of zero or sub zero temperatures (where the temperature does not exceed zero degrees centigrade for more than six hours in any day or any other formula as may be agreed with the MMO to define short periods of thaw); *(b) The establishment of three temperature monitoring points within the Humber Estuary;* *(c) A provision that if the construction restriction comes into effect as a consequence of cold weather conditions, it will be reviewed as follows—* *(i) after 24 hours of above freezing temperatures the restriction will be lifted on a temporary basis provided that the weather forecast relevant for the area including the Port of Immingham, (as agreed with the MMO) indicates that freezing conditions will not return within five days; and* *(ii) after a further five clear days of above-freezing temperatures, the restrictions will be lifted entirely.*"
3.3.2	The MMO has comments surrounding Condition 9 Sediment Sampling and Condition 20(1) Disposal at Sea. However, the MMO is currently reviewing these in line with other developments and will provide further comments at a later stage.	The MMO's position is noted, and, on that basis, no further response is required at this stage.
3.3.3	Condition 10 Agents/contractors/sub-contractors – The MMO advises that if this paragraph remains, reference to agents/contractors and sub-contracts should be removed from the definition of licence holder.	Reference to agents, contractors and sub-contractors has been removed from the definition of 'licence holder'.

3.3.4	Condition 20(2) - The MMO advises that the following should be added to this wording: "[…] approved in writing by the MMO".	The amendment has been made to the **draft DCO**.
3.3.5 – 3.3.6	The MMO suggests an additional paragraph should be added at the end of condition (20): *With respect to any provision of this Schedule which requires the licensed activities to be carried out in accordance with documents, strategies, information, plans, protocols or statements approved by the MMO prior to or under this licence, the documents, strategies, information, plans, protocols or statements so approved are taken to include amendments approved in writing by the MMO subsequent to the first approval of those documents, strategies, information, plans, protocols or statements provided it has been demonstrated to the satisfaction of the MMO that the subject matter of the relevant amendments does not give rise to any materially new or materially different environmental effects to those assessed in the environmental statement or in any updated environmental information supplied under the 2017 Regulations. (2) When any approval or agreement is required of, or with, the MMO pursuant to this Schedule such approval or agreement must not be given if it would give rise to any materially new or materially different significant effects on the environment that have not been assessed in the environmental statement or in any updated environmental information supplied under the 2017 Regulations.*	There is no need to duplicate this wording in Condition 20 as it already appears at Condition 6.

	The MMO recommends that the following paragraph should also be added to ensure that any changes to the plans, protocols, or statements that were originally approved under the license must be approved in writing by the MMO: "*With respect to any condition which requires the licenced activities to be carried out in accordance with the plans, protocols or statements approved under this licence. The plans, protocols and statements so approved are taken to include amendments that may be approved in writing by the MMO subsequent to the first approval of those plans, protocols or statements provided it has been demonstrated to the satisfaction of the MMO that the subsequent matter of the relevant amendments do not give rise to any materially new or materially different environmental effects to those assessed in the environmental information*"	There is no need to duplicate this wording, which already appears at Condition 6.
Schedule 14 Protective Provisions: Part 1 for the Protections of the Humber Conservancy Commissioners		
	The MMO notes that there are inconsistensies in terminology across the DCO which differs from the River Humber used in the DML. The MMO suggests that there is consistency throughout the DML.	The definition of River Humber in Paragraph 1 (Interpretation) of the deemed marine licence within the **draft DCO** **[PDA-004]** has been amended to mirror that in article 2 (Interpretation) of the main body of the **draft DCO**, as follows: "*'the River Humber' means the tidal estuary from its mouth at the Spurn Peninsula to its confluence with the rivers Ouse and Trent*" This is consistent with the term in the protective provisions for the Statutory Conservancy and Navigation Authority for the Humber (Part 1 of Schedule 14 of the **draft DCO**) because the term 'the river' is defined as meaning the River Humber, which itself is

		defined in article 2 (Interpretation) of the main body of the **draft DCO**.
Environmental Statement – Coastal Processes		
4.1.1 to 4.1.5	The coastal process assessment presented in this document is comprehensive and detailed. A few minor points have been raised regarding the modeling of sediment plume and transport impacts. However, these concerns are not considered significant for coastal processes systems.	The MMO's position is noted, and, on that basis, no further response is required.
4.1.5	The Applicant has addressed previous coastal process advisory comments made on the PEIR (Table 16-1), which suggested brief analyses to strengthen confidence in the underlying modelling. The Applicant indicates in Table 16-1 that an 'additional review' of model performance is provided in Appendix 16.A (model calibration), including a focus on natural 'excess suspended sediment concentration (SSC) events'. However, Appendix 16.A does not contain any specific mention of excess SSC events. Instead, it presents an analysis of event definition for application in modelling, but does not address the implications of model representation of the event for interpreting the impact assessments.	The MMO's response is noted, accepting that coastal process advisory comments made on the Preliminary Environmental Information Report ("PEIR") have been addressed. The model calibration and verification, described in **Environmental Statement ("ES") Appendix 16.A [APP-205]**, includes a combined approach to the verification of the sediment transport model, using the historic dredge volumes to assess the ability of the model to broadly represent the infill rates within the existing berth pockets and approach channels. Alongside this, the measured SSC values have also been used to ensure the model is representing the general trend (and phasing) of peaks and troughs within the timeseries (whilst noting the considerable 'noise' in the measured data, indicative of the large natural variability in existing (baseline) values).
4.1.6	Plate 22 suggests that wave height peaks and periods are generally underpredicted over the calibration period. Plate 21 suggests that measured SSC is reliably higher than modelled, and Tables 9/10 suggest actual sediment deposition rates are generally higher than modelled - modelled rates generally reflect the minimum measured deposition	The MMO's response is noted, in that the model performance is adequate for the assessment. As the MMO also comment, models cannot be expected to reproduce measured observations exactly, which is why the calibration report (**ES Appendix 16.A [APP-205]**) contains a range of data comparisons and uses (where possible) the

	rates. Altogether, these observations could imply that the modelling is not fully representative of potential 'worst-case' hydrodynamic and sedimentological impacts. Despite these observations, the Applicant maintains throughout Appendix 16.A that it considers model performance to be adequate for the assessment, based on their target accuracy. The MMO does not dispute this, as these models cannot be expected to reproduce observed measurements exactly.	existing range of natural variability to place the model performance into the wider context of the dynamic nature of the study area. This is particularly relevant when considering sediment transport rates, and **Tables 9 and 10** of **ES Appendix 16.A [APP-205]** reveal that the model is able to replicate the infill volumes and rates, at each of the existing assessment locations, to well within the envelope of natural variability. Furthermore, in a study such as this, where an existing baseline scenario is being compared against a scheme model run, any inherent uncertainty within each of the models will be equally present in both cases and will, thus, tend to cancel out. Consequently, the resulting modelled difference between the scheme and baseline (as used as the basis for the assessment) can be reliably taken to reflect the predicted impacts of the scheme.
4.1.7	The Applicant has referred to their modeling scenarios for both construction and operations as 'worst-case' based on the assumption that all elements of the infrastructure and berth would be in place simultaneously. However, given the observations noted in paragraph 4.1.6 above, MMO in consultation with Cefas questions whether the results of numerical modeling can be considered definitive 'worst-case' outcomes. The Applicant does claim this for the results of modeled bed elevation changes (paragraph 16.8.53), but has not provided a specific explanation of how this interpretation is supported by the modeling calibration, as suggested in Table 16-1. Nevertheless, the Humber Estuary is already a dynamic and highly-developed location, and it is possible to gauge the importance of the	The modelling studies undertaken for the Project have applied a conservative approach to each of the scheme elements in order to apply a 'worst case' to the assessment (i.e. modelling of the largest pile diameter option, and with an allowance for the general tolerances of the dredging equipment, rather than just the target depth, etc.). As noted in the above response to **Paragraph 4.1.6**, it is considered that the modelling can reliably represent the predicted impacts of the Project in the context of the existing baseline.

	observed modeling inaccuracies by comparison with adjacent existing facilities. The baseline data does not suggest that the modelling inaccuracies risk further meaningful degradation of the state of the marine environment. Therefore, MMO concludes that the risk, if it were that the modeling data do not represent absolute worst-case outcomes, is minimal.	
4.1.12	Previous MMO comments during Statutory consultation (January 2023) suggested a broader approach to the current standard cumulative assessment. However, the Applicant has not adopted this suggestion (as addressed in Table 25-1). Since this does not materially affect the impact assessment, MMO does not consider it necessary to pursue this matter further.	The MMO's position is noted, and, on that basis, no further response is required.
Environmental Assessment – Dredge and Disposal		
4.2.1 – 4.2.5	General comments	**Paragraphs 4.2.1 to 4.2.5** in the MMO's Relevant Representation provide comments in support of the assessments made. The MMO's position is noted, and, on that basis, no further response is required.
4.2.6 – 4.2.8	The redistribution of sediment-bound contaminants is also considered to be minor adverse and not significant. The Applicant bases this conclusion on the low levels of contaminants in the sediment data. No quantitative assessment is made to support this determination. It would have been better if the Applicant had attempted some comparison of the sediment results to the contaminant status of the surrounding area and/or impact zone(s). The mode of action for this	As acknowledged by the MMO, the levels of contaminants observed within the sediment sampling for the Project are broadly consistent with those observed in other sediment sampling in the area. This comment does not change the conclusion of the assessment in that the impact significance is assessed as minor adverse and not significant.

	impact pathway is whether the activity will result in higher contaminant levels in the surrounding environment – similar to the Applicant's assessment of impacts to water quality, however different in that it would be broader than just considering changes to water quality. Existing contaminants levels can be informed by sediment datasets in the surrounding area. For example, ABP Immingham hold several licences permitting maintenance dredging in the area, for which various sediment data exist. Data for licences L/2014/00429/5 and L/2014/00430/4 for example indicate levels of trace metals and certain organic contaminants to be broadly around or slightly above Cefas Action Level 1 (AL1). Overall, we would consider that the levels observed within the sediment sampling for the present application are broadly consistent with those observed in other sediment sampling in the area.	
4.2.9	The application will require the disposal at sea of dredged material. The contaminant levels observed are either below or slightly above AL1 for most contaminants (where an AL exists). The metals, organotins, PCB and OCP results are all much closer to their AL1 levels than their AL2 levels, and as such they do not preclude material from disposal at sea. For PAHs, most PAH congeners are below AL1 in most samples, however there are notable elevations above AL1 in samples 4 and 5. In absence of a defined AL2 for PAHs, Cefas utilise the Gorham-Test	The MMO's position is noted, and, on that basis, no further response is required.

	approach (1999; also in Long et al. 1995 and Long et al. 1998), which calculates the sum total of low- (LMW) and high- (HMW) molecular weight PAHs and compares these to observed effect-ranges. Total values of the LMW PAHS and total values of the HMW PAHS are calculated and then compared to threshold values. If a total value (for either LMW or HMW selection of PAHs) does not exceed the effects-range low (ERL), the indication is that the sediment in the sample can be considered low risk. If a total value exceeds the effects-range median (ERM) for either the LMW or the HMW total values, it can be considered higher risk, with more likelihood of harm occurring. Neither sample (4 and 5) exceed the effect-range median (ERM) for either PAH group, although the LMW PAHs are closer to the ERM than the ERL. However, overall the MMO in consultation with Cefas does not consider that these levels should preclude the material from disposal at sea as they appear largely consistent with other sediment contaminant data (as per those referenced in point 4.2.7).	
4.2.10	The evidence to support this application comprises bespoke marine sediment sampling which the Applicant states is in line with pre-application sampling advice under SAM/2022/00106. This appears to be a typo, as according to MMO records – verified by consulting MCMS/the Public Register – SAM/2022/00106 refers to an application for Fawley Power Station, whereas the sample plan advice for	The correct case reference is SAM/2022/00110. The correct data has been used within the assessments, and as such this does not change any of the respective conclusions.

	the present application appears to be SAM/2022/00110.	
4.2.12	The sampling conducted adheres to that recommended under SAM/2022/00110, however, we have not been able to determine from the documents reviewed which laboratory conducted the analyses. This should be clarified before a determination is made as it could impact the confidence which should be ascribed to the data. Given the experience that ABP have with marine licence applications, the MMO are fairly confident that the laboratory will have been validated by the MMO, however this cannot be assumed without substantiation for the purposes of decision-making. Therefore a completed MMO contaminant analysis template should be provided indicating the laboratory that undertook each analyses. Especially given that the application involves disposal at sea, for which xls submission of sediment data is essential to facilitate reporting.	The analysis was conducted by SOCOTEC, an MMO-accredited laboratory. Reference to this is made within **Sediment Contamination Data [APP-241 and APP-242]**. A completed MMO contaminant analysis template has also subsequently been provided to the MMO.
4.2.13	Cumulative effects are discussed in Chapter 27. The assessment put forward appears comprehensive from a dredge and disposal remit.	The MMO's position is noted, and, on that basis, no further response is required.
4.2.14	The MMO does not consider any mitigation to be necessary at this time in regards to dredge and disposal, however this is not final until the contracting laboratory has been confirmed.	The MMO's position is noted, and, on that basis, no further response is required.
Environmental Assessment – Benthic Ecology		
4.3.1 to 4.3.9	The MMO has provided comments in support of the assessment with respect to benthic ecology. Paragraph 4.3.9 summarises the position as:	The MMO's position is noted, and, on that basis, no further response is required.

	In summary, the MMO considers that ABP have submitted the ES in support of the construction of the proposed Immingham Green Energy Terminal which contains relevant information regarding benthic ecology receptors, and the MMO offers no comment that requires further information from the Applicant.	
Environmental Assessment – Fish Ecology		
4.4.1 to 4.4.9	The MMO have provided comments in 4.4.1 to 4.4.9 stating that they are in agreement with the following points within the fish assessments: Scoping Baseline characterization Hearing thresholds Mitigation save for the detailed points raised below.	The MMO's position is noted, and, on that basis, no further response is required.
4.4.10	The MMO seeks clarification regarding the Applicant's proposed restrictions on nighttime piling (Paragraph 4.4.7 iii). In Section 9.8.153, the Applicant asserts that: "Marine piling activities will take place between 07:00 and 19:00 during the winter months and from sunrise to sunset during the summer months. This approach has the potential to disproportionately impact fish species that migrate during daylight hours, while simultaneously reducing potential exposure for fish species that predominantly migrate during nighttime hours (e.g., river lamprey and glass eel)." However, in Section 9.9.5, the Applicant states: 'During the periods 1 March to 31 March, 1 June to 30 June and 1 August to 31 October inclusive, piling will be restricted at night. Specifically, no percussive piling will be undertaken from 19:00 to 07:00 in	**Table 1** at the end of this response presents a schedule of the proposed seasonal restrictions on construction activity for both fish and waterbirds for clarity. The statement in **Paragraph 9.8.153** of **ES Chapter 9: Nature Conservation (Marine Ecology) [APP-051]** was related to the general working hours that are proposed to be employed in the winter months (07:00 to 19:00) and the working hours that are proposed in the summer months (sunrise to sunset). The statement in **Paragraph 9.9.5** of **ES Chapter 9 [APP-051]** takes account of the restrictions that are proposed for fish as set out in **Table 1**.

	March, September and October and between sunset and sunrise in June and August'.	
4.4.11	The MMO recommends that no marine piling of any kind be permitted at night throughout the year, particularly considering the proposed extended duration of construction and dredging activities proposed. While a nighttime piling restriction would be most beneficial to nocturnal receptors, it would also provide a continuous period of respite for all marine receptors affected by the IGET works and other developments currently in the planning stages. Therefore, the MMO proposes that the Applicant's commitment to prohibit nighttime piling be incorporated into the DML as follows: Condition: No marine piling of any kind is to be carried out between the hours of 07:00 and 19:00 during winter months* and from sunrise to sunset during summer months*. The MMO requests that these timeframes be defined by the Applicant.	The months for which a night-time piling restriction is proposed are set out in **Table 1** at the end of this response. Winter months are defined as March, September and October and summer months are defined as June and August. The deemed marine licence in the **draft DCO [PDA-004]** currently states, in Schedule 3, Part 2, Condition 15(9), that "*no percussive piling of marine piles within the waterbody is to take place between the hours of 7pm and 7am from 1 March to 31 March (inclusive) and from 1 September to 31 October (inclusive) or between the hours of sunset and sunrise from 1 June to 30 June (inclusive) and from 1 August to 31 August (inclusive) in any one calendar year.*" This condition will be updated to remove reference to 'percussive' so that it refers to any marine piling. *(9) Subject to sub-paragraph 10, no ~~percussive~~ piling of marine piles within the waterbody is to take* *place between the hours of 7pm and 7am from 1 March to 31 March (inclusive) and from 1 September to 31 October (inclusive) or between the hours of sunset and sunrise from 1 June to 30 June (inclusive) and from 1 August to 31 August (inclusive) in any one calendar year.* *(10) Sub-paragraph 9 does not apply in relation to any—* *(a) ~~percussive~~ piling of marine piles undertaken on exposed mudflat outside the water column at periods of low water;* *(b) emergency works; and*

		(c) ~~percussive~~ piling operations that have been initiated where an immediate cessation of the activity would form an unsafe working practice.
4.4.14	The MMO objects to the Applicant's proposal to limit piling duration to 140 hours (single rig) or 196 hours (two rigs) from June 1 to June 30 and August 1 to October 31 for the following reasons: Salmon smolts are known to employ selective ebb-tide stream transport, migrating in the upper water column and within the fastest-flowing section of the water channel (Moore et al., 1995; Lacroix et al., 2004). Consequently, smolts migrating downstream during June are likely to be located in the main channel and susceptible to the effects of underwater noise. Limiting piling by the number of hours per day fails to account for the tidal state that smolts will utilise for downstream migration during June. In other words, if piling occurs in the month of June during an ebbing tide, there is a potential for an "acoustic barrier" to obstruct the downstream migration of smolts. The Applicant intends to conduct impact piling over approximately 343 days, working 7 days per week. They will utilise up to 2 rigs, operating for up to 270 minutes (4.5 hours) per 12-hour shift. Assuming the "worst-case" scenario of 4.5 hours of percussive piling per day, this translates to 126 hours of piling over a 4-week period. The MMO acknowledges that a certain degree of flexibility is necessary to accommodate additional stopping and starting, remobilization, etc., which may arise due to technical	The proposed limits to the piling durations for the Project were based on the those applied to the Able Marine Energy Park ("AMEP") project which provides a precedent of what was considered acceptable by all relevant stakeholders, including the MMO, based on the evidence available at that time for that project. The Statement of Common Ground ("SoCG") on the Shadow Habitats Regulations Assessment between Able Humber Ports Ltd (the Applicant for AMEP) and the MMO and Natural England states that the mitigation proposed for AMEP was considered sufficient to avoid an Adverse Effect on Integrity ("AEOI"). No specific evidence or rationale was provided in support of this statement. Similarly, the Environment Agency's oral representation at the Issue Specific Hearings held on 11-13 September 2012 for the AMEP Examination stated that the piling conditions "*are appropriate for this application*". There has been no new evidence since the restrictions for AMEP were agreed and, therefore, these restrictions are still considered to be acceptable. It is acknowledged that the marine construction activities for IERRT and the Project have the potential to overlap. Underwater noise from dredging for both projects is only expected to cause behavioural reactions in a relatively localised area in the vicinity of the dredger for fish. Underwater noise generated during piling required as part of the IERRT project along with the Project works has the potential to result in cumulative effects on fish. The maximum potential

	reasons or the presence of marine mammals in the vicinity. However, under a 2-rig scenario, the proposed cap of 196 hours for piling significantly exceeds the Applicant's worst-case scenario of 126 hours of piling and lacks adequate justification. Furthermore, a significant concern is that by not imposing daily piling restrictions, the Applicant could, in theory, conduct prolonged periods of piling during sensitive migratory periods. Most importantly, the cumulative impacts of concurrent piling noise at IGET and Immingham Eastern Ro-Ro Terminal (IERRT) time have not been thoroughly assessed or modelled. Therefore, the maximum energy levels and range of impact for noise remain unknown. Additionally, since IGET and IERRT have proposed identical mitigation measures, it is highly likely that each project will engage in piling at different times throughout the day, as well as concurrently during these "sensitive" months. Consequently, piling in the vicinity of these projects, which are located in close proximity to one another, is likely to result in a substantially longer overall piling period. Please refer to comments in point 4.4.17 for further details on the cumulative impact assessment.	spatial extent of instantaneous peak and cumulative Sound Exposure Level (SEL) effects on fish, were the construction activity for both projects to overlap and occur at the same time, are shown in **Figure 1** and **Figure 2** at the end of this response. The predicted zones of effects are based on the highest underwater noise levels generated during the proposed works for each project (i.e. impact piling) and maximum worst case assumptions presented in the respective underwater noise assessments for IERRT and the Project. **Figure 1** and **Figure 2** illustrate that impact piling noise has the potential to cause injury effects in fish close to the piling activity and behavioural responses over a wider area of the Humber Estuary for both projects. The maximum impact piling scenario for both projects, should the piling works overlap, is for up to seven tubular piles to be installed each day (four piles for IERRT and three piles for the Project) using up to six piling rigs driving at any one time (four piling rigs for IERRT and two piling rigs for the Project). If none of the pile driving activity for the two projects were to occur at the exact same time and temporally overlap over a 24-hour period, the maximum impact pile driving scenario would involve approximately 80 minutes of vibro piling per day (20 minutes for IERRT and 60 minutes for the Project) and 450 minutes of impact piling per day (180 minutes for IERRT and 270 minutes for the Project). Any disturbance and barrier to fish movements caused by the noise during piling for IERRT and the Project would be temporary, with periods during a 24-hour period when no piling

		will be undertaken. The proportion of impact piling is estimated to be at worst around 31% over a 24-hour period (based on 450 minutes of impact piling per day). In other words, any fish that remain within the predicted behavioural effects zone at the time of impact piling will be exposed to a maximum of up to 31% over the period of a day. The proportion of vibro piling is estimated to be at worst around 6% over a 24-hour period (based on 80 minutes of vibro piling per day). In other words, any fish that remain within the predicted behavioural effects zone at the time of piling will be exposed in total to a maximum of up to 37% over the period of a day. In reality, less than 7 piles are likely to be driven per day and also there is likely to be some temporal overlap in the pile driving activity; therefore, the assumptions on maximum pile-driving periods and daily exposures are considered to represent a worst case. Piling will also not take place continuously as there will be periods of downtime, pile positioning and set up. The same mitigation measures are proposed for both IERRT and the Project to help minimise potential adverse effects (i.e. soft-start procedures, timing restrictions to avoid sensitive periods for migratory fish and the use of marine mammal observers). In order to take account of any potential in-combination effects should the piling programmes for both projects overlap, it is proposed that the maximum duration of percussive piling permitted within any 4-week period must not exceed a total of 196 hours where any percussive pile drivers for either one or both projects are in operation. Where percussive piling is occurring simultaneously across the two projects, these respective time periods will not be double counted as the temporal exposure to this effect is not increased. This restriction applies from 1 June to 30 June and 1

		August to 31 October inclusive in any year to minimise the impacts on fish migrating through the Humber Estuary during this period. The measurement of time during each 196-hour work-block must begin at the start of each timeframe, roll throughout it, then cease at the end, where measurement will begin again at the start of the next timeframe, such process to be repeated until the end of piling works. This restriction does not apply to percussive piling that can be undertaken outside the waterbody at periods of low water. In addition, a piling reporting protocol is being developed in consultation with the MMO with associated actions to be taken in the event of an abnormal occurrence (e.g. equipment breakdown or if a marine mammal enters the mitigation zone). The proposed mitigation measures for underwater noise will limit the risk of exposure and reduce the residual impact of the Project (alone and in-combination) on fish to a minor adverse effect. Overall, therefore, the proposed hourly piling restrictions are considered appropriate and acceptable for the Project. **References:** Hawkins, A.D., Roberts, L. and Cheesman, S. (2014). Responses of free-living coastal pelagic fish to impulsive sounds. The Journal of the Acoustical Society of America, 135, pp.3101-3116. Popper A.N., Hawkins A.D., Fay R.R., Mann D.A., Bartol S., Carlson T.J., Coombs S., Ellison W.T., Gentry R.L., Halvorsen M.B., Løkkeborg S., Rogers P.H., Southall B.L., Zeddies D.G. and Tavolga W.N. (2014). Sound exposure guidelines for fishes

		and sea turtles: a technical report prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI. ASA S3/SC1.4 TR-2014. Springer and ASA Press, Cham, Switzerland.
4.4.17	The Applicant has assumed, under their worst-case scenario, that simultaneous piling will occur at IERRT and IGET. However, the ES lacks UWN modeling to substantiate this scenario. Considering that ABP is the Applicant for both projects, a more integrated approach would have been anticipated in this ES (and that of IERRT), encompassing UWN modeling for a scenario of concurrent piling with 2 rigs operating at IGET and 2 rigs operating at IERRT, to accurately represent the true extent of piling noise.	The maximum potential spatial extent of instantaneous peak and cumulative SEL effects on fish were the construction activity for both projects to overlap and occur at the same time are shown in **Figure 1** and **Figure 2** at the end of this document. The predicted zones of effects are based on the highest underwater noise levels generated during the proposed works for each project (i.e. impact piling) and maximum worst case assumptions presented in the respective underwater noise assessments for IERRT and the Project. Further information on the impacts is included in response to **Paragraph 4.4.16** above.
4.4.18 – 4.4.19	Despite reservations regarding the UWN modeling presented in the ES and the Applicant's proposed seasonal temporal mitigation, MMO cannot concur with the conclusions drawn on the cumulative impacts of noise and vibration for fisheries and fish ecology in the absence of concurrent modeling for the IGET and IERRT projects. In light of the probable cumulative impacts of UWN from piling, as outlined in paragraph 4.4.17, the MMO strongly recommends that the Applicant investigate the implementation of noise abatement measures, such as bubble curtains, for this project (as well as IERRT, which is also an ABP project). Recent coverage highlighting the successful use of bubble curtains for the South Shields Regeneration Project demonstrates their effectiveness as appropriate mitigation in an estuarine environment. This	Bubble curtain mitigation systems emit a constant stream of large and small air bubbles around the construction site of the piled foundation. The 'wall of bubbles' that is created absorbs part of the physical energy of emitted sound waves generated during the impact of the hydraulic hammer on a pile. The bubble curtain that was used at the South Shields Regeneration Project was reportedly able to reduce the sound of impact piling from 163dB to 140dB (i.e. a 23dB reduction) (Frog Environmental, 2024). A reduction of 8–21dB peak-to-peak has been measured at 750m distance to the noise source, although effectiveness is dependent on water depth and other physical parameters (Defingou *et al*., 2019; Koschinski and Lüdemann, 2020). For example, high tidal flows, such as those experienced offshore or in estuaries, can distort the bubble curtain and limit its effectiveness (National Physical Laboratory "NPL", 2023). Depth averaged current speed values measured at the site of the Project peaked at approximately 1.5m/s on the ebb tide and

	technology enabled piling work at this project to proceed without requiring temporal piling restrictions.	approximately 1.3m/s on the flood tide on the spring tide phase. Therefore, a cautious approach is considered more appropriate, as is adopted in underwater noise assessments in the United States where a standard assumption of 5dB attenuation is generally made for a bubble curtain (Caltrans, 2020). Furthermore, attenuation is most pronounced above around 1kHz (Dähne *et al*., 2017), and therefore bubble curtains may not be effective in reducing disturbance to fish that are predominantly sensitive at lower frequency ranges. Given the challenges in effectively installing bubble curtain systems in shallow water and constrained areas, and the potentially minimal attenuation and minimal benefits to fish, such a measure is not considered reasonable or appropriate to implement for the Project. **References:** Caltrans (2020). Technical Guidance for the Assessment of Hydroacoustic Effects of Pile Driving on Fish. Report No. CTHWANP-RT-20-365.01.04. October 2020. California Department of Transportation. Dähne, M., Tougaar, J., Carstensen J., Rose, A., Nabe-Nielsen J. (2017) Bubble curtains attenuate noise from offshore wind farm construction and reduce temporary habitat loss for harbour porpoises. Marine Ecology Progress Series 580: 221-237 Defingou, M., Bils, F., Horchler, B., Liesenjohann, T., & Nehls, G. (2019). PHAROS4MPAs - A Review of Solutions to avoid and

		mitigate environmental impacts of offshore windfarms. Husum: BioConsult SH report commissioned by WWF-France. Frog Environmental (2024). South Shields Regeneration: Bubble Curtains proven to reduce noise by 99% during marine construction. [Online] (accessed January 2024). Koschinski, S., & Lüdemann, K. (2020). Noise mitigation for the construction of increasingly large offshore wind turbines - Technical options for complying with noise limits. Germany: German Federal Agency for Nature Conservation (Bundesamt für Naturschutz (BfN)). NPL (2023). Characterisation of acoustic fields generated by UXO removal Phase 5B quarry trials of bubble curtain mitigation (BEIS Offshore Energy SEA Sub-Contract OESEA-22-142). Sei-Him Cheong, Lian Wang, Paul Lepper, Stephen Robinson. May 2023. NPL REPORT AC 22
Environmental Assessment – Shellfish Ecology		
4.5.1 - 4.5.9	The MMO finds the information provided is detailed, all relevant, and extensive, both in respect of the baseline and the impact assessments conducted. We have identified no significant gaps in respect to shellfish receptors. Therefore, no further information is required to assess the impacts on shellfish receptors.	The MMO's position is noted, and, on that basis, no further response is required.
Environmental Assessment – Commercial Fisheries		
4.6.2 – 4.6.3	The proposed works may have an impact on the fish and shellfish stocks within the work area. Increased amounts of suspended sediment concentrations will be created by the works themselves. Given that	**Table 1** presents a schedule of the proposed seasonal restrictions on construction activity. No percussive piling is proposed in April and May.

	disturbance of the seabed can significantly alter nursery and spawning grounds, it would be ideal for works to commence at a time that would be least detrimental to the least number of species. River lamprey spawning periods are usually between April / May, works should try to avoid that period. However, the MMO defers to the Inshore Fisheries Conservation Authority (IFCA) as the principle contact on matters related to commercial fishing operation. The MMO will continue to be part of the discussions relating to securing any mitigation related to this field.	The capital dredging for the Project will involve the dredge and disposal of only 4,000m³ over a 12-day period. Elevated SSCs due to dredge and dredge disposal are considered to be in the range of variability that can occur naturally in the Humber Estuary (which has very high SSCs year-round, particularly during the winter months) as well as due to ongoing maintenance dredging/disposal. Furthermore, the area local to the Project is not considered a key foraging, spawning or nursery habitat for fish.
Environmental Assessment – Underwater noise		
4.7.2	Underwater noise arising from vessel operations, maintenance dredge and dredge disposal (during the operational phase) has been scoped out however, for all marine receptors (Table 9.21 in Chapter 9). The justification put forward is that the outcomes of the assessment of underwater noise disturbance from capital dredging activities during construction will be the same for maintenance dredging activities during operation. Provided that the worst-case dredging assumptions have been considered, then the MMO has no major objections to the scoping out (of a more detailed assessment) of maintenance dredging during the operational phase. Nevertheless, it will still be important to consider any overlap of maintenance dredging operations with key migratory or spawning periods.	As explained in the ES, during operation of the Project, maintenance dredging will potentially be required in the same way as currently occurs at the Port of Immingham with the same dredging techniques used. The modelling of the Project (as reported in **ES Chapter 16: Physical Processes [APP-058]**) indicates that the berth pocket, once dredged, will remain swept clear of deposited material by the flood and ebb tidal flows (in much the same way the existing Immingham Oil Terminal berths are). Consequently, the need for future maintenance dredging within the new berth pocket is expected to be very limited (if required at all). Should maintenance dredging be required, it is proposed to be incorporated within the maintenance dredge licence for Immingham (L/2014/00429/1) as part of the renewal of the licence at the end of 2025.

		Consideration has been given to the timing of the proposed activities in relation to key fish migratory or spawning periods. It is not, however, possible to confirm the exact timing and programme for the maintenance dredging, and the assessment has, therefore, been undertaken on the basis that this activity could be undertaken at any time of year. If maintenance dredging for the Project is required periodically, this will be carried out in line with the existing regime. The frequency and volume of material deposited at the disposal site from each load (for maintenance dredging across the port) will not change compared with current maintenance dredging activities, as the same plant and methods are proposed to be used. Furthermore, the volume of material that will need to be maintenance dredged from the berth pocket will be lower than the volumes of capital dredge material. Overall, the changes brought about as a result of the maintenance dredge and disposal of maintenance dredge material during operation will be comparable to that which already arises from the ongoing maintenance of the existing Port of Immingham berths. Therefore, it is considered that the likely impacts on marine receptors as a result of maintenance dredging will be comparable to the existing licensed maintenance dredge regime.
4.7.3 and 4.7.4	The MMO provide confirmation that scoping out of vessel noise during operation is appropriate and an appropriate evidence base has been used in the underwater noise assessment.	The MMO's position is noted, and, on that basis, no further response is required.
Underwater Noise appendix		
4.7.8	While the MMO has no major concerns/objections with the source levels presented as such, it would be helpful if the Applicant could please provide more	As noted **ES Appendix 9.B: Underwater Noise Assessment [APP-187]**, factors that influence the source levels include the size (diameter), shape, length and material of the pile; the weight

	context on how these levels are relevant to the IGET development. For instance, it is not just the pile size (diameter) which is a factor. Other important considerations are the hammer energy, strike rate (piling profile) and water depth.	and drop height of the hammer; and the seabed material and depth. The highest peak noise levels are generally associated with larger-sized piles, given the larger surface area of the pile in contact with the water and the larger hammer energy and/or pile driving time involved in driving them. The Project will take place in very shallow water (maximum water depths at the location of the jetty are approximately 15 to 20m, reducing from around 15m to 0m along the approach jetty back to the foreshore). The published near-source sound pressure measurements that have been used to estimate source levels for the Project are from similar shallow water estuarine environments in the San Francisco Bay area (water depths ranging from around 5m to 10m).
4.7.9	For the concurrent piling scenarios, it would be helpful if the Applicant could please provide more detail e.g., in the form of a figure, showing the locations of the piling at both the jetty approach and jetty head platform, taking into consideration the minimum and maximum separation distances between the piling vessels. This would help illustrate that the chosen scenarios / modelling strategy, and the inherent idealisations / simplifications are indeed appropriate and precautionary.	**Figure 3** and **Figure 4** present the minimum and maximum separation distances between the piling rigs at the jetty approach and jetty. These are illustrative only and based on the current understanding of the construction operations.
4.7.11	Para 1.6.9 and para 1.6.10 – The MMO previously queried why the RMS source level is 10 dB higher than the SEL source level. The Applicant has responded (see Table 1) with: "The peak, SEL and RMS levels are those that were measured directly in the field and published in the literature that is referenced in Section 1.6. The SEL that is reported is effectively the SELss. The RMS metric has not been	Agreed. The relevant SEL_{cum} and SPL_{peak} metrics have indeed been used to assess the impacts of percussive piling noise in **ES Appendix 9.B: Underwater Noise Assessment [APP-187]**.

	used in the modelling of impacts of impact piling on fish but is included as a specific variable in the NOAA user spreadsheet tool that has been used to assess the effects of impact piling on marine mammals (Section 1.9)". Nevertheless, the MMO reiterates that the relevant metrics for assessing the impacts of impulsive activities are the SELcum (calculated by the aggregation of SELss) and SPLpeak.	
4.7.12	The assessment largely refers to appropriate peer-reviewed criteria for fish and marine mammal species. For behaviour and fish, the assessment refers to thresholds derived from Hawkins et al. (2014). Hawkins at el. exposed wild sprat and mackerel to short sequences of repeated impulsive playback sounds at different sound pressure levels, simulating the strikes from a percussive pile driver. The sound pressure levels to which the fish schools responded on 50% of the presentations were 163.2 and 163 dB re 1 µPa (peak-to-peak) (and estimated single strike sound exposure levels (SELss) were 135 dB and 142 dB re 1 µPa2 ·s for sprat and mackerel respectively). Whilst recognising that the application of simplistic sound level thresholds for behaviour should generally be avoided, these thresholds can be considered to be a conservative indicator for the risk of behavioural responses and potential displacement. As advised for the PEIR consultation, it is not entirely appropriate to convert the peak-to-peak threshold to a zero-to-peak threshold (of 157 dB by subtracting 6 dB) as the Applicant has done here. The MMO	The Sound Exposure Level Single Strike ("SEL_{ss}") behavioural threshold that the MMO has suggested (135dB SEL_{ss}) as an alternative to what was applied in the ES (157dB Sound Pressure Level Peak ("SPL_{peak}")) is considered to be overly conservative and precautionary for Atlantic salmon as it is based on sound levels to which schools of sprat, which are a much more sensitive fish species to noise than salmon, responded on 50% of observations. The use of an intermediate behavioural threshold (139dB SEL_{ss}) commensurate with the lower hearing ability of salmon is considered more appropriate and results in a very similar range of effects as the peak behavioural threshold that was used in **ES Appendix 9.B: Underwater Noise Assessment [APP-187]**.

	recommends that future assessments also adopt the threshold of 135 dB SELss.	
4.7.14	The MMO has no major concerns with the predictions for marine mammals for percussive (and vibro) piling. In general, the ranges appear to be relatively conservative in most cases.	The MMO's position is noted, and, on that basis, no further response is required.
4.7.15	The SPLrms is the most appropriate metric to apply for continuous sources. The SPLrms is additive when there are two or more continuous sources. If the piling rigs are relatively close together (within the estuary), then it is reasonable to add 3 dB as the Applicant has done here.	The MMO's position is noted, and, on that basis, no further response is required.
4.7.16 – 4.7.22	For marine mammals, the predictions in Table 20 (below for reference) for dredging and vessel movements look smaller than expected. This same point was raised during the PEIR consultation. The Applicant has responded stating that "the assumptions and input values to this spreadsheet are clearly set out in Table 19. These have been revisited and checked and the outputs remain unchanged in the appendix, apart from the rounding of distances to the nearest order of magnitude". Based on our experience of assessing such sources, and even if we assume a fleeing receptor, we expect larger Temporary Threshold Shift (TTS) effect ranges (over part of the estuary) for harbour porpoise and 24-hour exposure. In the first instance, these values do not make much sense considering that earlier on in section 1.9.24,	A capital dredge of approximately 4,000m³ would be required for the Project. The capital dredge is anticipated to be undertaken using a backhoe. Dredging by backhoe involves loading the dredged material onto an attendant split hopper barge which subsequently disposes the dredge material at a licensed disposal site. Capital dredge operations would be continuous (24/7), but very short term and temporary (around 12 days' duration). The backhoe will be largely stationary during the dredging process, only being repositioned as necessary as the dredging of an area is completed. A stational source model is, therefore, considered most appropriate to apply for dredging by backhoe. Backhoe dredgers generate RMS SLs (Root Mean Square Source Levels) in the range of 154 to 179dB re 1µPa m (Reine *et al.*, 2012; Nedwell *et al.*, 2008). This type of dredging is generally considered to be quieter compared to other types of dredging, with recorded sound levels just above the background sound at approximately 1km from the source (CEDA, 2011).

	the report predicts that there is a risk of TTS occurring within 700 m for all fish species. In fact, it is possible to construct some simple exposure calculation tests that indicate much larger effect ranges than those indicated in Table 20. For example, if we start from a SL value of 188 dB rms for dredging, in order to calculate 24h SEL, we need to estimate three distinct terms or quantities: the 24h exposure add-on (a positive term), the propagation loss (negative) and the auditory weighting term (also negative). The first quantity, namely the 24 h exposure add-on term is straightforward to calculate as 49 dB. The calculation of the propagation loss term is in general more complex, but nevertheless it is possible to estimate that it will balance out the exposure add-on term within a kilometre or so from the source (i.e., a propagation loss of ~50 dB for 1 km range). The last term, the effect of harbour porpoise auditory weightings, can be quite variable, according to the chosen spectrum (note that, ideally, the weighting should be performed on the received spectrum not on the source one, as the propagation loss is frequency dependent and thus will modify the spectrum). If one uses, for example, the dredging spectrum from Robinson et al. (2012), then the result of applying the harbour porpoise auditory weightings is a negative term of approximately 15 dB. Thus, starting from the 188 dB rms SL, we subtract 15 dB to get 173 dB, while the 24h exposure term and propagation loss to 1 km term cancel each other out.	The National Oceanic and Atmospheric Administration's ("NOAA's") user spreadsheet tool (NOAA, 2021) has been used to predict the range at which the weighted SEL_{cum} acoustic thresholds (NOAA, 2018) for PTS and TTS are reached during the proposed capital dredging by backhoe for the Project. In accordance with the guidance provided in NOAA's user manual and the instructions included within the user spreadsheet, 'Tab A: Stationary source, non-impulsive, continuous' was selected as the most appropriate method to apply for capital dredging activity. The model input values and associated assumptions are included in **Table 2**. **NOAA user spreadsheet tool input values for 'Tab A: Stationary source, non-impulsive, continuous'** **Model Inputs** / **Value** / **Assumptions** Weighting factor adjustment (kHz) / 2.5 / The maximum recommended default value provided in the user spreadsheet (NOAA, 2021) that leads to the greatest predicted ranges for PTS and TTS and is, therefore, considered a worst case. Source Level (L_{rms}) / 179 / The maximum estimated RMS SL for backhoe dredging that will be involved in capital dredging. Duration of Sound Production (hours) within 24-hour period / 24 / Value is based on backhoe dredging involving continuous working 24 hours a day, 7 days a week.

	Since the 173 dB is precisely the value of the Permanent Threshold Shift (PTS) threshold for harbour porpoise, this example indicates that the PTS range is approximately 1 km. Alternatively, we can construct an even simpler counter-argument. Namely, if we focus solely on the source level at 1 m, not including propagation, then the weighted SL value of 173 dB indicates that the animal exposure reaches 173 dB SEL after 1 second (by definition). Since this is the PTS threshold, and it is reached in 1 second rather than 24 h, the PTS range for 24 h exposure is implausible to be <1 m as indicated in Table 20. Thus, the PTS range is very unlikely to be <1m. However, the MMO acknowledges that marine mammals are not expected to remain stationary for extended periods of time in close vicinity to the source.	Propagation loss coefficient	17.91	Derived from 11 observations of transmission loss coefficient collected from a number of construction projects undertaken in shallow water estuarine and coastal locations (see **Section 1.4** of **ES Appendix 9.B: Underwater Noise Assessment [APP-187]**).

The distances at which PTS and TTS in marine mammals are predicted to occur during the proposed capital dredging works are included in **Table 3**.

Approximate distances (metres) marine mammal response criteria are reached during capital dredging

Marine Mammal Hearing Group	PTS	TTS
High-frequency ("HF") cetacean (harbour porpoise)	60	800
Phocid pinniped in water ("PW") (grey seal and common seal)	30	400

During operation of the Project, maintenance dredging will potentially be required in the same way as currently occurs at the Port. The modelling of the Project (as reported in **ES Chapter 16: Physical Processes [APP-058]**) indicates that the need for future maintenance dredging within the new berth pocket is expected to be very limited (if required at all). Any such maintenance dredging would be undertaken alongside existing

		licensed maintenance dredge operations undertaken at the Port by the Applicant. Maintenance dredging is largely undertaken by trailing suction hopper dredger ("TSHD"), which involves the periodic movement of the dredger between the dredge area and the licensed disposal site. Given the dredger is continually moving, a mobile source model is considered more appropriate for dredging by TSHD. RMS SLs of TSHDs are variable but generally range from 160 to above 180dB re 1µPa m for large TSHDs (Robinson *et al*., 2011). The TSHD sucks the soil from the seabed at a sailing speed of 1 to 1.5m/s (2 to 3 knots) (Vlasblom, 2005). The existing outputs presented within **Table 20** in **ES Appendix 9.B: Underwater Noise Assessment [APP-187]** are therefore considered to be worst case assumptions for the proposed maintenance dredging activities. It should be noted that the MMO's comment, "*earlier on in section 1.9.24, the report predicts that there is a risk of TTS occurring within 700 m for all fish species*", is not considered comparable to the outputs presented in **Table 20** as the TTS for fish was derived using a stationary model. Marine mammals are not expected to remain stationary for extended periods of time in close vicinity to the source of dredging, and therefore there is not considered to be any risk of injury or significant disturbance to marine mammals from the proposed capital and maintenance dredge activities. **References:** Centre for Environmental Data Analysis (CEDA). (2011). Underwater sound in relation to dredging. CEDA Position Paper - 7 November 2011.

		Nedwell, J.R., Parvin, S.J., Brooker, A.G. and Lambert, D.R. (2008). Subacoustech Report No. 805R0444. National Oceanic and Atmospheric Administration (NOAA) (2021). User Manual and User Spreadsheet Tool - 2018 Acoustic Technical Guidance. [Online] (accessed January 2024). National Oceanic and Atmospheric Administration (NOAA) (2018). 2018 Revisions to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-59, 167p. Reine, K.J., Clarke, D.G. and Dickerson, C. (2012). Characterization of underwater sounds produced by a hydraulic cutterhead dredge fracturing limestone rock. Robinson, S.P., Theobald, P.D., Hayman, G., Wang, L.S., Lepper, P.A., Humphrey, V. and Mumford, S. (2011). Measurement of noise arising from marine aggregate dredging operations. Marine Aggregate Levy Sustainability Fund (MALSF). MEPF Ref no. 09/P108. Vlasblom (2005). Chapter 2: Trailing Suction Hopper Dredger. [Online] (accessed January 2024).
4.7.24	Nevertheless, the report attempts (at various times throughout the document) to compare the received noise levels in Table 5 against the existing background noise levels – see paras 1.8.2, 1.8.3, 1.8.4, 1.9.10 and 1.9.39, 1.9.20, 1.9.49 and 1.9.27.	As explained in **Paragraph 1.5.15** of **ES Appendix 9.B: Underwater Noise Assessment [APP-187]**, the measured background noise levels showed a repeating pattern of peaks and troughs, ranging from 107 to 154dB re 1µPa (see **Figure 5** at the end of this response). Flow speed and broadband SPL were

	The MMO has some points and queries to make with respect to these statements: • "The RMS SPLs showed a repeating pattern of peaks and troughs, ranging from 107 to 154 dB re 1 µPa". This is quite a large range and a background noise level of 154 dB rms is very high. How often does the background noise reach these high levels? The MMO presumes that such levels would likely be caused by passing vessel traffic, but it would be helpful if further context was provided here. • Para 1.8.4, for example, states: "The levels of underwater noise generated by impact piling are predicted to reach existing background levels previously measured in the Humber Estuary within around 2 to 3km from the source. The SEL received levels of underwater noise generated during impact piling for the proposed development are predicted to reduce to around 147 to 154 dB 1 μPa^2s within 1km of the source of piling which is equivalent to peak SPL of 166 dB re 1 µPa using Equation 2 and comparable to the SL generated by a tug and barge. The peak levels of underwater noise that reach the opposite shore of the estuary are predicted to range from approximately 125 to 141 dB 1 μPa^2s (equivalent to 135 to 157 dB re 1 µPa) depending on the tidal state. These levels are comparable to the SLs generated by recreational boats". The comparisons made are misleading. Firstly, one cannot compare to the source level of a boat (i.e., tug or barge). Source levels are a theoretical concept	shown to be significantly positively correlated, which suggests that noise levels at the measurement location are highly dependent on tidal flow speed, with levels increasing with higher flow speeds (Xodus, 2015). In other words, these ranges in background noise are occurring on a twice-daily basis with the tide. Passing vessel movements in the estuary are also likely to be contributing to the background noise, but the monitoring data indicate that any intermittent and short-lived peaks from vessel traffic do not appear to be as dominant in characterising the peaks and troughs in ambient noise as tidal flows. The comparisons between the maximum predicted unweighted received levels generated by various construction activities from the Project and other existing background sources of noise in the Humber Estuary in **Section 1.8** of **ES Appendix 9.B: Underwater Noise Assessment [APP-187]** have been made to help describe how these levels attenuate with distance from the source and how they also compare to other sources that already exist in the estuary for descriptive or context purposes only, rather than to determine whether they are likely to cause harm or not to animals. The potential effects associated with the various activities on fish and marine mammals are assessed in **Section 1.9** of **ES Appendix 9.B: Underwater Noise Assessment [APP-187]**. This includes considering the spatial and temporal nature of underwater noise effects associated with construction (e.g. continuous 24/7 dredging). **References:**

	(the assumption of a point source and measured from 1 m distance). Furthermore – even if we accept that source level values bear a close correspondence to the sound levels present in the immediate vicinity of a boat – then it would be difficult to argue that a receiver (animal) located at barely 1 m from the source (including a recreational vessel) would not be disturbed. In other words, this does not hold as an argument that such noise levels are harmless and not concerning. If the argument was comparing the piling noise levels with those that a boat generates at a great distance (e.g., a boat transiting at several km away) then this could be reassuring evidence, but the noise levels being in fact as high as the source levels of boats is quite contrary to that. • Another important point to consider is that vessels come and go in the estuary, thus contributing/causing the reported transitory peak values of the ambient noise levels, whereas dredging will be continuous (24/7) and the vessel will remain in the vicinity for extended periods of time. Thus, even if – allegedly – the noise levels introduced by dredging would not exceed the observed maxima of the ambient noise levels, they would be expected to remain at these high levels for extensive periods, unlike the brief and rather infrequent peaks of the ambient noise.	Xodus. (2015). ABP Green Port Hull Underwater Noise Monitoring, Baseline Survey Results. Xodus Group, Report No. L-100208-S00-REPT-003.
4.7.27	The MMO advises that there will need to be a coordinated / joined up approach to ensure that the various developments taking place within the Humber estuary, especially between IGET and IEERT, are	See response to **Paragraph 4.4.14** above.

	appropriately managed to minimise the risk of potential impact on sensitive receptors, particularly migratory species. We note that the same mitigation measures (i.e., timing restrictions) are proposed for both projects.	
4.7.28	The MMO note that it may be wise to have a tracker of some sort for the Humber estuary (if there is not one already). This tracker could show when and where the various developments will be taking place, and what mitigation will be in place, to try and help manage cumulative effects.	As noted above in response to **Paragraph 4.4.14**, the same mitigation measures are proposed for both IERRT and the Project to help minimise potential cumulative adverse effects, given their proximity to each other and the potential for piling activity to overlap. This will include a piling reporting protocol, which has been agreed for IERRT and is being developed in consultation with the MMO for the Project. This reporting protocol will have associated actions to be taken in the event of an abnormal occurrence (e.g. equipment breakdown or if a marine mammal enters the mitigation zone). Reports are to be submitted to the MMO (reporting frequency to be agreed), and the Applicant will hold fortnightly meetings with the MMO. The proposed mitigation measures for both projects will limit the risk of exposure and manage the potential cumulative underwater noise effects. The in-combination underwater noise effects of other projects together with the Project have been assessed individually and across all projects in the **ES** and **Shadow Habitats Regulations Assessment [APP-238]**. Piling noise has the potential to cause injury effects in marine mammals and fish within close proximity to the piling activity and strong behavioural responses over a wider area across all projects. Other projects involving piling (i.e., IERRT, Humber International Terminal Berth 2, AMEP, and North Killingholme Power Project) will require similar mitigation to the Project to help minimise potential adverse effects (such as soft-start procedures, timing restrictions to avoid sensitive periods for

		migratory fish and the use of marine mammal observers). There are considered to be no significant cumulative effects as a result of the Project with all the proposed mitigation measures in place.
4.7.31	The MMO note that paragraph 9.4.31 of Chapter 9 states that "the underwater noise assessment assumes that the dredging and vessel activity will take place continuously (24/7) during construction and as such, provides a precautionary assessment (noting that capital dredging is programmed for 12 days)". The MMO would argue that this is more realistic rather than precautionary, given that dredge operations will be continuous (24/7). NOAA intends for the weighted SELcum metric to account for the accumulated exposure, i.e., over the duration of the activity within a 24-hour period.	The MMO's position is noted, and, on that basis, no further response is required.
4.7.32	Para 9.8.140 in Chapter 9 – please note that Atlantic mackerel does not have a swim bladder (and therefore falls in the third category comprising fish lacking swim bladders).	Agreed and noted. This does not change the outcomes of the underwater noise modelling or assessment.
Environmental Assessment – Shipping and Navigation		
4.8.1	The MMO defers to the Maritime and Coastguard Agency and Trinity House on matters of shipping and navigation. The MMO will continue to be part of the discussions relating to securing any mitigation, monitoring or other conditions.	The MMO's position is noted, and, on that basis, no further response is required.
Environmental Assessment – Marine Archaeology		
4.9.1	The MMO defers to Historic England on matters of shipping and navigation. The MMO will continue to be part of the discussions relating to securing any mitigation monitoring or other conditions.	The MMO's position is noted, and, on that basis, no further response is required.

Environmental Assessment – Seascape, landscape and Visual Resources		
4.10.1	The MMO defers to Natural England as the Statutory Nature Conservation Body (SNCB) on matters of Seascape, Landscape and Visual Resources. The MMO will continue to be part of the discussions relating to securing any mitigation and monitoring or development of any plans/conditions on this matter. The MMO would also remind the Applicant that the National Association for Areas of Outstanding Natural Beauty should be included in conversations regarding potential impacts to Areas of Outstanding Natural Beauty as they are the Non-Governmental Organisation responsible for them.	The MMO's position is noted, and, on that basis, no further response is required.

RR-018 – National Highways

National Highways has provided a number of comments relating to the Project in a technical memorandum **[RR-018]**. The points raised in the memorandum are set out below in the same order they were raised.

Cumulative effects

National Highways has recommended that the following emerging developments be considered within the Environmental Statement ("ES") cumulative assessment:

- Immingham Eastern Ro-Ro Terminal ("IERRT"): roll-on/roll-off ("Ro-Ro") facility at Immingham Port
- Station Road South Killingholme, works on land to the east of Rosper Road, Killingholme (planning reference: PA2023/502)

The IERRT has been included within the cumulative assessment as set out in **ES Chapter 25: Cumulative Effects and In-Combination Assessment [APP-067]** and also **ES Appendix 11.B: Traffic and Transport Cumulative Effects Assessment [APP-190]**. In addition, IERRT is also considered within the peak hour assessment of the A180/A1173 junction as included in **Appendix 1** of this response.

In connection with the works on land to the east of Rosper Road, Killingholme (planning reference: PA/2023/502), the Applicant has reviewed the supporting Transport Statement and Construction Traffic Management Plan, and as set out below under the 'Committed developments' heading, any cumulative impact is not considered to be material.

Collision data analysis

It is noted and welcomed that National Highways agrees with the conclusion that there is no existing road safety issue at the A180/A1173 junction, as set out in **ES Chapter 11: Traffic and Transport [APP-053]**.

ES Chapter 11: Traffic and Transport

It is noted and welcomed that National Highways agrees that a separate Transport Assessment is not required as **ES Chapter 11: Traffic and Transport [APP-053]** provides sufficient information.

Construction vehicle trip generation and distribution

Vehicle trip generation

It is noted and welcomed that National Highways states that the construction vehicle generation has been derived appropriately.

National Highways considers that the weekday peak hour periods should be 07:00–08:00 and 16:00–17:00 rather than 08:00–09:00 and 17:00–18:00 as set out in **Paragraph 11.8.17** in **ES Chapter 11: Traffic and Transport [APP-053]** which states "*during the weekday AM peak,08:00 to 09:00 there is anticipated to be 53 worker trips and during the weekday PM peak 17:00 to 18:00 there is anticipated to be 137 worker trips on the road network".*

The peak hours are noted and agreed. However, with reference to **Table 11-13** in **ES Chapter 11: Traffic and Transport [APP-053]**, during the hours National Highways considers are the peak hours, there is a total of 205 construction worker trips between 07:00–08:00 and 53 between 16:00–17:00.

National Highways has determined the number of car trips on the network during the peak hours by dividing the above number by 1.5 to reflect the assumed level of car sharing. This is not the correct approach as the 205 trips between 07:00–08:00 and the 53 trips between 16:00–17:00 already account for car sharing.

National Highways further considers that these trips have the potential to result in a material impact on the Strategic Road Network ("SRN"). However, when assessed against both the National Policy Statement for Ports ("NPSfP") Section 5.4 and the National Planning Policy Framework ("NPPF") Section 9, it is not considered that any impact during the construction phase would be either substantial in terms of the NPSfP or severe in terms of the NPPF.

Construction worker vehicle trip distribution

It is noted and welcomed that National Highways considers that the methodology adopted for the distribution of traffic is appropriate.

National Highways considers that there will be an impact on the A180/A1173 junction due to construction worker trips. It is unclear how National Highways has derived the traffic impact at this junction; therefore, the Applicant's methodology is set out as follows.

With reference to **Table 11-13: Construction Worker Traffic Daily Profile** in **ES Chapter 11: Traffic and Transport [APP-053]**, the total arrivals and departures of construction workers in the AM and PM periods can be given as follows.

	Arrivals	Departures	Two Way
07:00–08:00	190	15	205
08:00–09:00	38	15	53
16:00–17:00	15	38	53
17:00–18:00	23	114	137

Based on the distribution as set out in **Table 11-15: Construction Worker Distribution** in **ES Chapter 11: Traffic and Transport [APP-053]**, with 51% heading towards the A180/A1173 junction, the impact can be set out as follows during the AM and PM periods. It should be noted that any minor numerical errors are due to rounding and do not affect the assessments.

The change in flows on the A180/A1173 junction as a result of staff movements during construction between 07:00–08:00 is as follows.

07:00–08:00	Arrivals	Departures	Two Way
A180 W	17	1	18
A180 E	49	4	53
A1173	30	2	33
TOTAL	97	8	105

The change in flows on the A180/A1173 junction as a result of staff movements during construction between 08:00–09:00 is as follows.

08:00–09:00	Arrivals	Departures	Two Way
A180 W	3	1	5
A180 E	10	4	14
A1173	6	2	8

08:00–09:00	Arrivals	Departures	Two Way
TOTAL	19	8	27

The change in flows on the A180/A1173 junction as a result of staff movements during construction between 16:00–17:00 is as follows.

16:00–17:00	Arrivals	Departures	Two Way
A180 W	1	3	5
A180 E	4	10	14
A1173	2	6	8
TOTAL	8	19	27

The change in flows on the A180/A1173 junction as a result of staff movements during construction between 17:00–18:00 is as follows:

17:00–18:00	Arrivals	Departures	Two Way
A180 W	2	10	12
A180 E	6	30	36
A1173	4	18	22
TOTAL	12	58	70

The overall conclusion set out in **Paragraph 11.8.28** in **ES Chapter 11: Traffic and Transport [APP-053]** is that the additional level of trips associated with the construction workers during the weekday AM and PM peak periods is not material in terms of junction operation and the impact is not considered to be substantial (NPSfP Section 5.4) or severe (NPPF Section 9).

Therefore, irrespective of which hour is used, and with reference to the above tables, the maximum increase is 49 on the A180 E between 07:00–08:00. Given the Applicant's knowledge of the network, this is not considered to result in a substantial or severe impact that warrants further assessment.

In addition, the results of the capacity assessment of the A180/A1173 junction, as set out in the Transport Assessment submitted in support of the IERRT development, shows that this junction is predicted to operate well within capacity in all scenarios up to a design year of 2032, which is beyond the 2026 peak year of the Project's construction.

Any impact from the Project construction phase is temporary, with a peak year of activity in 2026. Given the above, it is not considered that there will be a severe impact on the SRN.

HGV trip distribution

National Highways has set out the HGV trip generation and distribution, but as no comment has been made, it is assumed that this is acceptable.

The total impact is 10 two-way HGVs on the A180 (W) and 8 two-way HGVs on the A180 (E) during both of the given peak hours of 07:00 and 08:00 and 16:00 and 17:00. These HGV movements have been taken forward into the assessment of the A180/1173 junction as included in **Appendix 1**.

Total construction vehicle trip generation

National Highways considers that a junction capacity assessment of the A180/A1173 junction should be provided. As demonstrated above, whilst an assessment of this junction is not considered to be required, as the trip generation during the construction phase is not considered to result in a severe impact on the SRN, a Sensitivity Test which provides an assessment at the peak of construction in 2026 has been included within **Appendix 1**. The conclusion of the Sensitivity Test is that the junction will continue to operate within capacity with the addition of the Project's construction traffic and committed development, including IERRT, in 2026.

Assessments

National Highways considers that a junction capacity assessment of the A180/A1173 junction should be provided. Whilst it is considered there is no requirement for this as stated above, it has been provided as a Sensitivity Test based on the traffic flows as set out in the IERRT Transport Assessment Addendum Report ("the IERRT TA Addendum Report") prepared by DTA dated December

2023 (Document Reference 8.4.17(a).1). The IERRT TA Addendum Report was submitted at Deadline 7 of the IERRT Examination and was given the reference REP7-013.

The modelling output included within the Sensitivity Test is based on the traffic flow information presented in the IERRT TA Addendum Report. These traffic flows are agreed with National Highways (as reported in the Statement of Common Ground [REF]) and as such include the relevant Passenger Car Units ("PCU") factors as requested. As it is based on the IERRT TA Addendum Report, it should be noted that the committed development included within this assessment differs from that included within the cumulative assessment in **ES Chapter 25: Cumulative and In-Combination Effects [APP-067]**.

As part of the Sensitivity Test, the following scenarios have been modelled based on the impact during the construction phase only:

- Base 2026
- Base 2026 + Committed Development
- Base 2026 + Committed Development + IERRT
- Base 2026 + Committed Development + IERRT + the Project (07:00–0800 and 16:00–17:00)

A Sensitivity Test has also been undertaken using construction traffic generation between 06:00–07:00 and 18:00–19:00, which with reference to **Table 11-13: Construction Worker Traffic Daily Profile** in **ES Chapter 11: Traffic and Transport [APP-053]** results in a total of 273 and 288 construction worker trips at these peak hours respectively.

The Sensitivity Test then utilises the IERRT traffic data, from the IERRT TA Addendum Report, for the peak hours between 07:00–08:00 and 16:00–17:00 and adds the highest Project construction traffic generation in the AM and PM periods to reflect a robust level of assessment. This comprises the following scenario:

- Base 2026 + Committed Development + IERRT + the Project (Sensitivity Test, Project construction traffic between 06:00–07:00 and 18:00–19:00)

The results of the Sensitivity Test in Appendix 1 demonstrate that no capacity problems are predicted at the A180/A1173 junction during any of the assessment scenarios in 2026, which is the peak of the Project construction phase.

Committed developments

It is noted and welcomed that National Highways has reviewed the committed developments set out in **ES Appendix 11.B: Traffic and Transport Cumulative Effects Assessment [APP-190]** and considered them appropriate.

National Highways has also requested that enabling works on land east of Rosper Road, Killingholme (PA/2023/502) be considered. The Applicant has reviewed the Transport Statement and Construction Traffic Management Plan prepared for that scheme (prepared by Sanderson Associates in March 2023) to establish the trip generation, distribution and assignment associated with the development. At this stage, no construction programme has been included in either the Transport Statement or Construction Traffic Management Plan for that scheme, and as such it is not known when the development will commence. However, based on the information provided, all trips will access the site via the A160/A180 interchange, travel along the A160 and enter Rosper Road via the A160/A1173 Roundabout. Both of these routes are outside of the assessment area for the Project, and as such any cumulative impact is not likely to be material.

Operational vehicle trip generation and distribution

Vehicle trip generation

It is noted and welcomed that National Highways agrees with the operational vehicle trip generation. A Framework Operational Travel Plan is being developed and will be submitted into the Examination in due course.

Vehicle trip distribution

It is noted and welcomed that National Highways agrees that the operational phase of the Project will not result in a material impact on the SRN.

As set out in **Paragraph 11.8.35** of **ES Chapter 11: Traffic and Transport [APP-053]** there is a total of 120 staff on site during the operational phase, however, the proportion of daytime and shift working has been amended from that given previously. From the total of 120 staff, 87 will work a normal daytime 'nine to five' and 33 will work over two separate 12-hour shifts starting at 07:00 and 19:00

respectively. It should be noted that the amended figures do not affect the conclusions of the assessment set out in **ES Chapter 11: Traffic and Transport [APP-053]**.

Based on the above, a daily profile can be set out as follows, assuming a split of 16 and 17 workers across both shift patterns:

Time period	Arrivals	Departures	Two Way
06:00 to 07:00	16	0	16
07:00 to 08:00	0	17	17
08:00 to 09:00	87	0	87
16:00 to 17:00	0	0	0
17:00 to 18:00	0	87	87
18:00 to 19:00	16	0	16
19:00 to 20:00	0	17	17

As can be seen, the number of trips during the agreed network peak hours of 07:00 to 08:00 and 16:00 to 17:00 is 17 in the AM period and 0 in the PM period, and is therefore not considered to be material.

Decommissioning phase

It is noted and welcomed that National Highways agrees with the proposal to secure a Decommissioning Environmental Management Plan ("DEMP") by a requirement of the Development Consent Order ("DCO"). An **Outline DEMP [APP-222]** is included with the DCO Application and the production of a Final DEMP is secured by **Requirement 18** in **Schedule 2** of the **draft DCO [PDA-004]**.

Construction Traffic Management Plan

National Highways has requested that the **Outline Construction Traffic Management Plan ("CTMP") [APP-223]** should include the following:

- A dust management plan
- Noise management plan
- Pollution prevention measures
- Contractor parking

It is confirmed that the management plans highlighted above have been included within the DCO Application in the **Outline Construction Environmental Management Plan ("CEMP") [APP-221]** as set out below:

- A dust management plan is included in **Appendix C: Outline Dust Management Plan** of the **Outline CEMP [APP-221]**.
- Noise and vibration mitigation and enhancement measures are included within **Table 4: Noise and Vibration** of the **Outline CEMP [APP-221]**.
- Pollution prevention measures are included in:
  - **Table 5: Nature Conservation (Terrestrial Ecology)** of the **Outline CEMP [APP-221]**
  - **Table 9: Marine Transport and Navigation** of the **Outline CEMP [APP-221]**
  - **Table 14: Marine Water and Sediment Quality** of the **Outline CEMP [APP-221]**
  - **Table 15: Water Quality, Coastal Protection, Flood Risk and Drainage** of the **Outline CEMP [APP-221]**
- Contractor parking is addressed within **Section 2.5: Parking Provision** of the **Outline CEMP [APP-221]**, with the Travel Plan Co-ordinator determining the number of spaces provided on site.

The development of the **Outline CEMP** into one or more Final CEMPs is secured under **Requirement 6** in **Schedule 2** of the **draft DCO [PDA-004]**. The Final CEMPs require approval from the relevant planning authority following consultation with the Environment Agency and Natural England on matters related to their function.

Outline Construction Worker Travel Plan

It is noted and welcomed that National Highways considers the measures included within the Outline Construction Worker Travel Plan ("CWTP"), which is an appendix to the **Outline CTMP [APP-223]**, to be appropriate.

Summary and conclusions

A summary of the Applicant's response to National Highways' Relevant representation is set out below.

Relevant Representation	Summary of Applicant's Response
After a review of WebTRIS data for the A180, JSJV would consider 07:00-08:00 and 16:00-17:00 as more appropriate weekday peak hour periods than 08:00-09:00 and 17:00-18:00 for the SRN.	This is agreed. **ES Chapter 11: Traffic and Transport [APP-053]** concludes that there is not considered to be a severe impact on the SRN during the AM and PM periods. The assessment provided above confirms that the overall conclusion remains the same.
The volume of construction worker vehicle trips has the potential to result in a material impact on the operation of the SRN.	This has been assessed above, and it is confirmed that the volume of construction vehicle trips will have no material impact on the SRN in absolute terms (with a maximum increase of 49 trips on the A180 E between 07:00 and 08:00 and 30 between 17:00 and 18:00). The junction modelling confirms the A180/A1173 junction is forecast to operate well within capacity.
The number of workers per vehicle is incorrectly presented and National Highways recommends that construction worker vehicle distribution is reviewed and presents the results on flow diagrams.	It is not clear how National Highways has derived their construction worker vehicle numbers. The additional number of trips at the SRN set out above are based on the approach outlined in **ES Chapter 11: Traffic and Transport [APP-053]**.
The volume of construction vehicle trips distributed has the potential to result in a material impact on the operation of the SRN. Consequently, National Highways recommends the provision of a junction capacity assessment for the A180 / A1173.	It is not considered that an assessment of the A180/A1173 junction is required, given the relatively low number of additional trips in the peak hours and the existing capacity of the junction, which operates well within capacity. However, an assessment has been undertaken as a Sensitivity Test which confirms that the junction is predicted to operate well within capacity at the peak year of construction, 2026.
National Highways requests that the PCU equivalent value of 2.5 is used in order to ensure an appropriate assessment of anticipated vehicular traffic associated with the development.	The base traffic has been taken from the IERRT TA Addendum Report, as was agreed with National Highways. The IERRT TA Addendum Report reflects the required PCU values.
Subject to the impact at the SRN, there may be a requirement for National Highways to request mitigation measures, e.g., that the	With reference to Section 5.4 of the NPSfP, given the capacity of the A180/A1173 junction, and the additional number of

arrivals and departures of construction staff occur outside of the SRN peak periods.	construction trips, those trips are not considered to result in a substantial impact. As such, it is considered that no mitigation measures would be required beyond those already set out in the **Outline CEMP [APP-221]**, **Outline CTMP [APP-223]** and Outline CWTP (**Appendix A** in the **Outline CTMP**).
National Highways considers that construction traffic associated with the enabling works on land east of Rosper Road, Killingholme (PA/2023/502) should be considered.	This has been considered and assessed above. Based on the information provided in the Application, all trips will access the site via the A160/A180 interchange, travel along the A160 and enter Rosper Road via the A160/A1173 Roundabout. Both of these routes are outside of the assessment area for the Project, and as such any cumulative impact is not likely to be material.
National Highways would typically expect the operational trip generation methodology to be revised to reflect Circular 01/2022 policy. However, considering the predicted operational impact on the SRN as highlighted, it is not anticipated that the proposed development traffic generation will have a significant material impact on SRN junction capacity.	Agreed. The operational phase of the Project will have no material impact on the SRN.
National Highways would still expect a Travel Plan to be prepared for the operational stage of the project in order to manage down the traffic impact of development and maximise the accessibility of and within sites by walking, wheeling, cycling, public transport, and shared travel.	A Framework Operational Travel Plan is being developed and will be submitted into the Examination in due course.
National Highways considers the OCTMP should also include the following: – A dust management plan; – noise management plan; – Pollution prevention measures; – Contractor parking.	These measures are included within the **Outline CEMP [APP-221]**.

RR-019 – Natural England

Reference	Relevant Representation	Applicant's Response
NE1	Natural England agrees with the information provided in Table 2 of the shadow HRA regarding the qualifying features relevant to the screening assessment. We broadly agree with the conclusions in Tables 3 – 5 regarding the potential for likely significant effects on the relevant designated sites, except where detailed comments are provided below (key issue ref NE2 and NE3).	Natural England's position is noted, and, on that basis, no further response is required.
NE2	Natural England agrees that there is evidence to suggest that there can be benefits of lighting during hours of darkness for wintering wading birds in increasing the amount of foraging time available. However, it is a complex situation and it is not yet known how artificial lighting during hours of darkness might affect the survival of wintering waders (Jolkkonen *et al*., 2023). Therefore, we advise that this justification provided in Table 4 of the shadow HRA is not sufficient to rule out likely significant effects on SPA birds from lighting during construction and operation, particularly as the proposed development will introduce additional lighting into previously unlit areas of the Humber Estuary designated sites. Therefore, further assessment should be provided on potential impacts of lighting on SPA birds. Natural England also notes that the flare stacks mentioned within Section 2.2.1 of Appendix 2.B: Lighting	**Lighting effects** As stated in **Table 4** and **Table 5** of the **Shadow Habitats Regulations Assessment ("HRA") [APP-238]**, artificial illumination can improve foraging conditions for waders and other waterbirds feed nocturnally at night. Artificial lighting has also been found in some situations to increase potential perceived predation risk in waders which can cause increased behavioural responses in areas with higher intensity illumination (Jolkkonen *et al.,* 2023). Further analysis suggests that operational lighting effects on the foreshore and Humber Estuary will be highly localised to the immediate vicinity of the jetty, with light spill falling to 2 lux[1] within 7.5m of the jetty and reaching levels consistent with current background illumination within 15–20m of the jetty. On this basis, potential operational lighting effects are considered to be highly localised and of negligible magnitude and are not considered to result in a Likely Significant Effect ("LSE") to any

	Assessment Report are not addressed within Chapter 10 Ornithology or the HRA. There is evidence that birds can be affected by such structures, sometimes with extreme consequences where large numbers are drawn to the flame and get incinerated. Therefore, Natural England advises that the potential impacts of the flare stacks on SPA birds are assessed in the HRA.	waterbird features of the Humber Estuary Special Protection Area ("SPA") or Ramsar. With respect to lighting effects on birds during construction, the majority of construction activities are planned to occur in daylight hours. Where construction is required at night on the approach jetty, effects will be localised. Temporary lighting during construction will be arranged so that glare is mimimised outside the construction areas, with a Lighting Management Plan ("LMP") incorporated into the Final Construction Environmental Management Plan ("CEMP") that addresses the use of lighting around potentially sensitive areas including the Humber Estuary. On this basis, potential construction lighting effects are considered to be highly localised and of a negligible magnitude, and as such are not considered to result in LSE to any waterbird features of the Humber Estuary SPA or Ramsar. This additional information will be provided in an update to the **Shadow HRA**. 1. For context, moonlight on a full moon can be up to 1–2 lux and direct sunlight over 100,000 lux (https://www.seratechnologies.com/what-is-lux-and-what-level-should-it-be). 2. **References**

		Jolkkonen, J., Gaston, K. J., & Troscianko, J. (2023). Artificial lighting affects the landscape of fear in a widely distributed shorebird. Communications Biology, 6(1), 131. **Potential effects of flare stacks** Flare stacks have the potential to cause incidental mortality to birds during nocturnal periods, with the flame emitted during a flaring event known to attract birds in some situations. Most incidents reported have been as a result of birds using the structures as a nocturnal roosting perch and/or birds attracted to the illumination of the flare during migratory movements. It should be noted that evidence suggests that effects on birds have been recorded as a result of flare stacks associated with offshore oil and gas platforms or refineries (Ronconi *et al.,* 2015). These structures have very large open flames that are active as part of normal operations. In contrast, the flare stacks proposed as part of the Project will be much smaller, with the flame largely enclosed as a result of shrouding. Furthermore, they are only required to be used during start up, shut down and emergency use (typically less than 5% of the time annually). In addition, no supporting terrestrial habitat for SPA species occurs within the Order Limits (as summarised in **Table 4** of the **Shadow HRA**). Furthermore, the SPA waterbird species screened into Stage 2 (Appropriate Assessment) are not known to use stacks or other similar structures in industrial areas of the Humber Estuary for roosting. Furthermore, the locations where the flare stacks will be installed (in the East Site-Ammonia Storage, East Site-Hydrogen Production Facility and West Site) are not on a known flight path route between the foreshore and

		nearby functionally linked land areas; flight path survey data suggests only very limited flights occur (during winter, migratory passage and summer months) (ABPmer, 2024). In addition, flare stacks are a feature of the industrial landscape in the local area with local populations of SPA birds considered accustomed to these features with no evidence to suggest that local populations have been affected by flare stacks from nearby refineries. Based on all these considerations, the risk of flare stacks causing injury or morality is considered to be negligible and will not result in LSE to any waterbird features of the Humber Estuary SPA or Ramsar. This additional information will be provided in an update to the **Shadow HRA**. **References** ABPmer (2024). Immingham Onshore Wind Turbines: Ornithological Monitoring, Final Report: December 2020 to March 2023, ABPmer Report No. R. 4314. A report produced by ABPmer for Associated British Ports, January 2024 Ronconi, R. A., Allard, K. A., & Taylor, P. D. (2015). Bird interactions with offshore oil and gas platforms: Review of impacts and monitoring techniques. Journal of Environmental Management, 147, 34-45.
NE3	Natural England highlights that the shadow HRA does not appear to include an in-combination assessment following the screening stage of the HRA. Tables 3 to 5 in the shadow HRA identify	**Tables 3 to 5** of the **Shadow HRA [APP-238]** relating to screening will be updated to consider projects alone and in-combination.

	whether there will be a significant effect. The tables do not identify whether this effect will be 'alone and/ or in combination'. The in- combination requirement makes sure that the effects of numerous proposals, which alone would not result in a significant effect, are assessed to determine whether their combined effect would be significant enough to require more detailed assessment. Therefore, where there are small effects which are not significant alone, these should be assessed alongside small effects of other projects which were not significant alone. Relevant information from other chapters, such as the Chapter 25: Cumulative and In- Combination Effects, should be incorporated into this assessment. In particular, we advise that an 'in combination' assessment should be carried out with the Immingham Eastern RORO Terminal NSIP for the relevant impact pathways.	
NE4	Natural England advise that further information is required to determine whether a conclusion of no AEoI from direct loss of intertidal habitat can be reached (Table 7 in the shadow HRA). The loss of habitat may be considered small, however it will nonetheless still represent an appreciable but minor effect on the habitat. We advise that the appropriate assessment should consider ecological impacts of the habitat loss in more detail and refer to targets for the relevant features of the SAC,	**Table 7** of the **Shadow HRA [APP-238]** provides an assessment of the intertidal habitat loss against relevant conservation objectives as well as the respective targets of these conservation objectives (as provided in the Supplementary Advice on Conservation Objectives ("SACOs")) when determining that a conclusion of no Adverse Effect On Intergrity ("AEOI") can be reached. However, further assessment detailing potential effects in the context of both the site's conservation objectives and

	rather than relying on the relative size of the loss alone to determine whether adverse effect on integrity can be ruled out. Further information may be found in the Supplementary Advice for the Humber Estuary SAC.	relevant attributes/targets for the Humber Estuary Special Area of Conservation ("SAC") is provided below. As discussed in **Paragraphs 4.3.3 to 4.3.7** and **Table 7** of the **Shadow HRA [APP-238]**, the loss of intertidal habitat is *de minimis* in extent and considered negligible in the context of the amount of similar habitat in the region (and as a proportion of the SAC/Ramsar site). On this basis, any change to the "*extent and distribution of qualifying natural habitats*" conservation objective and associated targets in terms of maintaining "*the presence and spatial distribution of mudflat and sandflat communities"* or restoring "*the total extent, spatial distribution and types of mudflats and sandflats*" is considered ecologically inconsequential both locally and more widely across the Humber Estuary site. A loss on this scale is also considered to be insignificant in terms of "*the structure and function (including typical species) of qualifying natural habitats*" conservation objective. In this respect, the loss is considered to have no material consequences in terms of the "*presence and abundance of key structural and influential species*" target with the loss not considered to prevent key species from being a viable component of mudflat habitat in the local area. Furthermore, other targets relating to structure and function in terms of maintaining species composition, sediment composition and Total Organic Carbon ("TOC") content in the local area, or more widely across the Humber Estuary site, will not be altered due to habitat loss on this scale. Direct loss of intertidal habitat due to the piles is considered to be insignificant in terms of the "*supporting processes on which qualifying natural habitats rely*" conservation objective, with any changes to associated targets relating to wave exposure, physico-

		chemical properties, sediment movement, hydrodynamic regime, sediment quality and water quality parameters considered to be negligible and ecologically inconsequential on mudflat habitat in the Immingham area and more widely across the Humber Estuary site. This information will be incorporated into the updated Shadow HRA.
NE5	Table 8 of the shadow HRA (relating to the direct loss of supporting intertidal habitat on qualifying species) identifies that there will be no adverse effect on integrity (AEoI) on bird species which are SPA/ Ramsar site features. Natural England agrees with this conclusion, based on the information provided.	Natural England's position is noted, and, on that basis, no further response is required.
NE6	Natural England advise that it is not possible to agree with the conclusion of no AEoI for this impact pathway on subtidal habitat (Table 9 in the shadow HRA). The loss of habitat may be considered small, however it will nonetheless still represent an appreciable but minor effect on the habitat. We advise that the appropriate assessment should consider ecological impacts of the habitat loss in more detail and refer to targets for the relevant features of the SAC, rather than relying on the relative size of the loss alone to determine whether adverse effect on integrity can be ruled out. Further information may be found in	**Table 9** of the **Shadow HRA [APP-238]** provides an assessment of the loss against relevant conservation objectives and respective targets of these conservation objectives (as provided in the Supplementary Advice on Conservation Objectives ("SACOs")) when determining that a conclusion of no AEOI can be reached. However, further assessment detailing potential effects in the context of both the site's conservation objectives and relevant attributes/targets for the Humber Estuary SAC is provided below. As discussed in **Paragraphs 4.3.21 to 4.3.24** and **Table 9** of the **Shadow HRA**, the loss in of subtidal habitat is *de minimis* in extent and considered negligible in the context of the amount of similar habitat in the region (and as a proportion of the SAC/Ramsar site). On this basis, any change to the "*extent and*

	the Supplementary Advice for the Humber Estuary SAC.	*distribution of qualifying natural habitats*" conservation objective and associated targets in terms of maintaining "*the presence and spatial distribution of estuary communities'* or restoring '*the total extent, spatial distribution of the estuary to ensure no loss of integrity, while allowing for natural change and succession*" is considered ecologically inconsequential both locally and more widely across the Humber Estuary site. A loss on this scale is also considered to be insignificant in terms of "*the structure and function (including typical species) of qualifying natural habitats*" conservation objective. In this respect, the loss is considered to have no material consequences in terms of targets associated with structure and function, including restoring connectivity, the presence and abundance of key structural and influential species, maintaining freshwater flow, habitat zonation, estuary morphology, sediment regime, species composition of component communities, substrate composition/distribution, tidal regime, topography and water density. Direct loss of subtidal habitat due to the piles is considered to be insignificant in terms of the '*supporting processes on which qualifying natural habitats rely'* conservation objective, with any changes to associated targets relating to sediment contaminants and water quality parameters considered to be negligible and ecologically inconsequential on mudflat habitat in the Immingham area and more widely across the Humber Estuary site. This information will be incorporated into the updated Shadow HRA.

NE7	Natural England advises that the most recent list of component species of the Humber Estuary SPA waterbird assemblage (Appendix A) should be referred to in determining the relevant features, with justification provided where impacts on a more limited list of species are assessed. We note that the species identified for assessment in the HRA include shelduck, redshank, black tailed godwit, teal, turnstone, oystercatcher and curlew. However, we advise that clarity should be provided on why these species have been selected. Natural England considers that all relevant species recorded within the sector should be scoped in. We also highlight that consideration may also need to be given to Sector B bird survey data as this is approximately 280m from the terminal construction zone. Therefore, the assessment should be refined once the exact location of the new jetty is known. Natural England recommends that the relevant bird survey results are collated and presented by month to demonstrate the pattern of usage across the year.	**Screening of SPA assemblage species** The rationale for screening in both qualifying and assemblage SPA species is provided in **Table 2** of the **Shadow HRA [APP-238]**. Natural England advised that numbers of birds exceeding 1% of the estuary-wide Wetland Bird Survey ("WeBS") five-year mean peak should be considered significant. This is a threshold commonly applied by Natural England on the Humber Estuary, and one which Natural England has been specifically requested to be applied for the Project, to determine whether there is the potential to adversely affect individual species. On this basis, any species recorded in the last five years (2018/19 to 2022/23) during the Immingham Outer Harbour ("IOH") monitoring on the section of Sector C between the Immingham Oil Terminal ("IOT") Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project) exceeding the 1% threshold were screened in. Applying this criteria, Black-tailed Godwit (a qualifying feature which also forms part of the assemblage) and Turnstone (an assemblage species) were screened in on the basis that these species are regularly recorded occurring in wintering numbers representing >1% of estuary-wide populations (i.e. the WeBS five-year mean peak) on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project). Species were also screened in on a precautionary basis when numbers were lower than 1% of estuary-wide populations but they were considered to be regularly recorded in this area. This

		included Shelduck, Redshank and Dunlin (qualifying features which also form part of the assemblage) and Teal, Oystercatcher and Curlew (assemblage species). All other assemblage species were screened out as they are considered rare or only occur infrequently and in low numbers in this area (representing <1% of the estuary-wide WeBS five-year mean peak). In order to provide further clarity, a table listing all the assemblage species listed in Appendix A of Natural England's Relevant Representation and the screening rationale for each of these species has been provided in **Table 1** at the end of this document. This table will also be provided as an appendix to the updated Shadow HRA. **Consideration of Sector B data** Sector B is located over 400m from the jetty and associated construction zone, and therefore birds in this area are considered to be out of the zone of influence of potential effects associated with the proposed development. However, in order to provide wider contextual data, **Annex A.2** of **Appendix A** of the **Shadow HRA [APP-238]** provides bird data for Sector B. **Presentation of monthly bird data** Relevant bird survey results for Sector C have been collated and presented by month to demonstrate the pattern of usage across the year. This is presented in **Table 1** of **Annex A.1** of the **Shadow HRA [APP-238]**. It is not possible to present data on a monthly basis at a more refined resolution than at the Sector C–

		wide scale given the collated format of distribution mapping data supplied by the ornithological surveyors. However, **Table A-8** of the **Shadow HRA** presents the abundance of waterbirds within and near to the Project (within approximately 400–500m of the Project). This was based on distribution mapping data for the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain and detailed discussion with the ornithological surveyors covering this count sector. This table presents information both on the abundance of birds during winter (October to March from 2018/19 to 2022/23) and passage months (August to September 2021 and April to September 2022). The numbers presented are considered to be representative of the abundances recorded in these months. Bird distribution information is presented in **Figure A-7** of the **Shadow HRA**.
NE8	Table 10 of the shadow HRA identifies that there will be no adverse effect on bird species which are SPA/ Ramsar site features. Natural England recognises that the red line boundary of the project includes a small proportion of the mudflat habitat available in bird survey sector C. However, bird surveys have identified that turnstone and black tailed godwit use the Immingham Oil Terminal to North Black Drain mudflat for roosting and feeding. Therefore, we advise that further information is needed, particularly on the locations of these roosts and whether the function of these areas as roost sites will be affected by the development. Consideration	As stated in Section **1.4**, **Figure A-7** and **Table A-8** of **Appendix A** of the **Shadow HRA [APP-238]**, the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project) is only known to typically support very low numbers of SPA species roosting. The only species known to roost in this area in numbers exceeding >1% of estuary-wide populations is Turnstone. The main roosting locations for this species are the upper shore boulders and sea defences in Sector C which are regularly used through the tide by individuals or small flocks of Turnstone, with flocks recorded (typically <20 to 30 birds feeding and roosting year-round) in the vicinity of the Project (as summarised in **Section 1.4**, **Figure A-7** and **Table A-8** of **Appendix A** of the

	should be given to potential changes to the foraging and roosting habitat within and outside the red line boundary.	**Shadow HRA**). In addition, Turnstone flocks move around widely along the foreshore in the Immingham area, utilising other areas of upper shore and sea defences as well as other structures in the area such as beams and jetty structures. Such structures are used for both feeding and roosting by Turnstone. As stated in **Paragraph 4.3.34** of the **Shadow HRA**, Turnstone would be expected to continue to feed and roost under the approach jetty structure during operation. On this basis, no change to roosting or feeding habitat is anticipated for this species a result of the presence of marine infrastructure. All other SPA wader and wildfowl species, including Black-tailed Godwit, have only been recorded roosting in very low abundances in this area (<10 birds of each species representing <1% of estuary-wide populations, as shown in **Table A-8** of the **Shadow HRA**). These species occasionally roost on upper shore habitat and sea defences. On this basis, no established roosts which are considered important even on a local scale will be impacted as a result of the proposed development. Very low numbers of Teal and Shelduck are also occasionally recorded floating on the water near the foreshore (< 50 m) in the vicinity of the project (consisting of a few individual Shelduck and <20-30 birds (representing <1% of the estuary wide WeBS five year mean peak)). These birds are loafing rather than feeding. These species are rarely recorded further offshore in this area. As stated in **Paragraph 4.3.34** of the **Shadow HRA**, the raised jetty structure is considered unlikely to change the distribution of waterbirds more widely along the foreshore fronting Immingham in this area, including foraging Black-tailed Godwit and feeding/roosting Turnstone. This was based on detailed

		observations of bird behaviour around existing jetties in the local area and in-depth analysis of distribution data for birds near and at distance from the nearby IOT Jetty.
NE9	Natural England advises that although we agree with the conclusions reached in Table 11 within the shadow HRA of no AEoI for this impact pathway, the dredging and subsequent deposition should be timed with the tide and circulation timings following the guidelines of safe disposal in the site. We recommend utilising a staggered approach for disposal of the seabed material with respect to the information provided in section 9.8.36 regarding the sensitivity of the organisms to sediment deposition which are present at the dredge site.	Deposition during capital dredging and disposal is not considered to cause an AEOI due to the relatively minor potential effects (as summarised in **Paragraphs 4.4.11 to 4.4.28** of the **Shadow HRA [APP-238]** and agreed by Natural England (NE key issue ref: NE9)). Furthermore, the suggested measures identified by Natural England have not been identified as a requirement for ongoing maintenance dredging and disposal in the Humber Estuary region (where much larger volumes are dredged annually) as part of the maintenance dredge protocol. In addition, the measure would be considered to provide limited ecological benefits, given the existing background deposition levels in the Humber Estuary, the impoverished nature of the benthic communities within and near to the dredge/disposal sites, the known existing tolerance levels of infauna to deposition and high recoverability rates of benthos characterising the areas.
NE10	Natural England notes that based on evidence provided in relevant MarESA assessments, the characterising benthic organisms recorded within the dredge area are considered tolerant to sediment deposition of at least 50 mm and agrees with the conclusion detailed in Table 12 the shadow HRA of no AEoI for this impact pathway.	Natural England's position is noted, and, on that basis, no further response is required.
NE11	Natural England notes that the sediment deposition changes which are to occur in the capital dredge disposal ground is predicted to be in the range of 1	Natural England's position is noted, and, on that basis, no further response is required.

	to 2 mm at distances of up to 1km from the disposal sites. As referenced in section 4.4.14, the faunal community at the disposal site can tolerate sediment deposition in the region of 5 cm. Sedimentation at this scale is unlikely to result in significant smothering effects to most faunal species with recoverability expected to be high. It is acknowledged that full recolonisation is expected to take somewhere in the region of 6 months to 1-2 years, depending on the species. Local changes to the bathymetry (as a result of material disposal to the bed) within the disposal site will be small in the context of the existing depths. As is currently the practice, disposal activity will be targeted to the deeper areas within the site, ensuring that bed level changes are not excessive in any one area, thus minimising the overall change. Natural England agree that with the assessment provided in Table 13 of the shadow HRA that the impacts will be small scale or short lived and is not likely to cause an adverse effect on integrity of the Humber SAC/Ramsar.	
NE12	The shadow HRA frequently refers to impoverished benthic communities being present at both the	Natural England makes reference to intertidal communities at the Immingham Green Energy Terminal dredge site. However, it should be noted that no intertidal habitats are present within or

	dredge and disposal sites i.e., 4.4.35, 4.4.47 and 4.5.19. Natural England agrees that the disposal site is impoverished, however we disagree with the dredge site being classified as impoverished. Although less diverse in nature, the intertidal and subtidal benthic communities at the Immingham Green Energy Terminal dredge site are of low to moderate ecological value, which is consistent with other similar biotopes previously sampled by the Institute of Estuarine and Coastal Studies (IECS) in 2015 and Environment Agency (EA) in 2016 within the Humber Estuary SAC.	near the capital dredge footprint which is located approximately 1km from the foreshore. With respect to subtidal benthic communities, use of the term 'impoverished' is considered appropriate for describing benthic communities within the dredge footprint. The number of taxa found in the samples collected as part of the Project-specific benthic surveys ranged from one (Station 3) to eight (Station 1), and the number of individuals from 10 organisms per m² (Station 3) to 190 organisms per m² as described in **Section 1.3** of **Appendix A** of the **Shadow HRA [APP-238]**. To put this into context, these numbers are lower than has been recorded at benthic stations at the Clay Huts (HU060) dredge disposal site which Natural England agree is impoverished (with 16 taxa and abundance over 1,000 organisms per m²) recorded at several stations at the disposal site (ABPmer, 2022). The numbers are also lower than recorded in other subtidal benthic surveys in the Immingham area where the number of taxa has exceeded over 15 in some samples and organism abundance over 10,000 organisms per m², although most samples are also considered to be similarly impoverished with <5 taxa and organism abundance of <1,000 per m²) (ABPmer, 2022; Able UK Limited, 2021; IECS, 2010). The samples were also at the lower end of the scale in terms of taxa and organism abundance when compared to subtidal benthic data from other estuaries and inshore areas in the UK, where samples can include over 40 taxa and organism abundance levels exceeding 20,000-30,000 organisms per m²) (ABPmer, 2019a;

		ABPmer, 2019b; Natural England/Environment Agency, 2017; Johnson *et al*., 2022). The judgement on using the term 'impoverished' has therefore been based on comparing the benthic communities within and near to the dredge footprint (derived from Project-specific benthic data) with benthic data more widely for the Immingham area, and also applying expert judgement based on an in-depth understanding from a wide variety of subtidal benthic datasets from estuaries and coastal areas throughout the UK. **References** Able UK Limited. (2021). Able Marine Energy Park (Material Change 2 – Tr030006). Updated Environmental Statement: Chapter 10: Aquatic Ecology. ABPmer (2019a). Southampton Water Benthic Ecology Surveys, Summary Report, ABPmer Report No. R.3141. A report produced by ABPmer for Associated British Port, Southampton, January 2019 ABPmer (2019b). Rochester Wharf Benthic Ecology Survey, Survey report, ABPmer Report No. R.3218TN. A report produced by ABPmer for Hanson Aggregates Marine Ltd, July 2019. ABPmer (2022). Immingham Eastern RoRo Terminal, Environmental Statement Appendix 9.1: Benthic Ecology Survey ABPmer Report No. R.3742. A report produced by ABPmer for Associated British Ports, December 2022.

		Institute of Estuarine and Coastal Studies (IECS) (2010). South Humber Channel Marine Studies: Intertidal and Subtidal Benthic & Fish Surveys 2010: Report to Yorkshire Forward. Johnson, G., Burrows, F., Crabtree, R., and Warner, I. (2022). Fal and Helford SAC Subtidal Sediment Data Analysis 2017. A Report for Natural England. Natural England Commissioned reports. Report number NECR387. Natural England/Environment Agency (2017). Fylde Marine Conservation Zones Baseline Survey Report 2015.
NE13	Natural England requires further information to determine whether the maintenance dredging operation has the potential to result in an AEoI. The following information relating to the maintenance dredge regime needs to be provided: • Number of times per year maintenance dredging will be carried out at the site • Total maintenance dredge area and its location in relation to the project site. Furthermore, in section 4.4.35, we do not agree with the statement that the seabed in the project area is of limited ecological value. The seabed at the Port of Immingham is part of a designated feature of the Humber Estuary SAC (Subtidal muddy sand), which primarily constitutes the project area and is a sub-type of the Annex I notified feature "H1110 Sandbanks which are	**Maintenance dredging frequency and footprint** A stated in **Paragraph 4.4.31** of the **Shadow HRA [APP-238]**, maintenance dredging is expected to be to be very limited (if required at all). As a result, any dredging that is required will only be undertaken infrequently (frequency will be dictated by operational requirements, but it is anticipated there could be several years or more between maintenance dredge campaigns). To provide further clarity, as stated in **Paragraphs 16.8.73 to 16.8.75** of **Environmental Statement ("ES") Chapter 16: Physical Processes [APP-058]** and shown in **Figure 16.14**, the assessment concludes a negligible requirement for maintenance dredging with the modelling indicating that the berth pocket, once dredged, will remain swept clear of deposited material by the flood and ebb tidal flows (in much the same way as the existing IOT berths are). **Maintenance dredge habitat characterisation**

	slightly covered by sea water all the time" and is part of the Humber Estuary SAC.	The subtidal seabed habitat within and near the maintenance dredging area is also not considered characteristic of the standard Joint Nature Conservation Committee ("JNCC") description of "*H1110 Sandbanks which are slightly covered by sea water all the time*". Specifically, sub types of the "*H110 Sandbanks which are slightly covered by sea water all the time*" feature consist of muddy sand along with gravelly and clean sands, eelgrass beds or maerl beds based on standard JNCC descriptions. None of these sub-types were recorded within or near to the maintenance dredge footprint and the habitat in this area is therefore not considered characteristic of this feature. To provide further clarity, the seabed specifically within and near to the maintenance dredge footprint has been shown to consist of mud or sandy mud based on the results of the Project-specific benthic survey results (**Section 1.3** of **Appendix A** of the **Shadow HRA**) with mud (silt) content ranging from 97 to 55%. Lower mud (silt) content and higher sand levels would be required in the samples from the area to classify as muddy sand under standard sediment classifications such as Textural Group Classification (Folk, 1954). **References** Folk, R., 1954. The distinction between grain size and mineral composition in sedimentary-rock nomenclature. Journal of Geology 62, 344–359.
NE14	Natural England is satisfied that the effects of the project works on the hydrodynamic and sedimentary processes will be small in scale and are not likely to cause an adverse effect on	Natural England's position is noted, and, on that basis, no further response is required.

	integrity of the Humber SAC (Table 15 of the shadow HRA).	
NE15	The disposal of capital dredge material will be evenly deposited at the most central and deepest areas at the dredge disposal sites (HU060 and HU056). This will minimise the initial reduction in water depth and any environmental changes at these disposal sites. Local changes to the bathymetry (as a result of material disposal to the bed) within the disposal site will be small in the context of the existing depths. Natural England agrees that changes to bathymetry at the dredge disposal site will be small and is not likely cause an adverse effect on integrity of the Humber SPA/ SAC (Table 16 of the shadow HRA).	Natural England's position is noted, and, on that basis, no further response is required.
NE16	Natural England is satisfied that shading will not cause any direct changes to qualifying habitats beneath the marine infrastructure and is not likely to cause an adverse effect on integrity of the Humber SAC (Table 15 of the shadow HRA). There are unlikely to be any negative effects on benthos as no seagrass or limited macroalgae species occur in the project area. (Table 17 in shadow HRA)	Natural England's position is noted, and, on that basis, no further response is required.

NE17	Natural England agree with the Applicant's conclusion of no AEoI for this impact pathway (Table 21 and 22 of the shadow HRA).	Natural England's position is noted, and, on that basis, no further response is required.
NE18	Natural England notes the results of the sediment contaminant analysis at the project site and agrees with the conclusions of no AEoI for these impact pathways (Table 23 and 24 of the shadow HRA).	Natural England's position is noted, and, on that basis, no further response is required.
NE19	Natural England recommends that the relevant bird survey results are collated and presented by month to demonstrate the pattern of usage across the year. Section 4.10.16 of the shadow HRA identifies that black tailed godwit (2%) and turnstone (10%) are recorded in numbers over 1% of the estuary population in the area of intertidal mudflat between Immingham Oil Terminal and the North Beck Drain. Therefore, we advise that the appropriate assessment should provide further assessment on the potential impacts on these species. In particular, the appropriate assessment should identify any key areas that these species are using for roosting and whether these are likely to be affected by construction activities. Section 4.10.23 states that ambient noise levels collected for the IERRT project on the foreshore around the Port of Immingham have been used in this assessment. However, we note that the measurement location (M6) Northern Boundary of	**Presentation of monthly bird data** Please see the response to NE7 with respect to the presentation of monthly bird data. **Potential effects on roosting birds during construction** As stated in **Paragraph 1.4.28**, **Figure A-7** and **Table A-8** of **Appendix A** of the **Shadow HRA [APP-238]**, the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project) is only known to typically support very low numbers of SPA species roosting. The only species known to roost in this area in numbers exceeding >1% of estuary-wide populations is Turnstone. The main roosting locations for this species are the upper shore boulders and sea defences in Sector C which are regularly used through the tide by individuals or small flocks of Turnstone, with flocks recorded (typically <20 to 30 birds feeding and roosting year-round) in the vicinity of the Project (as summarised in **Paragraph 1.4.28**, **Figure A-7** and **Table A-8** of **Appendix A** of the **Shadow HRA**). In addition, Turnstone flocks move around

	IERRT project site is adjacent to a road and not within the red line boundary for the IGET project. Natural England advises that this measurement location is not considered to be representative of the ambient noise levels in the relevant areas of the Humber Estuary for this project. The IGET project in effect extends the Port of Immingham into an area which is likely to be less disturbed (with port infrastructure currently limited to the north west side) and consideration should be given to the potential for the ambient noise level to be lower than within the Port frontage. Therefore, Natural England advises that noise measurements are monitored at an additional location in closer proximity to the proposed works. Natural England notes that a 200m potential disturbance distance is relied upon in the assessment of noise and visual disturbance impacts. Natural England acknowledges that 200m is generally considered an acceptable disturbance distance for most construction activities within a port environment where birds will show some habituation to human activity. However, Natural England advise that a precautionary approach is taken to noise disturbance distances for piling. We recognise that birds are highly likely to be disturbed where noise levels exceed 70 dB LAmax. However, there may also be effects on birds between 55 and 70 dB, we therefore consider that 200m does not represent a precautionary	widely along the foreshore in the Immingham area, utilising other areas of upper shore and sea defences as well as other structures in the area such as beams and jetty structures. Such structures are used for both feeding and roosting by Turnstone. As summarised in **Table 27** of the **Shadow HRA**, this species is considered particularly tolerant to disturbance with no potential for an AEOI with the application of the proposed mitigation. All other SPA wader and wildfowl species, including Black-tailed Godwit, have only been recorded roosting in very low abundances in this area (<10 birds of each species representing <1% of estuary-wide populations, as shown in **Table A-8**). These species occasionally roost on upper shore habitat and sea defences. On this basis, no established roosts which are considered important even on a local scale will be impacted as a result of the proposed development during construction. Very low numbers of Teal and Shelduck are also occasionally recorded floating on the water near the foreshore (< 50 m) in the vicinity of the project (consisting of a few individual Shelduck and <20-30 birds (representing <1% of the estuary wide WeBS five year mean peak)). These birds are loafing rather than feeding. These species are rarely recorded further offshore in this area. **Ambient noise levels** Project-specific ambient noise measurements will be collected within the Order Limits. This information will be incorporated into an

	approach and advise that the noise disturbance zone should be larger, such as 300m from noise source. Therefore, we advise that the assessment is revised. With regards to the justification provided in ES 10.8.38 of Chapter 10 Ornithology, it is important note that preventing disturbance is not just about avoiding starvation for individuals, it is also about ensuring that a bird is fit enough to migrate to breeding grounds and reproduce and maintain the population. In addition, a study in France does not necessarily translate to the conditions that may be experienced on the Humber; Alves et al., 2013[3] shows a difference in thermoregulation costs between three sites (Portugal, South Ireland and the East of England). A flight response is considered the most extreme disturbance event. Before birds are driven to fly away, disturbance events may still increase the stress response in a bird, for example by reducing the amount of time spent foraging or roosting or increasing the time spent scanning for threats or moving slowly away. In addition, it is difficult to know if birds are not moving away because they are habituated or if they are in poor condition. Therefore, Natural England advises that the behavioural studies cited in the ES should not be relied upon in the	updated version of the Shadow HRA and will be used to inform an updated assessment. **The use of a 200m disturbance buffer** It is acknowledged that in areas with very low background ambient noise levels that noise levels of between 55dB and 70dB could cause disturbance reactions in birds as individuals will not be habituated to noise. In addition, a precautionary buffer of 300m might be appropriate in these situations. Noise levels between 55dB and 70dB are considered to be relatively low-level noise (for context, an electric toothbrush produces noise levels of 50–60dBA, a washing machine 50–75dBA and hair dryer 69–95dBA (Centre for Hearing and Communication, n.d.)). The assessment of piling effects for the Project was specifically undertaken in the context of background noise levels in the Port of Immingham area with noise levels in the range of 55–70dB known to regularly occur on daily basis at the foreshore fronting the Port of Immingham. Local waterbird populations are therefore subjected to noise levels of between 55dB and 70dB repeatedly, with observations from ongoing ornithology surveys in the area suggesting that birds show limited responses and continue to feed in important numbers on the mudflats, suggesting they are habituated to noise at these levels.

[3] Alves, J. et al., 2013. Costs, benefits, and fitness consequences of different migratory strategies. *Ecology*, 94(1) 11-17.

	assessment of potential impacts on SPA birds from disturbance events. In addition, 10.8.54 states "birds would be expected to redistribute to nearby foreshore in the Immingham/Grimsby area and continue to feed and roost in these alternative locations following dispersal." However, Natural England advises that this assumption should not be relied upon, due to development pressures in these areas, and potential limitations for relocation within the surrounding area should be considered in the assessment. In particular, the Environment Agency Stallingborough 3 flood risk management scheme and Immingham Eastern RORO NSIP may be taking place at the same time as IGET and limit the availability of alternative feeding sites. Please also clarify whether the noise assessment includes combined effect of noise from terrestrial and marine works. Further advice regarding the combined effect of noise from terrestrial and marine works is provided below (key issue ref NE35).	Construction restrictions based on a 200m zone rather than 300m is considered proportionate based on the following: • As stated in the **Shadow HRA [APP-238]** (**Paragraph 4.10.30**), the winter marine construction restriction from 1 October to 31 March will minimise disturbance during the colder winter months when waterbirds are considered vulnerable to the effects of disturbance. This proposed mitigation restricts all construction activity including marine piling within a 200m zone of exposed foreshore (until an acoustic barrier/visual screen has been installed on both sides of the semi-completed structure). The noise suppression system will be used for piling undertaken outside of the 200m restriction zone. The noise suppression system is predicted to reduce noise levels to <70dB LAmax at distances greater than approximately 200m from the marine piling, which will be in the range of existing background noise levels of operational port activities. The 70dB criterion is considered an appropriate threshold for noise associated with piling specifically in the Port of Immingham area as highlighted above. • With respect to visual stimuli associated with the piling activity, as specified in the **Shadow HRA** (**Paragraphs 4.10.19 and 4.10.20**), evidence from the disturbance monitoring of the IERRT Ground Investigation ("GI") works, which used a jack-up barge (which will also be used for the Project piling), recorded limited disturbance with Black-tailed Godwit, Shelduck and other SPA species feeding within 60m and in numbers in the local

		area comparable to previous years. On this basis, 200m is also considered appropriate with respect to visual stimuli associated with piling activity. • Observations from a range of piling-specific studies indicate limited responses to piling at distances of more than 200m (as summarised in **Table 2** at the end of this document). 3. • The suitability of a 200m buffer has also been confirmed by the ornithologists who have undertaken the survey work in the Port of Immingham area which was used to inform the assessment. Their observations suggest that disturbance responses to human activity (including workers/plant on or near the foreshore, vehicles, vessels or port related noise) rarely occur when the source of disturbance is greater than 200m from waterbirds. This includes species known to be more sensitive to disturbance such as Shelduck and Curlew. These findings are also consistent with data and observations by ABPmer ornithologists within other port environments, including Southampton where waterbirds are regularly recorded within 200m of human activity and continue feeding without eliciting any disturbance response (either dispersive or sub-dispersive), with disturbance responses typically occurring at distances of <100m from stimuli including for species considered more sensitive to disturbance such as Shelduck and Curlew.

		It is acknowledged that the potential for some limited responses in more sensitive species such as Shelduck cannot be ruled out at distances of more than 200m from piling. However, such responses at these distances would be expected to be mild and very infrequent given the evidence on the known habituation to existing port-related activity and noise. On this basis and as detailed in the **Shadow HRA**, the winter marine construction restriction is considered effective at minimising disturbance and allowing birds to continue to feed in the footprint of the Project during the winter months. Specifically, as highlighted in **Table 27** of the **Shadow HRA**, disturbance of the magnitude predicted is not considered to compromise any of the conservation objectives of the Humber Estuary SPA/Ramsar site. **Effects of dispersive (flight) and sub-dispersive responses** It is noted and agreed with respect to the statement from Natural England that "*preventing disturbance is not just about avoiding starvation for individuals, it is also about ensuring that a bird is fit enough to migrate to breeding grounds and reproduce and maintain the population*". Residual disturbance effects at a flyway level have been considered in the **Shadow HRA** as stated in **Table 27**: "…*any disturbance or displacement during construction, with the proposed mitigation, is expected to be limited (with waterbirds able to continue feed in the same areas during winter as observed prior to construction). Therefore, the predicted residual effects with the proposed mitigation in place are considered inconsequential with respect to impacts to individual energy*

		budgets (i.e. increased energetic costs through disturbance and changes to available feeding resources or prey intake will all be negligible). On this basis, population level consequences (at both a local and fly way level) in terms of mortality or changes in breeding success will not occur". It is also agreed that sub-dispersive disturbance response (such as increased vigilance and corresponding reduced feeding rates or time spent roosting) can increase the stress response in birds in some situations. However, in areas such as Immingham where birds are relatively habituated to human activity, waterbirds perceive less risk associated with potential noise and visual disturbance stimuli, so responses where birds stop feeding and increased stress levels are likely to be low compared to if new sources of human activity are introduced into more remote areas of coast (where birds are less habituated). It is also worth noting that sub-dispersive responses (such as increased alertness) typically have less energetic consequences per disturbance event than dispersive responses (such as where birds stop feeding and take flight to another location). However, research also suggests that even when frequent dispersive flight response occur, energetic consequences and effects on overall foraging time can be limited. For example, as stated in the **Shadow HRA** in **Paragraph 4.10.12**, Collop *et al.* (2016) examined the likely consequences of different frequencies of disturbance on various wading birds using their data on mean flight time and mean total time lost. The authors found that a 5% reduction in birds' daily available feeding time would be expected to result from responding to between 38 and 162 separate disturbance events (depending on species and tidal stage). The mean cost per individual flight response represented less than a tenth of a

		percent of each species' daily energy requirements. The study concluded that the energetic costs of individual disturbance events were low relative to daily requirements and unlikely to be frequent enough to seriously limit foraging time. Furthermore, there is no evidence to suggest that Black-tailed Godwit or Turnstone are in poor condition, with local Humber Estuary populations either increasing (Black-tailed Godwit) or remaining relatively stable (Turnstone) despite ongoing pressure from recreational disturbance along the South Bank of the Humber Estuary (Woodward *et al.,* 2019; Austin *et al.*, 2023). **Alternative feeding locations** With the proposed mitigation in place and as stated in **Table 27** of the **Shadow HRA**, Black-tailed Godwit and other birds would be expected to be able to continue to feed on mudflat in the footprint of the Project during the winter months with only very limited responses anticipated (involving infrequent and mild responses, i.e., at worst, very localised flight responses with birds resuming feeding quickly in local area). If any of these infrequent local flights do occur there is still considered to be extensive areas of mudflat available in the local area, even if both the Environment Agency Stallingborough 3 flood risk management scheme and IERRT take place at the same time as the Project. Further clarity is provided below and will be incorporated into the updated Shadow HRA. With respect to the Environment Agency Stallingborough 3 flood risk management scheme, and as stated in **Table 35** of the **Shadow HRA** (Table 36 of the updated Shadow HRA), the flood defence works will not be undertaken during the winter period

		(between October and March). On this basis, any locally dispersed birds will have extensive areas of mudflat available east of the Project towards the Pyewipe mudflat during the key wintering period. With respect to IERRT, with the proposed winter restriction on construction in place (from 1 October to 31 March on activity including piling within 200m of exposed foreshore), extensive mudflat is also available for feeding west of the IOT Jetty for any locally dispersed birds due to the Project. With this measure, birds would be anticipated to have alternative feeding opportunities along the foreshore fronting the Port of Immingham. It should also be noted that approximately 90% and 70% respectively of the foreshore at low water between the Inner Dock entrance and the IOT (i.e the mudflat habitat fronting the Port of Immingham) will be at distances of more than 200m and 300m respectively from the construction zone. Furthermore, ringing data suggests that the local wintering population of Black-tailed Godwit is known to have relatively wide-ranging movements, with flocks frequently moving between alternative feeding sites in the Immingham/Grimsby area. This species is therefore considered to have some plasticity in terms of switching between different sites for feeding compared to some other waders species known to be more site faithful and which utilise smaller wintering ranges. On this basis, potential effects on alternative feeding sites are predicted to be limited. **Noise effects from terrestrial and marine noise**

		There is also the potential for combined effects of marine and landside piling to cause potential noise disturbance to coastal waterbirds. However, terrestrial noise modelling has predicted that the nearest landside piling to the foreshore (within Work Area No. 5. associated with piling of the foundations of the ammonia storage tanks) is predicted to cause noise levels <55 dB LAeq,1hr and <65 dB LAmax on the foreshore. This is lower than the 70 dB criteria applied in the assessment and also in the range of background noise in the local Port of Immingham area. The terrestrial piling is also more than 300m from the foreshore (which is greater than the 200 m disturbance buffer applied in the assessment). On this basis, SPA waterbird features on the foreshore are predicted to be out of the zone of potential disturbance effects arising from terrestrial piling noise during construction. Correspondingly, combined effects resulting from terrestrial and marine piling will be negligible and not considered to compromise any of the conservation objectives, and it is concluded that there is no potential for AEOI on qualifying interest features of the Humber Estuary SPA. **References** Austin, G.E., Calbrade, N.A., Birtles, G.A., Peck, K., Shaw, J.M. Wotton, S.R., Balmer, D.E. and Frost, T.M. (2023). Waterbirds in the UK 2021/22: The Wetland Bird Survey and Goose & Swan Monitoring Programme. BTO/RSPB/JNCC/NatureScot. Thetford. Centre for Hearing and Communication (n.d.). Common Noise Levels – How Loud is Too Lound? [Online] (accessed February 2024).

		Collop, C., Stillman, R.A., Garbutt, A., Yates, M.G., Rispin, E., and Yates, T. (2016). Variability in the area, energy and time costs of wintering waders responding to disturbance. Ibis, 158(4), pp.711-725. Woodward, I.D., Frost, T.M., Hammond, M.J., and Austin, G.E. (2019). Wetland Bird Survey Alerts 2016/2017: Changes in numbers of wintering waterbirds in the Constituent Countries of the United Kingdom, Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs) and Areas of Special Scientific interest (ASSIs). BTO Research Report 721. BTO, Thetford.
NE20	Natural England advise that programming of the marine construction works should be considered so that the most disturbing works (including approach jetty) are carried out in the summer and early autumn, with works that are less disturbing to the SPA birds taking place during the coldest months (December to February inclusive). This measure is advised to ensure that black tailed godwit, which are at the northern edge of their wintering range on the Humber, can continue to feed across both tides each day during the coldest months, to maintain body condition.	Natural England's comments have already been addressed by the mitigation measures proposed for the Project. The Project construction programme has been designed around the proposed mitigation measures. As stated in **Paragraph 4.10.30** of the **Shadow HRA [APP-238]**, the winter marine construction restriction from 1 October to 31 March (for the approach jetty) will ensure that the disturbing activities including piling, as well as all other construction activity on or near the foreshore (within 200m of exposed intertidal), will not take place during the winter months including from December to February. Less-disturbing works, such as construction activity behind the acoustic barrier/visual screens installed on the semi-completed approach jetty structure, will instead be potentially undertaken in these months. With the winter restriction described above in place, Black-tailed Godwit will be able to continue to feed on the foreshore in the Immingham area across both tides each day during the coldest months, to maintain body condition.

NE21	Natural England has a number of concerns with respect to the proposed mitigation measures for impacts of noise on non-breeding birds (Table 27 of the shadow HRA). The assessments of effectiveness of the proposed mitigation measures rely upon the 200m disturbance distance and 70dB threshold. As outlined above, Natural England advises that a more precautionary approach should be taken to assessing disturbance impacts from piling. Therefore, the assessment of proposed mitigation measures should be revised in line with this advice. Soft start piling may reduce the 'startle effect' on birds when piling starts, but it is not generally used as a mitigation measure to reduce the impacts on SPA waterbirds. We advise that there is no robust evidence to suggest that soft start piling prevents disturbance caused by the noise. Natural England advises that a precautionary approach should be taken to setting the timing of works to ensure that there is sufficient distance between the piling site and exposed mudflats (being used by SPA birds) when piling starts. The winter marine construction restriction states that marine construction associated with the approach jetty can only be undertaken more than 200m from the foreshore. More information is needed about how this will be achieved, for example through the use GPS to identify the location of piles and	**Assessment of proposed mitigation** The Applicant's assessment of noise effects and potential mitigation relating to noise disturbance was specifically developed based on guidance given by Natural England as part of the consultation for the IERRT project (**Paragraph 4.10.20** of the **Shadow HRA [APP-238]**) which advised that "*peak levels below 55 dBA can be regarded as not significant, while peak noise levels approaching 70 dBA and greater are most likely to cause an adverse effect … birds may habituate to regular noise below 70 dBA, but irregular noise above 50 dBA should be avoided*". On the basis of this advice, a threshold of 70dBA was applied to the assessment relating to noise. The application of 70dB is a widely accepted approach used in impact assessments and is also consistent with other literature and evidence on noise disturbance (such as Xodus, 2012; Wright *et al*., 2013; ABPmer, 2002 and IECS, 2009). As discussed further in the Applicant's response to NE19, the assessment of piling effects for the Project was also specifically undertaken in the context of background noise levels in the Port of Immingham area. The Shadow HRA will be updated to include Project-specific noise measurements from within the Order Limits of the Project. With respect to the use of a 200m disturbance buffer, as discussed further in the Applicant's response to NE19, the Applicant has referenced numerous scientific papers, site-specific bird disturbance monitoring, grey literature, and anecdotal evidence from ornithologists to demonstrate that a 200m disturbance buffer is sufficient to mitigate impacts of noise and

	therefore distance from the foreshore. It may be possible to add markers on the mudflat to improve certainty about distances. We note that the cold weather construction restriction refers to the implementation of "*temporary cessation of all construction activity within 200m of exposed intertidal foreshore* following *seven consecutive days of freezing (zero or sub-zero temperature) weather conditions*." However, Natural England advises that the cold weather restrictions should apply to all marine construction works, not just those located within 200m of the exposed intertidal foreshore. We recommend that the cold weather construction restriction should be implemented after three consecutive days of freezing weather conditions. Although the JNCC seven day stop was developed in relation to wildfowling, wildfowling clubs often choose to stop much earlier than seven days in very harsh weather. As a precautionary measure we would advocate taking a precautionary approach of three days at this location, especially where freezing conditions are accompanied by high winds and poor visibility. Where an alternative approach is proposed, further justification should be provided.	visual disturbance from construction to a level that would not be considered an AEOI (acknowledging that, even if some disturbance may occur, it would only be of limited consequence and not constitute an AEOI) when considered against the site's conservation objectives. On this basis, the application is considered to be robust, based on established guidance and precautionary in the context of the proposed development being in close proximity to an existing port operational area. **The use of soft starts during piling** The purpose of soft starts during piling is not to prevent disturbance noise as Natural England suggest but instead to allow birds to become more tolerant to marine piling noise by allowing a more gradual increase in noise levels which will reduce the potential for birds to become startled. The use of this procedure is a widely established measure to help reduce disturbance to waterbirds. It is acknowledged that initial sudden noise associated with an activity elicits a greater response than further subsequent noise (due to increasing tolerance of the birds to the stimuli). On this basis, soft starts will allow the more gradual increase in noise levels which would help reduce potential 'startling' effects to waterbirds associated with the first sudden bangs of piling (during periods which are not subject to seasonal restrictions). It should also be noted that the use of soft starts is not considered one of the primary mitigation measures in place (such as the construction restriction) but is part of an overall mitigation strategy

	Natural England also recommends the use of a suitably qualified Ecological Clerk of Works (ECoW) during the construction period. An ECoW will be able to guide the works, ensure that agreed mitigation measures are adhered to and therefore avoid disturbance to large flocks of SPA birds.	which is designed to help minimise potential disturbance effects on waterbirds during construction. **The use of GPS and markers to improve certainty about distances** The Applicant welcomes Natural England's suggestion of the use of GPS and markers on the mudflats as a potential option that could be used to improve certainty about distances. The feasibility of this option will be explored further in consultation with Natural England. **Cold weather construction restriction** It is considered unnecessary to stop all marine construction activity as part of the cold weather construction restriction as much of the work is considered to be well outside the zone of potential disturbance effects to SPA waterbird species screened into the assessment (which occur on or very close to the foreshore). For example, construction of the jetty platform and the berth capital dredge are located approximately 1km from the foreshore. The proposed cold weather construction restriction is based on the JNCC's scheme to reduce disturbance to waterfowl due to shooting activity in severe winter weather. This scheme applies a restriction to the activity after freezing conditions (determined from minimum air and grass temperatures) for seven consecutive days. The proposed restriction in the **ES** and **Shadow HRA** is, therefore, considered appropriate and based on established working practices.

		The use of a Ecological Clerk of Works ("ECoW") In principle, a suitably qualified Ecological Clerk of Works ("EcoW") is a suggestion that the Applicant will consider for appropriate activities during the construction period. The possibility of using an EcoW during construction will be discussed with Natural England. **References** ABPmer. (2002). ABP Teignmouth Quay Development Environmental Statement. ABP Marine Environmental Research Ltd, Report No. R.984a. Institute of Estuarine and Coastal Studies (IECS). (2009). Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance. Institute of Estuarine and Coastal Studies Report to Humber INCA. Wright, M.D., Goodman, P., and Cameron, T.C. (2013). Exploring behavioural responses of shorebirds to impulsive noise. Wildfowl, 60(60), pp.150-167. Xodus. (2012). Grimsby River Terminal Construction Pile Noise Monitoring and Bird Behaviour Observations. Associated British Ports.

NE22	Natural England advises that further assessment is required regarding operational noise and visual disturbance impacts on SPA birds during operation, including turnstone and black tailed godwit (Table 28 in shadow HRA). As outlined above for construction, the appropriate assessment should identify any key areas that these species are using for roosting and assess whether these are likely to be affected by operational activities. Consideration should be given to the fact that the proposed development will introduce additional disturbance into previously undeveloped areas of the Humber Estuary designated sites. We note that 10.9.70 of Chapter 10 Ornithology states "the berth during spring tide periods will be located approximately 1km from intertidal mudflat used by coastal waterbirds. On this basis, disturbance responses are considered highly unlikely due to vessel movements and berthing operations." However, we advise that further information is required to inform the assessment of operational impacts in the HRA, including whether any SPA waterbirds have been recorded using the water in this area. ES 10.8.71-10.8.76 of Chapter 10 Ornithology provides some assessment of disturbance impacts from vessels; however, we advise that details of the species which may be affected should be	**Roosting birds on the intertidal** As stated in **Paragraph 1.4.28**, **Figure A-7** and **Table A-8** of **Appendix A** of the **Shadow HRA [APP-238]**, the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project) is only known to typically support very low numbers of SPA species roosting. Turnstone is the only species known to roost in this area present in numbers above the 1% threshold which is used by Natural England as an indicator of potential for adverse effects on bird species on the Humber Estuary. The main roosting locations for Turnstone are the upper shore boulders and sea defences in Sector C which are regularly used through the tide by individuals or small flocks of Turnstone, with flocks recorded in the vicinity of the Project (typically <20 to 30 birds feeding and roosting year-round). Turnstone are considered to be very tolerant to potential disturbance (**Table 26** of the **Shadow HRA**) and would be expected to continue using these roosting areas during operation. All other SPA wader and wildfowl species, including Black-tailed Godwit, are only recorded roosting in very low abundances in this area (<10 birds of each species representing <1% of estuary-wide populations, as shown in **Table A-8** of the **Shadow HRA**). These species occasionally roost on upper shore habitat and sea defences. On this basis, no established roosts which are considered important even on a local scale will be impacted as a result of potential disturbance during operation. ***Loafing birds near the intertidal***

	provided. In addition, disturbance events are described as typically occurring within 100m of the activity; however, some species are disturbed at greater distances. As detailed above, it is important to note that a bird flying away is the most significant impact of disturbance; causing birds to feed or roost less, have increased vigilance or more slowly move away is still a disturbance impact. Further information should be provided regarding the definition and assessment of 'Mild and localised' disturbance events and what is considered 'rarely' in the context of occurrence of more significant disturbance events. We note that 10.8.69 refers to 'Consistent evidence of changes (reductions) in waterbird abundance in the local area which could be linked to operational activities was not recorded'. However, clarity should be provided on whether any changes in abundance were recorded, but not considered 'consistent'. Natural England advises that the increase in vessel traffic should be compared against the existing vessel traffic for the estuary to inform the assessment of impacts on SPA birds, including details of any effect on the between vessel intervals.	Very low numbers of Teal and Shelduck are occasionally recorded floating on the water near the foreshore (< 50 m) in the vicinity of the project (consisting of a few individual Shelduck and <20-30 birds (representing <1% of the estuary wide WeBS five year mean peak)). These birds are loafing rather than feeding. These species are rarely recorded further offshore in this area. Potential operational effects on the very low numbers present would be anticipated to be negligible. **Feeding birds on the intertidal** The bird data suggests that the foreshore fronting the Project (i.e. the section of Sector C between the IOT Jetty and the mudflat fronting North Beck drain within approximately 400–500m of the Project) is regularly used by a variety of feeding waterbirds. In an estuary-wide context, numbers of most SPA qualifying and assemblage species recorded in this area were generally only recorded in low numbers feeding in the intertidal during winter, passage and summer periods (i.e. <10–20 birds representing <1 of the estuary-wide WeBS five-year mean peak). Only feeding Black-tailed Godwit during the winter and Turnstone (in winter, passage and summer periods) were present in numbers above the 1% threshold which is used by Natural England as an indicator of potential for adverse effects on bird species on the Humber Estuary.

		Turnstone are considered to be particularly tolerant to potential disturbance, and operational disturbance to Black-tailed Godwit is not expected to be of a magnitude that will cause an AEOI based on the rationale and evidence provided in **Paragraphs 4.10.36 to 4.10.44** and **Table 28** of the **Shadow HRA**. **Diving birds offshore around the vessel berths** The additional operational vessel movements resulting from the Project will only constitute a small increase in vessel traffic in the area (approximately a 3% increase). All SPA features screened into the **Shadow HRA** (**Table 2**) are shorebirds that occur on or very near intertidal habitats (and also associated functionally linked land). As stated in **Paragraph 4.10.36** of the **Shadow HRA**, the nearest berth during spring tide periods will be located approximately 1km from intertidal mudflat used by coastal waterbirds. Waterbirds on or very near to the foreshore are therefore considered to be out of the zone of influence of potential disturbance effects associated with berth vessel movements. Diving birds utilising water column habitats could be potentially exposed to disturbance associated with berth vessel movements. However, no SPA assemblage species of diving bird (such as diving ducks) were screened into the **Shadow HRA** (**Table 2**) on basis that they are considered to be absent/only occur very rarely within the vicinity of the jetty. This includes diving bird species such Goldeneye and Scaup in the species list provided in the note *Annex B: Humber Estuary Special Protection Area: non-breeding waterbird assemblage (Version 1.2, June 2023*) provided by Natural England.

		Clarification over disturbance terminology The use of the wording 'mild and localised' and 'rarely' were not in the assessment section of the **Chapter 10** (i.e summary of effects) but in the general scientific context review. They related to monitoring of potential disturbance due to the movements of vessels berthing at pontoons associated with offshore windfarm Operation and Maintenance ("O&M") facilities in several other UK port locations and therefore does not specifically relate to the proposed development. The text in **Chapter 10** in **Paragraph 10.8.69**, which states "*consistent evidence of changes (reductions) in waterbird abundance in the local area which could be linked to operational activities was not recorded*", also relates to these contextual studies rather than impacts specifically associated with the proposed development. However, where the term 'mild' disturbance responses has been used more widely in the assessment, this is considered to relate to disturbance responses which are either sub-dispersive (such as increased vigilance) or walking/short-flight responses with birds rapidly resuming feeding/roosting behaviour near to their original location. This is opposed to larger magnitude responses (such as dispersive flights out of the local area) which take longer for birds to resume original behaviour and correspondingly carry a greater energetic burden.
NE23	It would be NEs preference for the underwater noise pathways (injury and behavioural disturbance) to be assessed separately. Natural England is supportive in principle of the mitigation outlined here to reduce the risk of injury	Underwater noise can result in a range of responses in marine mammals (from mortality/injury, behavioural avoidance/responses and/or masking of biological signals, e.g. echolocation). The impact assessment for the Project has been undertaken to identify the Project activities that have the potential to result in

	to marine mammals during piling (Table 29 of the shadow HRA). We suggest that a project-specific Marine Mammal Mitigation Plan is created, to capture the proposed mitigation measures in a standalone document, particularly as some measures are not standard (e.g. cease piling if marine mammals observed in the mitigation zone). The mitigation should include the following for full adherence to the JNCC Guidelines: • Any individual undertaking the role of MMO must have received training through a JNCC-approved MMO course. A break in piling of 10 minutes should lead to the mitigation process being implemented. Start-up of piling should not occur if the mitigation zone is not fully visible (e.g. fog, dusk). In this case piling should be delayed until conditions are conducive for marine mammal observations.	adverse effects on receptors and to identify suitable mitigation to avoid or minimise those effects to acceptable levels. Within the **Shadow HRA** (**Paragraphs 4.11.6 to 4.11.13, 4.11.29 to 4.11.42**) **[APP-238]**, underwater noise effects on marine mammals are considered under one impact pathway. However, the ranges at which injury effects (permanent/temporary) are predicted (using an agreed underwater noise propagation model and recognised published thresholds), as well as the ranges at which behavioural responses are anticipated (based on a detailed desk-based review of the available scientific literature) are clearly presented. Both of these outcomes are considered in the assessment, along with the potential significance of effects or the level of mitigation that is required. The mitigation for marine mammals is specified in the assessments and captured in both the **Outline CEMP [APP-221]** and draft Deemed Marine Licence within the **draft Development Consent Order ("DCO") [PDA-004]**. Therefore, the Applicant does not see the requirement to produce a further plan.
NE24	Natural England agree with the Applicant's conclusions (Table 29 of the shadow HRA) that adverse effect on integrity can be ruled out for The Wash and Norfolk Coast SAC from the project alone, based on the information provided.	Natural England's position is noted, and, on that basis, no further response is required.

NE25	Natural England notes that vibro-piling may occur overnight and therefore may have an impact on migrating lamprey (Table 29 of shadow HRA). As a result, we advise that the night-time restrictions that have been applied to percussive piling should be extended to include vibro-piling to mitigate impacts to migratory lamprey. If this is not committed to, impacts from night-time vibro- piling on lamprey will need to be assessed and included in the HRA.	Vibro-piling and potential impacts on migratory lamprey species are considered in detail within the **Shadow HRA [APP-238]**. Please refer specifically to **Table 3** and **Table 5** in **Section 3 (Screening)**, and **Section 4.11** of the Appropriate Assessment in the **Shadow HRA**. The assessment has been undertaken on the basis that the works could take place at any time of year (including overnight) as a worst case. Therefore, impacts from night-time vibro marine piling on lamprey have been assessed. As noted in **Section 4.11** of the **Shadow HRA**, for vibro marine piling of either 2.3m or 1.5m diameter piles, there is predicted to be a risk of mortality, potential mortal injury or recoverable injury within 10m in fish with no swim bladder (i.e. lamprey). For vibro marine piling, there is a risk of Temporary Threshold Shift ("TTS") and behavioural response in fish within around 1km from the source, which equates to 43% of the width of the Humber Estuary at low water respectively and 29% of the estuary width at high water. The scale of the behavioural response is partly dependent on the hearing sensitivity of the species. Fish without a swim bladder (e.g. lamprey) are likely to show only very subtle changes in behaviour in this zone. The partial and temporary barrier from vibro-piling alone (including overnight) is not considered to have the potential to result in an AEOI on lamprey. Despite this conclusion, the Applicant is committed to extending the night-time restrictions that have been applied to percussive piling to include vibro-piling. The draft Deemed Marine Licence will be updated at Deadline 1 to secure this change.
NE26	Natural England agrees with the conclusion of no AEoI for these impact pathways on lamprey (Table 30 of shadow HRA).	Natural England's position is noted, and, on that basis, no further response is required.

NE27	Natural England agrees with the conclusion of no AEoI for these impact pathways on marine mammals.	Natural England's position is noted, and, on that basis, no further response is required.
NE28	Natural England agree with the Applicant's conclusions that there will be no adverse effect on integrity from the potential introduction and spread of non-native species during construction, subject to securing and implementation of the biosecurity measures included in 6.5 Outline Construction Environmental Management Plan (Table 31 of the shadow HRA).	The Applicant's existing biosecurity management procedures will apply to the operational facility. The Applicant is happy to have further discussion on this point.
NE29	Natural England agree with the Applicant's conclusions that there will be no adverse effect on integrity from the potential introduction and spread of non-native species during operation, subject to securing and implementation of ABP's existing biosecurity management procedures (Table 32 of the shadow HRA). However, we would encourage that an overall biosecurity management plan including the operational facility is produced and we welcome further discussion.	The Applicant's existing biosecurity management procedures will apply to the operational facility. The Applicant is happy to have further discussion on this point.
NE30	Clarification should be provided on whether the methodology outlined in Natural England guidance NEA001 has been followed when undertaking the assessment of road traffic impacts.	As confirmed in **Table 1** of the **Shadow HRA [APP-238]**, the assessment begins by considering whether the contribution of the Project exceeds 1% of the critical load or level, then whether the contribution 'in combination' exceeds 1% of the critical load or level. If it does exceed 1% either alone or in combination with

	Chapter 2 of the ES notes that there will be new access off Kings Road and onto the A1173. It is not confirmed if this has been considered during the screening of the operational traffic impacts.	other projects or plans, then further ecological interpretation has been undertaken. In-combination effects are described in **ES Chapter 25: Cumulative and In-Combination Effects [APP-067]**. The step-by-step approach to assessment set out in the guidance document NEA001 screens out further assessment of European sites where there are no such sites (or sensitive features) within 200m of an affected road. There are no European sites within 200m of any road used by Project-related traffic and nor any affected roads. It is confirmed that the screening of operational phase traffic data accounted for Project-related vehicles accessing the West Site via Kings Road. The value given in **ES Appendix 6.B [APP-176]**, **Table 2** for Queens Road is the section of road between the West Site Entrance and the A1173. On this section, the traffic impact was +189 Light Duty Vehicle and +96 Heavy Duty Vehicle two-way movements per average day. North of the West Site Entrance – i.e. traffic accessing the East Site – the traffic impact will be less, as fewer Project-related vehicles are required to access the East Site (via Queens Road and Laporte Road).
NE31	Natural England notes that potential air quality impact of emissions from marine vessels used during construction have been screened out based on: a 3km distance between vessels and sensitive features of the Humber Estuary SAC; the number of vessels; and the operational duration. There are not any widely recognised screening distance thresholds of material impacts from marine vessels and therefore there is uncertainty as to whether the	The basis for the suggestion of a 10km zone of influence is unclear and appears to be arbitrary. It is noted that Environment Agency air emissions risk assessment guidance refers to a 10km distance. However, that guidance is with relation to permitted activities regulated by the Environment Agency. Such activities typically require high stacks, which mitigate local impacts, but also disperse emissions over a greater area. It is the Applicant's opinion that the Environment Agency's air emissions risk assessment guidance is not intended for the consideration of

	3km distance is sufficient for impacts to be insignificant. As phase 1 of the construction period may have a two year duration, there is the potential for impacts from construction vessels to be sustained for two years. Dispersion modelling of vessels used during construction is therefore considered necessary to establish whether there could be a significant impact on habitats. It is recommended that a modelled grid over 10km is modelled with discrete receptors to represent the nearest sensitive ecological receptors and to understand the extent of impacts from construction vessels.	smaller, transient emissions sources, such as construction vessels. Transport emissions have a much smaller dispersal distance than energy from waste facilities and other significant emitters for which a 10km zone of influence would be more appropriate. While the zone of influence for ship exhaust stacks will be greater than that for vehicle exhausts (where the zone of influence is 200m), this has been allowed for in the precautionary use of a 3km zone of influence. It is also worth referring to Paragraph 6.8.45 of **ES Chapter 6: Air Quality [APP-048]**, which refers to the Local Air Quality Management Technical Guidance published by Defra (LAQM TG(22)). The guidance requires local authorities to consider emissions from vessels for the purpose of Local Air Quality Management only where there is relevant exposure within either 250m or 1km of the berths and main areas of manoeuvring, subject to the number of "large ship movements". It is noted that the construction vessels to be utilised for the construction of the IGET project do not fall under the definition provided in the LAQM TG(22) guidance for large ships (smaller ships with less weight will not require the same energy demand as large ships and will therefore have lower emissions) and the distance within which the guidance suggest that air quality could be of concern is considerably less than the 3km referred to in **ES Chapter 6: Air Quality [APP-048]**. Whilst the LAQM TG(22) guidance is not intended for the consideration of the exposure of habitats to air emissions, it does provide some guidance on the likely spatial extent of emissions from vessel sources. It is also noted that whilst phase 1 of the construction period may have a two-year duration, not all the construction vessels listed in

		Paragraph 6.8.32 of **ES Chapter 6: Air Quality [APP-048]** will be required for the full duration of that period. In addition, when present at the site, the majority of construction vessels will not need to have their vessel engines operating for any prolonged period of time. The exception to this is the dredging vessels, but they will only be required to operate for a period of up to 24 hours a day and seven days a week until the full dredge volume has been removed (estimated to be 12 days). In the context of the Humber Estuary and vessels already on the approach to and from the Port of Immingham (and other ports on the Humber), the intermittent emissions from the limited number of construction-related vessel movements will be negligible at the nearest air quality sensitive receptors.
NE32	Natural England notes from 4.7.15 to 4.7.22 of the HRA that nitrogen deposition impacts are insignificant within Humber Estuary saltmarsh habitats against the critical load of 20kg/ha/yr, which is at the higher scale of the Critical Load range provided for this habitat by APIS (10-20kg/ha/yr). Whereas, when comparing to the lower critical load of 10kg/ha/yr (6.8.61 and 6.8.62 of ES chapter 6), the vessel project contribution to nitrogen deposition is over 1% and the total concentration over 100% of the CL at two receptors (O_E1, O_E2) within the saltmarsh habitats. The report cites the importance of frequency and duration of inundation by seawater as the reasoning for the selection of the critical load of 20	Natural England has provided the unpublished 2019 document 'Humber Estuary SSSI: NFEU Saltmarsh Surveys 2018'. This contains the results of a survey of saltmarsh in the Humber Estuary SSSI. The areas of relevance to this question (air quality receptors O_E1 and O_E2) are coincident with survey locations 78 and 81 of Appendix 1 of the Natural England report. Table 5 of the Natural England report identifies that the habitat present at survey locations 78 and 81 is primarily a species-poor stand of sea couch (*Elytrigia atherica*), National Vegetation Classification ("NVC") community SM24, with adjacent areas of NVC community SM6 (*Spartina anglica*) saltmarsh. Sea couch is a common and widespread grass typical of higher saltmarshes but also found in many other circumstances including lower marsh and sand dunes. Section 2.3 of the JNCC (2004)

	kg//ha/yr for saltmarsh areas of the lower estuary. Many areas of the Humber Estuary are regularly inundated; however, Natural England advises that further information is required to determine whether 20 kg//ha/yr is the most appropriate critical load to use in this case. Natural England generally advises that the upper CL is acceptable for areas of pioneer/lower saltmarsh, whereas the lower CL should be used for areas of upper saltmarsh. This is in line with APIS advice and essentially is because of how inundated/vegetated the habitat is. The justification for the selection of the critical load should consider the sensitivity of individual botanical species or assemblage found within the Humber Estuary saltmarsh habitats to impacts from nitrogen deposition. From the assessment, it is unclear whether there are species or the botanical assemblage within saltmarsh that are more sensitive to nitrogen deposition than the 20kg N/ha/yr critical load stated. Therefore, Natural England advises that further information should be provided on the species present in these areas of saltmarsh to inform whether the saltmarsh at the receptor location is likely to be upper or lower saltmarsh. We recommend that the assessment refers to further sources of information, such as aerial photography; the Environment Agency's mapping	Common Standards Monitoring Guidance for Saltmarsh Habitats thus classifies community SM24 as a 'drift line' community, rather than as 'pioneer saltmarsh', 'low-mid saltmarsh' or 'mid-upper saltmarsh'. Similarly, Air Pollution Information System (APIS) does not identify community SM24 as an 'Atlantic salt meadow' community, which it restricts to communities SM10 to SM20, but rather classifies it more generally as an 'estuary' community. Sea couch grass has a high capacity for nitrogen assimilation such that nitrogen deposition will not adversely affect it. With regard to the adjacent areas of SM6, Section 2.3 of the JNCC Common Standards Monitoring guidance identifies community SM6 as 'pioneer saltmarsh'. On balance, it is therefore considered appropriate for this area to use the critical load suitable for more nitrogen-tolerant saltmarsh habitat of 20kgN/ha/yr. **References** Joint Nature Conservation Committee (JNCC) (2004). Common Standards Monitoring Guidance for Saltmarsh Habitats. [Online] https://data.jncc.gov.uk/data/7607ac0b-f3d9-4660-9dda-0e538334ed86/CSM-SaltmarshHabitats-2004.pdf (accessed February 2024).

	project of saltmarsh types; and/or vegetation records on NBN Atlas, to determine the extent of vegetation of these areas and determine whether the appropriate CL has been applied.	
NE33	Natural England note that an operational phase marine vessel assessment has been provided. However, further justification should be provided to clarify that the assumptions used for the amount of time each vessel could be docked, and the Marpol emissions standards of vessels using IGET, are representative of a realistic worst-case scenario. There may be a requirement to secure the maximum hours each vessel can be docked within the DCO, if these values are relied upon in the HRA conclusions.	With regards to the duration of docked vessels, it has been assumed that there will be up to 292 vessel calls per year and that each call will require 24 hours in dock, and that the vessel auxiliary engines will be operational at discharge load for the entirety of that 24-hour period. In reality, it is likely that some vessels will be docked for periods of less than 24-hours. It is also unlikely that the discharge load will be required for a full 24-hour period, with lower engine load at other times. The assessment reported in **ES Chapter 6: Air Quality [APP-048]** is likely to represent a precautionary assessment of vessel emissions. With regards to the MARPOL Regulations, all vessels accessing the Immingham Green Energy Terminal ("IGET") facility will comply with Regulation 13 Tier II emission standards as a minimum. This is a mandatory requirement of all vessels operating within the North Sea ("NS") Emission Control Area ("ECA"), which the Humber Estuary is within. As of 1 January 2021, it became mandatory for all new vessel engines operating in the NS ECA (including new vessels and older vessels being retrofitted with new engines) to comply with Regulation 13 Tier III emission standards, which are more stringent than the Tier II standards. Therefore, the scenario that assumes all vessels using the IGET facility are Regulation 13 Tier II compliant, as described in **ES Chapter 6 [APP-048]**, is precautionary for the year of opening

		assessed and will be even more precautionary for the years beyond. This is because it is likely that a proportion of the vessel fleet in the year of opening assessed will be Tier III compliant, and over the years following the year of opening, the number of Tier II compliant vessels will reduce and the number of Tier III compliant vessels will increase, due to the evolution of the vessel fleet.
NE34	Natural England welcomes that the air quality assessment considers the combined effects from the marine vessel emissions and the landside plant emissions. We also note paragraph 6.8.60 of ES chapter 6 considers impacts from separate sources from the marine vessel emissions and the landside plant emissions. However, for further clarity, we recommend that the values from these sources are reported in a separate table or column of the existing table to fully understand contributions from each of these impact pathways, as this will be useful to inform the effectiveness of any mitigation. We also note that in ES chapter 6, paragraph 6.4.58, flare stacks have been modelled at a specific location within the relevant area, within which there is flexibility in the design for this location to change. Although it is stated that the location of the stack within the relevant area would not change conclusions, it has not been confirmed if this is the representative worst-case location where impacts, especially in combination with other sources, may lead to a higher increase in predicted pollutant concentrations. Information on	The source apportionment of site and vessel emissions to the Project pollutant contributions reported in the **ES** can be provided and will be submitted as a Technical Note. It is not possible to define a worst-case location for air quality regarding the flare stacks. The positioning of stacks at a location will be worst-case for some receptors but not for others, depending on their orientation to the stacks. Also, each stack is subject to a small amount of flexibility, meaning that there are numerous combinations that would be worst-case for different receptors. The Applicant can confirm with certainty that the flexibility in stack locations will not affect the conclusions of the assessment, particularly at the nearest sensitive habitats, given the limited contribution of stack impacts at those locations.

	potential emissions from the flare stacks should also be incorporated into the HRA. Natural England also note that under '*Impact* pathways*: Physical changes to habitats resulting from the deposition of airborne pollutants*' Table 3 states: '*The nearest saltmarsh habitat (H1330) is approximately 3km north west of the site*....'. We advise that saltmarsh habitat is found to the south east and north east of the site rather than the north west. Also, under 'Impact Pathways: Physical change to habitats resulting from the deposition of airborne pollutants' Table 4 states: 'The designated habitats closest to the construction site are marine habitats and are therefore not sensitive to changes in air quality due to dust smothering or marine vessel/ road vehicle emissions during construction.' This is not consistent with information provided in ES Chapter 6, 8 or 9 and APIS. It should be clarified whether this is meant to state mudflat habitats rather than marine habitats.	This is a typographical error and can be corrected by replacing "*north west*" with "*north east*". This is a typographical error; this text should say "*intertidal*" rather than "*marine*".
NE35	Natural England notes that 4.13.1 of the shadow HRA considers the intra-project effects of the different aspects of the project on the European site features. Natural England advises that this assessment should be revisited once the assessment of impacts and mitigation measures	**Section 4.13** of the **Shadow HRA [APP-238]** on intra-project effects will be updated to provide further detail on potential intra-project effects relating to terrestrial and marine construction noise and piling.

	have been agreed, including for the impacts on SPA birds during construction and operation. We advise that the assessment should provide more detail about whether terrestrial construction noise as a result of this proposal will have combined effects with the marine construction noise and lead to increased levels of disturbance to SPA birds. In addition, there should be clarity about whether there will be piling at more than one location each day and if this is the case what effect this will have on bird disturbance.	
NE36	Natural England notes that Tables 34, 35 and 36 consider the 'in combination' effects at the Appropriate Assessment stage. However, the current shadow HRA does not provide a sufficient in- combination assessment, which requires further details to address the outstanding issues. We advise that this table should identify where impacts have been fully avoided through mitigation and where there is still a residual impact that could act in combination. This assessment should consider the residual effects of developments together. If mitigation or compensation has completely avoided or removed the effect that this would not act in combination with other projects. Natural England will review the assessment in more detail after further information is provided	Natural England have advised that the in-combination assessment (and specifically **Tables 34, 35 and 36**) of the **Shadow HRA [APP-238]** should identify where impacts have been fully avoided through mitigation or compensation and where there is still a residual impact that could act in-combination. However, the final row in **Tables 34, 35 and 36** of the **Shadow HRA** (Tables 35, 36, and 37 of the updated Shadow HRA) provides an in-combination assessment of all potential projects screened into the assessment together, taking into account relevant proposed mitigation or compensation for each of the projects to derive a judgment on the potential for AEOI based on residual effects. It should be noted that almost all established marine based mitigation (such as seasonal restrictions, spatial working buffers, noise reducing measures, JNCC piling protocols, etc.), including those identified for relevant projects screened into the in-combination assessment, typically reduce potential residual effects to an acceptable level rather than completely

	about impacts (and associated mitigation) as detailed above.	avoiding/removing a potential impact on a receptor. In an HRA context, this is to a level which is not considered to result in AEOI in the context of the site's conservation objectives. Compensation is used to offset residual loss or permanent damage to features rather than removing an effect. The in-combination assessment has therefore been undertaken on this basis which is consistent with the established approach for undertaking HRA assessments.
NE37	The screening distance used for the in-combination assessment is smaller than we would normally advise for marine mammals (see NE's Best Practice Advice for Offshore Wind Marine Environmental Assessment Phase III report). In a HRA context, we consider it should at least cover all projects that can contribute to in-combination effects within the boundary of the SAC e.g. within the Humber Estuary SAC when considering underwater noise disturbance to the grey seal feature.	The Spurn Peninsula on the Outer Humber Estuary and promontory of Grimsby Docks means that much of the underwater noise will be limited by these hard constraints and will not propagate to the outer part of the estuary and beyond. In addition, the upstream bend in the estuary at Salt End will mean that elevated underwater noise levels will not be able to propagate beyond this point. In other words, potential behavioural responses and/or displacement effects are primarily limited to the section of the estuary between Salt End (upstream) and Grimsby to Spurn Bight (downstream). On this basis, the zone of influence with respect to potential disturbance effects on grey seal features is constrained by the shape of the estuary and largely limited to between Salt End (upstream) and Grimsby to Spurn Bight (downstream). The approximate distance from the Project to the upstream limit of potential underwater noise effects (Salt End) is 15km. The downstream limit (Grimsby to Spurn Bight) is also approximately 15km away. This is the same screening distance as was used for the IERRT assessment which was considered suitable by Natural

		England for screening cumulative and in-combination effects after further consultation with Cefas.
NE38	Cumulative underwater noise disturbance and barrier effects to grey seal feature of the Humber Estuary SAC and Ramsar site have not been considered in sufficient detail. The mitigation listed is primarily aimed at reducing the risk of injury and will have limited benefit to reducing barrier effects/disturbance. There is no equivalent standard mitigation to reduce the risk of significant disturbance. Therefore, it is not appropriate to rely on mitigation to conclude that the in-combination disturbance impact will not be significant residually. The assessment itself must demonstrate no AEoI. More detail should be provided on the nature of this combined impact from IGET (piling, dredging and dredge disposal combined) plus the 7 (or more) projects which may cause disturbance through underwater noise and vibration. The worst-case for disturbance and barrier effects, on a temporal and spatial basis across projects, should be presented. When considering the disturbance from all the separate projects together, the Applicant must provide evidence to support their claim that it is still short-term and temporary (at a biologically relevant scale). In this the Applicant should factor in that there may be a delay between	The marine construction activities for IERRT and the Project have the potential to overlap. Underwater noise from dredging for both projects is only expected to cause behavioural reactions in a relatively localised area in the vicinity of the dredger for grey seals. Underwater noise generated during piling required as part of the Project along with the IERRT scheme has the potential to result in cumulative effects on grey seal features of the Humber Estuary SAC. The maximum potential spatial extent of instantaneous peak and cumulative Sound Exposure Level ("SEL") effects on grey seal, were the construction activity for both projects to overlap and occur at the same time, are shown in **Figure 1** and **Figure 2** at the end of this document. The predicted zones of effects are based on the highest underwater noise levels generated during the proposed works for each project (i.e. impact piling) and maximum worst case assumptions presented in the respective underwater noise assessments for IERRT and the Project. Instantaneous peak Permanent Threshold Shift ("PTS") and Temporary Threshold Shift ("TTS") effects in grey seal are predicted to occur within close proximity to the impact piling activity and cumulative SEL PTS and TTS effects are predicted over a wider area (**Figure 1 and Figure 2**). Assuming seals evade the injury effects zone, they are not considered to be at risk of any instantaneous or cumulative injury effects during impact piling. Strong behavioural responses may occur over a wider area, although the existing constraints of the estuary are such that elevated underwater noise levels generated during piling for

	the cessation of noise and seals showing no disturbance response. Further mitigation may need to be considered to conclude no AEoI. This would be best co-ordinated at a strategic level, across the planned overlapping projects in the Humber. This would likely involve minimising the temporal overlap of the noisiest activities in the respective projects i.e. by coordinating breaks in the noise to ensure barrier effects from multiple projects do not act cumulatively to create a single, long-term barrier effect. Furthermore, monitoring of the seal response to the in-combination effects is also advised, to validate the conclusion.	IERRT and the Project are physically constrained to within the outer section of the Humber Estuary and are unable to directly reach the grey seal breeding site at Donna Nook. The Spurn on the Outer Humber Estuary and promontory of Grimsby Docks mean that much of the underwater noise will be limited by these hard constraints and will not propagate to the outer part of the estuary and beyond. In addition, the upstream bend in the estuary at Salt End will mean that elevated underwater noise levels will not be able to propagate beyond this point. In other words, potential behavioural responses and/or displacement effects are primarily limited to the section of the estuary between around Salt End (upstream) and Grimsby to Spurn Bight (downstream). The maximum impact piling scenario for both projects, should the piling works overlap, is for up to seven tubular piles to be installed each day (four piles for IERRT and three piles for the Project) using up to six piling rigs driving at any one time (four piling rigs for IERRT and two piling rigs for the Project). If none of the pile driving activity for the two projects were to occur at the exact same time and temporally overlap over a 24-hour period, the maximum impact pile driving scenario would involve approximately 80 minutes of vibro piling per day (20 minutes for IERRT and 60 minutes for the Project) and 450 minutes of impact piling per day (180 minutes for IERRT and 270 minutes the Project). Any disturbance and barrier to grey seal movements caused by the noise during piling for IERRT and the Project would be temporary, with periods during a 24-hour period when no piling will be undertaken. The proportion of impact piling is estimated to be at worst around 31% over a 24-hour period (based on 450

		minutes of impact piling per day). In other words, any grey seals that remain within the predicted behavioural effects zone at the time of impact piling will be exposed to a maximum of up to 31% over the period of a day. The proportion of vibro piling is estimated to be at worst around 6% over a 24-hour period (based on 80 minutes of vibro piling per day). In other words, any grey seals that remain within the predicted behavioural effects zone at the time of piling will be exposed in total to a maximum of up to 37% over the period of a day. In reality, less than seven piles are likely to be driven per day and also there is likely to be some temporal overlap in the pile driving activity; therefore, the assumptions on maximum pile-driving periods and daily exposures are considered to represent a worst case. Piling will also not take place continuously as there will be periods of downtime, pile positioning and set up. The same mitigation measures are proposed for both IERRT and the Project to help minimise potential adverse effects (i.e. soft-start procedures, timing restrictions to avoid sensitive periods for migratory fish and the use of marine mammal observers). In order to take account of any potential in-combination effects should the piling programmes for both projects overlap, it is proposed that the maximum duration of percussive piling permitted within any four-week period must not exceed a total of 196 hours where any percussive pile drivers for either one or both projects are in operation. Where percussive piling is occurring simultaneously across the two projects, these respective time periods will not be double counted as the temporal exposure to this effect is not increased. This restriction applies from 1 June to 30 June and 1 August to 31 October inclusive in any year to minimise the impacts on fish (including lamprey) migrating through the Humber

		Estuary during this period. The measurement of time during each 196-hour work-block must begin at the start of each timeframe, roll throughout it, then cease at the end, where measurement will begin again at the start of the next timeframe, such process to be repeated until the end of piling works. This restriction does not apply to percussive piling that can be undertaken outside the waterbody at periods of low water. In addition, a piling reporting protocol is being developed in consultation with the MMO with associated actions to be taken in the event of an abnormal occurrence (e.g. equipment breakdown or if a marine mammal enters the mitigation zone). Reports are to be submitted to the MMO (reporting frequency to be agreed), and the Applicant will hold fortnightly meetings with the MMO. The proposed mitigation measures for underwater noise will limit the risk of exposure and reduce the residual impact of the Project on marine mammal features to a minor adverse effect. Therefore, assuming the proposed mitigation measures for IERRT and the Project are implemented, the predicted in-combination effects are not considered to compromise any of the conservation objectives, and it is concluded that there is no potential for AEOI on qualifying interest features. The in-combination effects of other projects together with the Project which may cause disturbance to grey seal through underwater noise and vibration have been assessed individually and across all projects in **Table 34** of the **Shadow HRA** (Table 35 of the updated Shadow HRA). Dredging across all projects is only expected to cause behavioural reactions in a relatively localised area in the vicinity of the dredger. Piling noise has the potential to cause injury effects within close proximity to the piling activity and

		strong behavioural responses over a wider area of the Humber Estuary across all projects. Other projects involving piling (i.e. Humber International Terminal Berth 2, Able Marine Energy Park ("AMEP"), and North Killingholme Power Project) will require similar mitigation to the Project to help minimise potential adverse cumulative effects (such as soft-start procedures, timing restrictions to avoid sensitive periods for migratory fish and the use of marine mammal observers). There is considered to be no potential for AEOI on qualifying interest features as a result of the the Project with the proposed mitigation measures in place in combination with the other projects. All other projects will be subject to similar mitigation measures to avoid the potential for any adverse cumulative underwater noise effects on these features. It is therefore considered a reasonable and robust conclusion that the predicted residual in-combination effects will not compromise any of the conservation objectives, and it is concluded that there is no potential for AEOI on qualifying interest features.
NE39	Natural England advises that the in-combination assessment should provide a detailed assessment of disturbance impacts on Humber Estuary SPA birds during construction. Consideration should be given to whether construction works, and in particular piling works, could be carried out at the same/similar time as works associated with other relevant projects in the area, including the IERRT project. As detailed above (ref NE19), potential limitations for relocation of birds within the	Further assessment on whether the piling (and other construction activity) associated with relevant projects, including IERRT, could overlap temporally with the Project will be included in the updated Shadow HRA. This will include consideration of potential disturbance and displacement effects with the proposed mitigation in place for each of the relevant projects.

	surrounding area should be considered in the assessment.	
NE40	In-combination road traffic changes should be assessed, and potential impacts considered at relevant sensitive habitat receptors, considering the calculated change in AADT from cumulative developments identified within the Traffic and Transport Cumulative Assessment.	It is unclear which Habitats Directive nature conservation site is considered by Natural England to be at risk of in-combination effects from traffic emissions impacts. There are no European designations within 200m of a road used by Project-related traffic.
	Appendix 6B states that air quality sources from IERRT are included in combination with the project. We note that road traffic emissions from IERRT are included in the future baseline and operational traffic data scenarios, however it is not clear whether other IERRT sources of emissions to air have been considered in the assessment. It should be clarified whether there is potential for overlap of other emission sources which could act in combination with the emissions from IGET.	The in-combination impact of the Project alongside the IERRT project is described in **ES Chapter 25: Cumulative and In-Combination Effects [APP-067]**.
	Table 3, ES Appendix 25.C states that the South Humber Bank Energy Centre's impact to Nitrogen Deposition within the Humber Estuary salt marsh receptor (O_E5) is around 4% of the critical load, but it also states, "However as the cumulative process contribution of these projects will not result in an exceedance of the 20-30kg/N/ha/yr Critical	As discussed in **Paragraphs 4.7.3 and 4.7.18**, among others, of the **Shadow HRA [APP-238]**, the modelling in support of this Application was undertaken using the lowest part of the critical load range (10kgN/ha/yr). However, the combined contribution of the Project and IERRT at this location (O_E5) is 0.3% to 0.4% of the critical load (**Table 34** of the **Shadow HRA** and Table 35 of

	Load for N deposition at any of the salt marsh receptors, no significant cumulative effects are predicted." As the Critical Load range for the saltmarsh receptors has been reduced to 10-20kg/ha/yr, there is the potential for this cumulative impact to now exceed this critical load. Therefore, it should be clarified whether the correct critical load value has been used when assessing the potential cumulative and in combination effects associated with air quality.	the updated Shadow HRA), meaning the contribution of the Project to the 'in-combination' effect of South Humber Bank Energy Centre is minimal.
NE41	Natural England will comment on Section 5 after further discussions about adverse effects and mitigation measures. We consider that it would be useful to provide a summary for each of the European sites affected. This section should include a summary of mitigation measures, and whether they will completely avoid or reduce the impact to an acceptable level. The level of certainty that mitigation measures will be effective should also be indicated. Where mitigation measures interact, it would be useful to provide a schedule of mitigation measures and how they are implemented over the calendar year (including differentiation between European site features and features which are not European site features). For example, timing of piling to avoid impacts on SPA birds and migrating	The Conclusions section of the **Shadow HRA (Section 5) [APP-238]** will be updated to include a summary of mitigation and whether the measures will completely avoid or reduce the impact to an acceptable level, and also a judgement on the confidence in mitigation effectiveness. **Table 3** at the end of this document presents a schedule of the proposed seasonal restrictions on construction activity to avoid impacts on SPA birds and migrating lamprey. This will be provided as part of an appendix to the updated Shadow HRA.

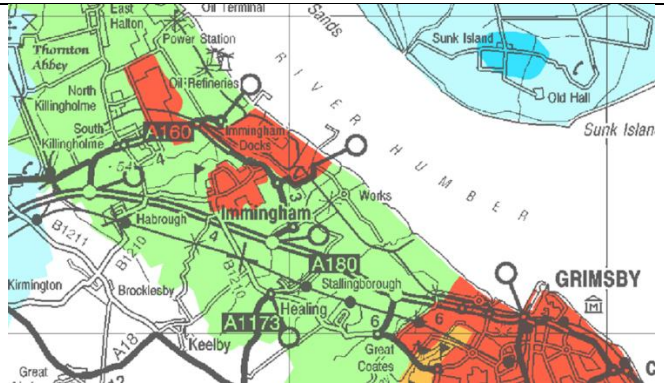
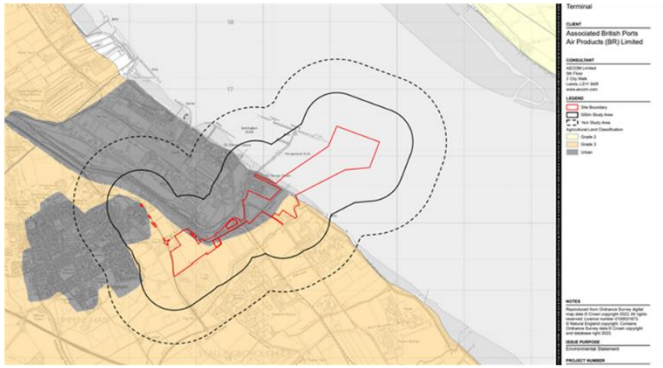
	lamprey. We do not consider that this is covered elsewhere in the document.	
NE42	Natural England would welcome clarity on how the sensitivity levels for coastal waterbirds have been determined, i.e. are they 'average sensitivity' levels across all waterbird species? Natural England recommends that consideration should be given to the most sensitive species.	Sensitivity levels for ornithology receptors in **ES Chapter 10: Ornithology [APP-052]** have been based on either presenting a range in sensitivity based on relevant individual species sensitivity levels (such as highlighted in **Table 10-19** for disturbance) or taking into account what the worst-case sensitivity is likely to be for relevant species on a precautionary basis. Consideration has been given to the most sensitive species within assessments.
NE43	Natural England highlights that the development falls within the South Humber Gateway Mitigation Zone. Policy 9 of the North East Lincolnshire Local Plan states "Development proposals on greenfield land within the Mitigation Zone will be required to make contributions towards the provision and management of the mitigation sites identified on the Policies Map." We note that 1.4.40 of the HRA describes the limited habitat suitability of the West Site area for SPA birds and refers to wintering bird survey results that recorded no SPA birds within this area. However, Natural England considers that the South Humber Gateway Mitigation Strategy is intended to apply to all relevant developments within this zone to address the adverse impacts of development at a strategic level, irrespective of further bird survey results at a site-level. Therefore,	As Natural England have noted, **Paragraph 1.4.40** of the **Shadow HRA [APP-238]** describes the limited habitat suitability of the West Site area for SPA birds and that wintering bird survey results recorded no SPA birds within this area. The area therefore does not form 'Functionally Linked land' in the context of the Humber Estuary SPA/Ramsar and therefore no mitigation or compensatory provision is required in the context of the **Shadow HRA**.

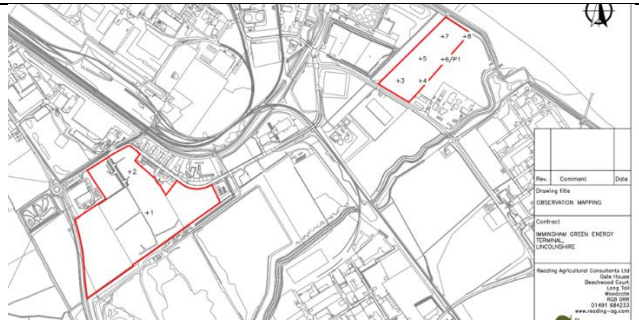
	the requirement to contribute to the scheme should be determined by the relevant authority.	
NE44	Based on the information provided in ES it is demonstrated that IGET alone does not trigger the air quality assessment screening thresholds along the A180 for Hatfield Chase Ditches SSSI. However, it is recommended that the applicant clarifies whether the IGET's traffic contribution in-combination with other scheme's triggers the air quality screening thresholds, considering the numbers reported in the Traffic and Transport Cumulative Assessment chapter.	The IERRT modelling (IERRT DCO submission document REP7-027 (ABP, 2023)) indicates that cumulative traffic growth would exceed the 1% of the critical load criterion. However, a significant adverse effect is not expected on this SSSI. Firstly, APIS indicates that background nitrogen deposition at this SSSI is on an improving (reducing) trajectory, having reduced from 17kgN/ha/yr in 2003 to 15kgN/ha/yr in 2020 meaning that, when the effects of the Project are considered along with existing nitrogen sources (which will be responsible for the majority of nitrogen deposited), a net improvement (reduction) in nitrogen deposition is still expected. A net improvement within the areas of SSSI affected by the M180 was also shown in the IERRT modelling for this SSSI, despite traffic growth from all sources. In addition to identifying a net improvement, the modelling concluded no significant adverse effect for the following reasons: "*The HCD SSSI units within the zone of influence of the Project are Unit 10 (North Idle Drain Gatehouse to M180) and Unit 7 (South Engine Drain), which are culverted beneath the M180, and both of which are assessed by Natural England in its most recent SSSI condition assessment to be in 'unfavourable – declining' condition. The reasons for the condition assessment within these SSSI units are identified as freshwater pollution due to agricultural run-off/ discharge, which will result in nitrogen input to the watercourse … the nitrogen input from agricultural run-off will be more heavily influencing the vegetation assemblage in the SSSI units* [than localised

		deposition from atmosphere] *given the extensive areas of agricultural land that border the watercourses*". It should also be noted that APIS tool states for this SSSI regarding nitrogen deposition that there is "*No comparable habitat with established critical load estimate available*". The Applicant notes that for the IERRT DCO Natural England requested that the critical load for swamp/fen be used for this SSSI, and that has therefore also been done for the IGET DCO. However, since this conflicts with APIS, it is considered a cautious approach. **References** ABP (2023). Immingham Eastern Ro-Ro Terminal – Applicant's Response to Natural England's Deadline 6 Submissions. [Online] https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030007/TR030007-001093-Associated%20British%20Ports%20-%20Comments%20on%20any%20submissions%20received%20at%20D6%203.pdf (accessed February 2024).
NE45	Natural England agrees that impacts of the proposal on little tern associated with the Lagoons SSSI can be scoped out, based on the information provided.	Natural England's position is noted, and, on that basis, no further response is required.
NE46	Natural England highlight that the ALC survey should be carried out across the full extent of agricultural land within application site boundary at a detailed level where BMV has been identified, e.g. one auger boring per hectare, (or more detailed for a small site) supported by pits dug in	The following extract from **ES Appendix 21.A: Agricultural Land Classification Survey Report [APP-215]** presents the soil survey methodology: "*3. Agricultural land quality*

	each main soil type to confirm the physical characteristics of the full depth of the soil resource, i.e. 1.2 metres. A semi detailed survey may be acceptable where the site is clearly expected to be non-BMV (1 auger per 2 ha plus representative pits).	***Soil survey methods*** *3.1 The land parcel in the south-west has been investigated extensively by a GI contractor. Two profiles were examined in this field parcel by RAC to verify soil textures, colours and structures. Access was available to only part of the north-eastern parcel where another six soil profiles were examined using an Edelman (Dutch) auger for the purpose of the ALC survey. One soil pit was also excavated to examine subsoil structures and stone content. The locations of RAC's observations are indicated on Figure RAC/10011/1.* *3.2 At each observation point the following characteristics were assessed for each soil horizon up to a maximum of 120cm or any impenetrable layer:* *• soil texture;* *• significant stoniness;* *• colour (including localised mottling);* *• consistency;* *• structural condition;* *• free carbonate; and* *• depth.*"

		Soil sampling was undertaken at a rate of one per hectare. In summary, it is considered that the methodology described by Natural England has been applied to the area sampled, albeit that the full extent of the site could not be sampled. Bullet (ii) in the response to NE47 below explains that data from 40 boreholes and 40 trial pits were used in the analysis to classify the grade of ALC land. The West Site in total was 20 hectares and therefore required 20 samples (one per hectare) for classification methodology described by Natural England.
NE47	Natural England highlights that ALC surveys require an ALC surveyor with suitable experience and qualification level, with these credentials provided as part of the ALC report. Amounts of surveyed ALC land should be noted in hectares. Natural England recommend that a map of the project boundary be provided alongside the ALC map to allow for identification of the areas of the application site not surveyed. Natural England recommends further clarification regarding the sampling densities used, with justification provided for bespoke sampling densities. Detailed ALC maps can only be produced when detailed ALC surveys have been undertaken. As such, Natural England recommends further information regarding the plotting of the ALC map (reference RAC/10011/2), specifically regarding the south-western part of the	The agricultural land survey was undertaken by Reading Agricultural Consultants Ltd ("RAC"). RAC has more than 50 years' experience of providing advice on agricultural, environmental and countryside issues. The company grew out of Reading University with lecturers identifying a gap in the market for agricultural litigation and insurance expertise. RAC soon diversified to include soils and rural planning services, expanding to become a market leader in the sector with consultants based nationwide. As requested, the ALC map is presented alongisde a map of the Project Boundary in **Plates 1 and 2**, respectively. This is to allow for identification of the areas of the Application site not surveyed. **Plate 3** presents the locations where samples were taken by RAC for the ALC classification survey.

	site, which is noted as being entirely grade 3b, despite only two borings being undertaken. Additionally, it is noted that 3.1 of Appendix 21.A: Agricultural Land Classification Survey Report states that 'access was available to only part of the north-eastern parcel'. Natural England consider that further information is provided regarding why the whole area was not accessible.	 Plate 1. ALC Yorkshire and Humberside  Plate 2. Order Limits for IGET DCO Application

		 Plate 3. Locations sampled by RAC for the ALC Survey There were two areas of agricultural land within the Order Limits shown in **Plate 2**. The survey boundary for both areas of agricultural land is shown on **Plate 3**. The agricultural land in both areas is classified as Grade 3 BMV land as per Natural England's Agricultural Land Classification, which has been graded (either 3a or 3b) for assessment purposes. These are (i) approximately 13ha of existing arable land to the east of Laporte Road which is in arable use and (ii) abandoned arable land slightly over 20ha to the south of Kings Road. The access and survey constraints are described further below: (i) The land to the east of Laporte Road has two landowners, one being Polynt and the other being Tronox. Access to the half of the field owned by Tronox was granted but not the half that was owned by Polynt. Both parcels of land are farmed in the same way by one farmer, as one arable unit, even though the land has two owners. Bedrock and superficial geology underlying the field is the same, as is the gradient and aspect of the field. It is stated in the ALC survey report by RAC

			that the ALC classification for the site is limited to ALC grade b due to the wetness grade for the soil at the site. The land owned by Tronox where permission had been granted was surveyed at one sample per hectare as per Natural England guidelines (see NE46). The soils are identical to the eye and, given the above, there is no reason to suspect that the soil types differ between the areas owned by the two parties.
		(ii)	At the time of the assessment the 20ha to the south of Kings Road was undergoing a GI and archaeological trial trenching. Most of the land had been disturbed and it was not possible to take intact samples at a rate of one per hectare. However, soils were classified using details and samples from 40 borehole logs and 40 plus trial pit logs across the site that had been excavated during the GI. The design utilised, where possible, soil samples recently obtained from the GI works. The GI that had been undertaken was an intensive investigation at a much higher density than required for ALC. Bedrock and superficial geology underlying this area of the site was constant, as was the gradient and aspect. Having access to all the borehole logs enabled the classification of the soils. Particle size analysis data from the soil samples was made available for the texture of the topsoil to be described and laboratory analysis was undertaken to determine pH, organic matter content and major nutrients within the soil samples from the GI. Therefore, there was sufficient data contained in the borehole logs and laboratory test

		results to assess the ALC of the land south of Kings Road without the need for a separate soil survey.
NE48	Natural England advises that additional information is required regarding soil handling methods. Reference should be made to the Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. In order to both retain the long term potential of this land and to safeguard all soil resources as part of the overall sustainability of the whole development, it is important that the soil is able to retain as many of its many important functions and services (ecosystem services) as possible. Sustainable soil management should aim to minimise risks to the ecosystem services which soils provide, through appropriate site design / masterplan / Green Infrastructure etc. All soils should be handled when in a dry and friable condition, below their plastic limit. A field method should be specified for assessing when soils are in a suitable condition for handling. Where topsoil is proposed to be stripped, the soil handling methodology and soil protection proposals should be reviewed to ensure that appropriate mitigation is in place to allow for the restoration of the land to the baseline ALC grade.	An Outline Soils Management Plan ("SMP") is provided within **Appendix B** of the **Outline CEMP [APP-221]**, and is referenced within **Paragraph 21.7.21** of **ES Chapter 21: Ground Conditions and Land Quality [APP-063]**. The Outline SMP is based on guidance provided in the following guidance documents: • Department for Environment, Food and Rural Affairs (2009). Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. • Ministry of Agriculture, Fisheries and Food (2000). Good Practice for Handling Soils. • British Standards Institution (2015). BS 3882:2015 – Specification for Topsoil. • Institute of Environmental Management and Assessment ("IEMA") (2022). IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment. The Outline SMP covers the scope outlined by Natural England and a requirement is in place to submit Final CEMPs which will contain a detailed Soil Management Plan (or Plans). **Paragraph 21.7.16** of **ES Chapter 21: Ground Conditions and Land Quality [APP-063]** states that "*Topsoil removal or stockpiling isn't proposed in the Laporte Road Temporary Construction Area as soils will need to be levelled and compacted, prior to use as a laydown area. This area will be*

		subject to light grading, with a breathable heavy duty ground mat protection applied following these works to reduce potential compaction from materials laydown and associated activities".
NE49	Natural England has adopted standing advice for protected species, which includes guidance on survey and mitigation measures. Natural England is not providing bespoke advice on the protected species information provided in the ES for this project. A separate protected species licence from Natural England or Defra may be required. Applicants should refer to the guidance at Wildlife licences: when you need to apply to check to see if a mitigation licence is required. Applicants can also make use of NE's charged service Pre Submission Screening Service for a review of a draft wildlife licence application. Natural England can then review a full draft licence application to issue a Letter of No Impediment (LONI) which explains that based on the information reviewed to date, that it sees no impediment to a licence being granted in the future should the DCO be issued. See Advice Note Eleven, Annex C – Natural England and the Planning Inspectorate | National Infrastructure Planning for details of the LONI process.	Noted. This is a general reference to Natural England's standing advice on protected species rather than a specific comment on this Project.
NE50	Natural England agrees with the Applicant's conclusion that maintenance dredging will not	Natural England's position is noted, and, on that basis, no further response is required.

	impact water quality at the project site and will result in no AEoI for this impact pathway.	
NE51	The Environment Act 2021 includes NSIPs in the requirement for BNG. The biodiversity gain objective for NSIPs is defined as at least a 10% increase in the pre-development biodiversity value of the on-site habitat. It's the intention that BNG should apply to all terrestrial NSIPs accepted for examination from November 2025. This includes the intertidal zone but excludes the subtidal zone. Although BNG is not yet a mandatory requirement for NSIPs, we strongly recommend that net gain provision is secured through this development. This will reflect the important role NSIPs must play in delivering the government's environmental targets. Early engagement with Natural England on BNG proposals will help maximise outcomes and reduce risks. The biodiversity baseline should include all land contained within the site's red line boundary and proposals can be iteratively refined over time and throughout detailed design.	As Natural England notes, Biodiversity Net Gain does not yet apply to nationally significant infrastructure projects ("NSIPs"). However, the Applicant has recognised the need for meeting biodiversity enhancement obligations in local and national policies and, as explained in the **Planning Statement [APP-226]**, will allocate the environmental benefits and enhancements generated by an area of one hectare of intertidal habitat that is being created through an already approved (and currently under construction) realignment scheme known as the Outstrays to Skeffling Managed Realignment Scheme ("OtMRS"). The allocation to the Project will be set up via separate legal agreement.

	We encourage developers to: • develop BNG proposals in adherence with well-established BNG principles: • BS 8683:2021 Process for designing and implementing Biodiversity Net Gain • CIEEM/IEMA/CIRIA good practice principles (2016) and guidance (2019). • use the latest version of the Defra biodiversity metric to calculate BNG (currently version 4.0) and adhere to the rules and principles set out within the metric guidance. Biodiversity gains should be secured for a minimum of 30 years and be subject to adaptive management and monitoring. BNG plans should be secured by a suitably worded requirement in the DCO.	
NE52	Natural England advises that an assessment of cumulative effects should also be provided in the HRA. In addition to the requirement for an in-combination assessment (outlined above), it is also necessary to consider the existing influences on the site which have affected and are continuing to affect the condition of relevant European site features. These influences constitute what is referred to as the 'current environmental baseline'. A cumulative	All previously consented projects will have considered potential effects on the designated sites. Our baseline descriptions and assessment have been based on the current environmental baseline. This statement is underpinned by the large volume of data that was collected to inform this Application. With respect to potential impacts advised by Natural England, they are considered in more detail below: • Loss and fragmentation of SAC habitats: Direct and indirect intertidal and subtidal habitat loss are the two key

	effect might arise when a succession of individual impacts, which have each been previously assessed in isolation as being trivial or insignificant, accumulate over time to reach an incremental scale of loss which becomes adverse (or risks becoming adverse if it continues). The cumulative effects assessment should therefore consider the impact of the additional impacts of the project against the current environmental baseline of the Humber Estuary. In particular, we advise that the cumulative effects assessment should consider (but not necessarily be limited to) the increase in the area of Port of Immingham; loss and fragmentation of SAC habitats; increase in vessel traffic; and increase in dredging. The cumulative effects assessment should make reference to the Supplementary Advice on Conservation Objectives. Where the Supplementary Advice includes targets to restore an attribute of the site feature (such as habitat area or species population size), consideration should be given to whether cumulative impacts will hinder the restoration of these attributes.	pathways which could lead to loss/fragmentation of SAC habitats. The in-combination assessment has already considered habitat loss (and change) associated with proposed projects in the Immingham region including loss as a result of all the proposed projects screened into the assessment together. • Vessel traffic: The Project along with IERRT will result in an increase in operational vessel traffic in the Port of Immingham area by approximately 6%. Vessel movements have the potential to result in a potential collision risk and disturbance to grey seal features of the SAC. However, the small increase in vessel traffic is not considered to result in an LSE to this feature. This is in the context that only mild behavioural responses are anticipated for seals in relative proximity to vessels, with noise levels unlikely to be discernible above ambient levels in the wider Humber Estuary area given the high levels of existing background vessel noise. Grey seals are also considered well adapted to avoiding collision risk given the existing exposure to high levels of shipping activity. This information will be provided in the LSE screening table. • Dredging: The in-combination assessment of the **Shadow HRA** already considers effects of ongoing/future maintenance dredging in the Immingham area along with proposed future dredging requirements as a result of proposed projects in the region. This is also set in the context of the maintenance dredge protocol which is established for the estuary as a whole.

RR-020 – Network Rail Infrastructure Limited

Relevant Representation	Applicant's Response
This is the section 56 representation of Network Rail Infrastructure Limited" to (Network Rail) provided in respect of the Applicant's application for a Development Consent Order (Order) to authorise the construction, maintenance and operation of the relevant works proposed to be set out in Schedule 1 of the Order to be carried out on or which affect railway property, including powers to compulsorily acquire land and rights over land (Scheme). Network Rail is a statutory undertaker and owns, operates and maintains the majority of the rail infrastructure of Great Britain. The Applicant proposes to construct a pipeline to be run underneath the railway line between the western and eastern hydrogen production facilities. The Book of Reference (BoR) identifies 12 plots (Plots) identifiable on Sheet 5 of the Land Plans as land that Network Rail owns or has an interest. The compulsory acquisition powers sought are described in the BoR as being the creation of new rights (including restrictive covenants) and temporary possession and use of land (Compulsory Powers). Network Rail objects to the inclusion of the Plots in the Order. The Plot constitutes land acquired by Network Rail for the purpose of its statutory undertaking and, accordingly, this representation is made under section 56 and sections 127 and 138 of the Planning Act 2008. Network Rail also objects to all other compulsory powers in the Order to the extent that they affect, and may be exercised in relation to, Network Rail's property and interests.	Network Rail's objection to the inclusion of the plots in the Development Consent Order (DCO) and its wider objection is noted. The need for the inclusion of the relevant powers in the DCO is addressed in the **Statement of Reasons [AS-008]**. Schedule 12 of the draft DCO [PDA-004] sets out the rights which may be acquired compulsorily and restrictive covenants imposed compulsorily with specific reference to land in which Network Rail has an interest.

Network Rail notes that the Compulsory Powers are sought in relation to operational railway (being the Brocklesby and Immingham Branch (Railway Line)).	The Applicant does not intend to build any surface structures within the land parcels in question; however since there will be structures under the ground within the referenced land parcels, the Applicant wishes to obtain a restrictive covenant to protect its underground pipelines from future development. The Applicant is happy to continue to discuss and address any specific concerns that Network Rail may have in this regard.
In addition, the designated route providing HGV access to the site of the Scheme includes Queens Road Overline Bridge (Bridge) which crosses the Railway Line. If Queens Road Bridge is closed for any reason, traffic may route over the nearby Kiln Lane Level Crossing and South Marsh Level Crossing. Network Rail has concerns over this as South Marsh Level Crossing is not suitable for the use of HGVs and the use of Kiln Lane Level Crossing may have an adverse impact on its lifespan.	Network Rail's concern regarding the use of the specified level crossings by HGVs is noted. There will be no need for any traffic relating to the Project to use the South Marsh Level Crossing. This crossing is remote from the Project and is not on a route which HGV traffic is likely to use. None of the works proposed on the public highway as part of the development involve or require the closure of Queens Road or the Queens Road Bridge. If the Queens Road is closed (by others) for any reason, then an alternative route to the East Gate / Laporte Road will need to be agreed with the Local Highway Authority (NELC). This is outside the control of the Applicant. Notwithstanding the above, the Construction Traffic Management Plan will include provisions regarding the avoidance of use of those level crossings where practicable. Air Products is in discussion with Network Rail regarding appropriate safeguards in the event that the use of level crossings is required at any point.
Therefore, Network Rail is seeking mitigation measures to ensure the safety, security and operation of its railway assets. In order for Network Rail to be in a position to withdraw its objection Network Rail requires: (a) agreements with the Applicant that regulate: (i) the manner in which rights over the Plots and any other railway property are	The Applicant is in negotiation with Network Rail as to the acquisition of appropriate rights by agreement and updates will be provided during the Examination. Air Products has also had productive discussions with Network Rail regarding the protection of the railway during the undertaking of works in the vicinity of the network (and

acquired and the relevant works are carried out including terms which protect Network Rail's statutory undertaking and agreement that compulsory acquisition powers will not be exercised in relation to such land; and (ii) the carrying out of works in the vicinity of the operational railway network to safeguard Network Rail's statutory undertaking;	particularly the construction of the pipeline under the railway) and consider that appropriate measures can be agreed to satisfy Network Rail's requirements.
(b) the inclusion of protective provisions in the DCO for its benefit.	Protective provisions are proposed in Part 5 of Schedule 14 of the **draft DCO [PDA-004]** submitted with the Application.
To safeguard Network Rail's interests and the safety and integrity of the operational railway, Network Rail objects to the inclusion of the Compulsory Powers and any other powers affecting Network Rail in the Order. Network Rail requests that the Examining Authority treat Network Rail as an Interested Party for the purposes of the Examination.	

RR-021 – North East Lindsey Drainage Board

The Applicant welcomes the North East Lindsey Drainage Board's ("NELDB's") Relevant Representation.

The Applicant acknowledges the comments made by NELDB and is fully cognisant of their role in maintaining and controlling land drainage infrastructure within their statutory remit and the appropriate consents required from NELDB.

Comprehensive discussions have taken place with NELDB. The Applicant acknowledges that further discussion is needed on two fronts:

- Firstly, to agree on specific modifications to the land drainage network in association with the Project.
- Secondly, to ensure that appropriate provisions are included in the **draft Development Consent Order ("DCO") [PDA-004]** for the benefit of NELDB. It is acknowledged that the Land Drainage Consent requirements are specifically disapplied in the draft DCO, and Protective Provisions benefitting the NELDB are under discussion.

Specifically, the Applicant understands that NELDB may require the inclusion of a set of Protective Provisions in **Schedule 14** of the **draft DCO [PDA-004]** (as opposed to specific protections directly written in the articles within the body of the draft DCO itself).

The Applicant will therefore work with NELDB during the course of the Examination regarding modifications of NELDB's drainage infrastructure – and indeed flows that interface with that infrastructure – and to seek to agree with NELDB an appropriate set of Protective Provisions.

The Applicant looks forward to continued engagement with the NELDB.

RR-022 – North East Lincolnshire Council

The Applicant welcomes North East Lincolnshire Council's (NELC's) Relevant Representation.

1. Economy and Growth

The Applicant acknowledges NELC's supportive statement. NELC – in its Local Plan[4] – recognises that the economy of North East Lincolnshire is focused around five key sectors, including the ports and logistics sector, the renewables and energy sector, and the chemicals and processing sector. The Port of Immingham is specifically identified as being of international trading significance in this context. The Applicant is pleased that NELC acknowledges the scale of this Project's investment. Ultimately, the creation of these jobs, and consequential upskilling programme, will introduce additional spending power into the local economy and assist with improving social mobility.

Section 23.8 of the **Environmental Statement ("ES") Chapter 23: Socio-economics [APP-065]** assesses the employment opportunities available as a result of the construction and operation of the Project as well as Gross Value Added in the local economy as a result of direct and indirect employment opportunities. The Project will generate significant benefits in this regard.

NELC's concern around the potential implications of the implementation of land use planning zones around the new development, and specifically those elements related to the storage and processing of ammonia, is acknowledged. These landside aspects require separate Hazardous Substances Consent – which is to be issued by NELC following consultation with the Health and Safety Executive ("HSE") – and the resultant delineation by HSE of inner, middle and outer zones will dictate what types of further development will be permitted within those zones in accordance with HSE's Land Use Planning guidance [REF],[5] depending on its sensitivity level.

This concern is considered in the response to Q1.1.12.5 **[TR030008/EXAM/9.3]** In light of the industrial nature of the area, much of the adjoining land is allocated for employment development. The existence of the land use planning zones will not prevent the occupation and use of those adjacent sites by other manufacturing, commercial or industrial users. The delineation of land use planning zones remains solely within the legislative purview of the HSE through the Hazardous Substances Consent process. The Applicant, together

[4] https://www.nelincs.gov.uk/assets/uploads/2020/10/The-NEL-Local-Plan-adopted-2018.pdf
[5] https://www.hse.gov.uk/landuseplanning/methodology.htm

with Air Products, has engaged with the HSE as part of an ongoing dialogue and will keep NELC updated. The Applicant does not consider that the Project will sterilise large areas of land for future development opportunities.

2. Ecology and Landscape

Long Strip Woodland

The Applicant notes NELC's concern with regards to the proposed area for compensation as shown on **Figure 1: Location of Woodland Enhancements and New Woodland Creation** in the **Outline Woodland Compensation Strategy [APP-224]**.

The measures contained within the **Outline Woodland Compensation Strategy** are considered by the Applicant to be adequate to compensate for the loss of Tree Preservation Order trees. However, the Applicant is committed to working closely with NELC to address its concerns regarding the proposed woodland compensation area and will update the separate Statement of Common Ground as the Examination progresses. A meeting was held on-site with NELC on 17 January 2024 to progress the discussions on this matter.

The Final Woodland Compensation Plan would be secured through Requirement 11 of Schedule 2 of the DCO.

Bats

The Applicant can confirm that the bat roost within Long Strip would not remain. The Applicant's proposed mitigation for the loss of the bat roost(s) in the Long Strip woodland is set out in **Paragraph 8.9.4** of **ES Chapter 8: Nature Conservation (Terrestrial Ecology) [APP-050]**.

The Applicant notes that NELC agrees with **Paragraph 7.2.3** of the **ES Appendix 2.B: Lighting Strategy [APP-173]** "*that it must be committed to minimising light spill to retained habitats, particularly in relation to bat corridors to avoid impact on the conservation status of bats due to new lighting*". This would be secured by way of DCO Requirement 16, and the strategy will be committed to minimising light spill to retained habitats, particularly in relation to bat corridors to avoid impact on the conservation status of bats due to new lighting.

Otter

The Applicant notes NELC's confirmation that the North Beck Drain is used by otter as recently as 2023, as suggested in **Paragraph 8.6.26** of **ES Chapter 8: Nature Conservation (Terrestrial Ecology) [APP-050]**.

Public Right of Way

Public Rights of Way ("PRoW") have been assessed from a health perspective within **ES Chapter 24: Human Health and Wellbeing [APP-066]**. Appropriate mitigation measures associated with the temporary diversion of Public Bridleway 36, as set out in the **Stopping Up and Restriction of Use of Streets and Public Rights of Way Plan [APP-017]**, will be implemented including providing notice and installation of adequate signage as included within the **Outline Construction Environmental Management Plan ("CEMP") [APP-221]**.

There is no permanent impact on Public Bridleway 36 which runs through Long Strip woodland.

3. Highways

The Applicant acknowledges NELC's concern regarding traffic movement associated with the development. The Applicant's assessment of traffic and transport matters is set out in **ES Chapter 11: Traffic and Transport [APP-053]**.

The Applicant will continue to work with the Highway Authority to resolve any highway concerns.

4. Visual Impact

It is agreed that the Project will be visible in near, medium, and distant views, as set out in the assessment of visual effects within **ES Chapter 13: Landscape and Visual Impact [APP-055]**.

It is agreed that although the Project is located within the South Humber Industrial Landscape (identified as Local Landscape Type ("LLT") 1 – Industrial Landscape within the North East Lincolnshire Landscape Character Assessment Sensitivity and Capacity Study (FPCR Environment and Design Ltd, 2015)), the scale of development will make it apparent in the wider landscape, as set out in the assessment of landscape effects and the assessment of visual effects within **ES Chapter 13: Landscape and Visual Impact [APP-055]**.

The study area is determined by the potential visibility of the Project in the surrounding landscape and is proportionate to the size and scale of the proposals and nature of the surrounding landscape context. The Guidelines for Landscape and Visual Impact Assessment 3rd Edition ("GLVIA3") state that the study area should include "*the full extent of the wider landscape around it which the Proposed Development may influence in a significant manner*."

A study area of 3km from the Site Boundary was defined using a combination of Zone of Theoretical Visibility ("ZTV") analysis and professional judgement, as it is unlikely that significant effects would be experienced at distances greater than 3 km from the Proposed Development as described within **ES Chapter 13: Landscape and Visual Impact [APP-055]**. The Lincolnshire Wolds National Landscape is over 3km from the Proposed Development, so highly unlikely to experience significant landscape or visual effects.

Views from residential properties to the south- east of Immingham have been considered in the **ES Chapter 13: Landscape and Visual Impact [APP-055]** within Viewpoint 6 (PRoW to the rear of Ings Lane/Talbot Road). Baseline views are represented in **Figure 13.8.8 Summer Viewpoint Photography [APP-115]** and **Figure 13.9.8 Winter Viewpoint Photography [APP-116]**. An indicative representation of the Project is illustrated in **Figure 13.10.6 Photomontage [APP-117]**.

The assessment at Viewpoint 6 within **ES Chapter 13: Landscape and Visual Impact [APP-055]** concludes that taller structures associated with the East and West Sites would be partially visible on the skyline; however, intervening vegetation would assist in screening lower-level structures. The assessment has identified that there is likely to be some views of the taller structures from residential receptors where there is limited screening from existing boundary vegetation, as described within the baseline view.

Native tree and shrub planting and native hedgerow planting is proposed along the western boundary of the West Site and is outlined within the **Outline Landscape and Ecology Management Plan ("LEMP") [APP-225]** and illustrated on **Figure 1: Indicative Landscape and Biodiversity Plan** of the **Outline LEMP**. The proposed planting will provide additional screening of the lower-level structures associated with the Project from views located to the south-west of the Site, which include residents on the edge of Immingham (represented at Viewpoint 6) and recreational users of the Public Rights of Ways (represented at Viewpoint 5 and Viewpoint 7) and is described within **ES Chapter 13: Landscape and Visual Impact [APP-055]**."

5. Drainage

The Applicant is pleased to note that NELC considers the **ES Appendix 18.B: Drainage Strategy [APP-210]** is acceptable.

Ground Level Raising

Regarding the point raised by NELC around ground level raising and the potential need for interceptor drains to protect adjacent land, property or highway from surface water runoff, **Drawing 60673509-ACM-XX-XX-0004** of **Annex A** to **ES Appendix 18.B: Drainage Strategy [APP-210]** shows where the surrounding catchments drain and how the Applicant would divert relevant flows around the proposed works. Two interceptor drains are identified as being required in this drawing.

Permeable Paving

The Applicant notes NELC's point regarding permeable paving and welcomes NELC's further comments.

The final Drainage Strategy(ies) will be approved through **Requirement 12** of the **draft DCO [PDA-004]** by NELC (following consultation with the Environment Agency and the North East Lindsey Drainage Board).

The Applicant understands NELC's position regarding its relationship with the North East Lindsey Drainage Board.

6. Environmental Health

The Applicant acknowledges NELC's comments on environmental health matters and is pleased that the impacts examined in the following **ES** chapters represent a full and coherent analysis and that NELC agree with the proposed mitigations.

- **ES Chapter 6: Air Quality [APP-048]**
- **ES Chapter 7: Noise and Vibration [APP-049]**
- **ES Chapter 21: Ground Conditions and Land Quality [APP-063]**

7. Comments on SoCC

NELC's position is noted.

8. Heritage

The Applicant acknowledges the points raised by the NELC Heritage Officer regarding heritage matters and is grateful for the ongoing dialogue and engagement with the NELCs Heritage Officer.

The Applicant's assessment of historic environment (terrestrial) matters is set out in **ES Chapter 14: Historic Environment (Terrestrial) [APP-056]**. The Applicant agrees with the NELC Heritage Officer that the potential for archaeological remains is Very Low/Low across the terrestrial part of the application site.

Regarding NELC's point around the potential for archaeological remains in the temporary construction area, within these areas in Work No. 8 and 9, recent geophysical survey indicated that there is the potential for unknown below ground archaeological remains at this location.

The working methodologies for construction and construction associated activities in Work No. 8 and 9 will be designed so as to "do no harm" as outlined within **Table 11** of the **Outline CEMP** [APP-221].

With this commitment in place, it was agreed at a meeting on the 28 July 2023, involving the Applicant and the Heritage Officer for NELC, that no further archaeological works will be required in the temporary construction area as the potential remains will be preserved in situ during construction. Should this change, then the NELC Heritage Officer will be consulted fully at that stage. This will take the form of a consultation meeting regarding any changes to the approach and the appropriate archaeological mitigation that may need to be implemented in advance of any construction works in the temporary construction area.

With regards to the historic Post Medieval plantation woodland (Long Strip), as described in **ES Appendix 8.F: Arboricultural Impact Assessment [APP-185]** and the **Outline CEMP [APP-221]** a survey of the woodland will be undertaken which will aim to preserve a record of the woodland and so mitigate the impacts of the Project upon it. It is the Applicant's understanding from a meeting on 17 August 2023 between the Applicant, the NELC Tree Officer and the NELC Heritage Officer, that the resulting report will be deposited in the NELC Historic Environment Record. Should the NELC Heritage Officer not think that this is an appropriate repository, the Applicant welcomes further discussions with NELC to resolve this.

9. DCO Requirements

NELC's position is noted and the Applicant looks forward to discussing this matter further in due course.

The Applicant looks forward to continued engagement with NELC.

RR-024 – PD Ports Services Limited

The Applicant notes the representation made by PD Port Services Limited ("PDPS"), including the description of PDPS's site and operations and welcomes PDPS's support for the Project in principle.

The Applicant acknowledges PDPS's concerns raised regarding the potential for the construction and operation of the Project to adversely affect PDPS's operations. The Applicant welcomes the confirmation that PDPS are seeking to work positively with the Applicant and the Applicant confirms that it is continuing to engage with PDPS in relation to the Project. A meeting took place on 15 February via Teams between representatives of the Applicant, Air Products and PDPS to give PDPS an update on the Project and discuss the concerns raised in their relevant representation.

For ease of reference, the Applicant has used the same paragraph numbering as is contained within the PDPS representation in this response.

Vehicle route

The Applicant welcomes the confirmation that PDPS do not have any objection to the reduced speed limit (**Paragraph 2.5)**.

The Applicant notes PDPS's concern that any closure of Laporte Road will have a significant impact on PDPS's operations and will require a 3-mile detour, which PDPS are concerned may encourage customers to find an alternative provider (**Paragraph 2.5**).

The Applicant acknowledges that, during installation of the culvert and pipeline under Laporte Road, the passage of traffic along that road will be affected. The works are anticipated to take between 2–4 weeks. There are various possible construction methods (as follows) – the length of any closure (if required) will depend on which one is adopted:

- Construction of the culvert using two prefabricated boxes, which could potentially be done in two halves, with temporary traffic lights on Laporte Road
- Closure of Laporte Road to place oversized sleeves across the road and then reinstatement of the road (which may result in a shorter road closure) – the pipes and cables would then be placed through the sleeves without any further closure
- Full construction of the culvert across Laporte Road with the closure of the road

The design of the culvert and sleeves is not finalised and depends on design constraints such as water table level and utilities in the road.

The Applicant and Air Products will liaise with PDPS over the installation of the culvert pipeline on Laporte Road with a view to minimising the impact on PDPS as far as is possible. The Construction Traffic Management Plan (section 6.1 of the Outline Construction Traffic Management Plan [**APP-223**]) will provide a formal process of liaison between the parties, in particular the provision of prior notice of significant events. Final Construction Traffic Management Plans are secured by requirement 7 (Schedule 2 of the draft Development Consent Order [**PDA-004**]).

Temporary access off Laporte Road

PDPS have raised queries regarding the extent of time that the temporary access from Laporte Road will be in place and have sought comfort that the access and traffic generated will not interfere with their operations (**Paragraphs 2.6** and **2.7**).

It is anticipated that most of the works to construct the access will be able to be constructed 'off the highway'. Whilst the tie into Laporte Road will require works on the public highway, the Applicant does not envisage that this would need a closure of Laporte Road. Temporary traffic lights may be installed if required.

The temporary access road will provide access to the field opposite PDPS as shown indicatively on Plate 10 of APP-223. This field is proposed to be used during construction for parking and material laydown. The access is on the opposite side of the road to the access to the PDPS site and therefore access to the PDPS site will not be adversely affected.

Traffic movements to and from this temporary access will be limited. As confirmed in **APP-223** (Table 6) the East Site is expected to generate a peak of 59 HGVs per day, of which only a portion will use this access. This is less than 6 HGVs per hour and will have no material impact on safety or operation of adjacent access for PDPS.

Culvert

PDPS note (**Paragraphs 2.8** and **2.9**) that, in relation to the installation of the proposed culvert under Laporte Road, it is unclear what works will take place on the highway. The Applicant notes PDPS's concern that those works may affect the strength of Laporte Road and lead to weight restrictions being imposed.

The Applicant confirms its proposed highway works will be designed so they will not generate a requirement for any weight restriction on Laporte Road (it is understood that there is no existing weight restriction in place).

COMAH status / restrictions

PDPS expresses concern in **Paragraphs 2.11** and **2.12** regarding the implications of the proposed Control of Major Accident Hazards ("COMAH") status of the Project for the operation and use of the PDPS site.

The Port is already subject to land use planning zones due to the existence of a number of facilities with consent to handle hazardous substances (the Immingham Oil Terminal ("IOT") located at the Port East Gate for example). Part of PDPS's property is within the composite land use planning inner zone. The rest of PDPS's property (closest to Laporte Road) is within the middle zone.

Once the Health and Safety Executive ("HSE") have completed the assessment and proposed revision of land use planning zones associated with the hazardous substance consent related to the proposed hydrogen production facility, it is likely that the inner zone will cover a larger portion of PDPS's property.

HSE categorise 'Development Types' which fall within defined 'Sensitivity Levels'. The Development Type of PDPS's activities is 'workplace', which HSE categorise as Sensitivity Level 1 (for the specified detail and size - see extract in **Table 1**). The matrix on which HSE base their advice states that Sensitivity Level 1 activities in the inner zone or middle zone are classed as 'DAA' which means that HSE 'Do not Advise Against' any such development.

Table 1: Extract from Table 1 Development type: People at work, Parking (HSE's Land Use Planning Methodology Paragraph 42: HSE: Land use planning - HSE's land use planning methodology)[6]

Development Type	Examples	Development detail and size	Justification
DT1.1 - Workplaces	Offices, factories, warehouses, haulage depots, farm buildings, non-retail markets, builder's yards, self-storage units	Workplaces (predominantly nonretail), providing for less than 100 occupants in each building and less than 3 occupied storeys - **Level 1**	Places where the occupants will be fit and healthy, and could be organised easily for emergency action. Members of the public will not be present or will be present in very small numbers and for a short time

[6] https://www.hse.gov.uk/landuseplanning/methodology.htm

Table 2: HSE Decision matrix (HSE's Land Use Planning Methodology Paragraph 35: HSE: Land use planning - HSE's land use planning methodology)[7]

Level of Sensitivity	Development in Inner Zone	Development in Middle Zone	Development in Outer Zone
1	DAA	DAA	DAA
2	AA	DAA	DAA
3	AA	AA	DAA
4	AA	AA	AA

DAA = **Do not Advise A**gainst development
AA = **A**dvise **A**gainst development

As explained above, the potential change for PDPS from a land use planning perspective would be that part of their property will change from middle zone to inner zone. In this area of change, as can be seen from **Table 2**, HSE is likely to advise against development which is of Sensitivity Level 2 (which would typically be acceptable in the middle zone but not the inner zone). Level 2 Sensitivity is based on the general public – at home and those involved in normal activities. It is unlikely that Sensitivity Level 2

[7] https://www.hse.gov.uk/landuseplanning/methodology.htm

activities would be proposed in this location given the PDPS activities and the size of the area available within the current middle zone. There would be no change in respect of the part of the site that is already in the inner zone.

As part of its compliance with the COMAH Regulations 2015 (including the preparation of the pre-construction safety report and Major Accident Prevention Policy), the Applicant will engage with neighbouring operators including PDPS and inform them about any new relevant major accident hazard scenarios and any emergency actions that would need to be taken by them in such scenarios. **Environmental Statement Chapter 22: Major Accidents and Disasters [APP-064]** submitted with the Development Consent Order ("DCO") application contains an assessment of relevant major accident and disaster risk event scenarios (see **Table 22-5**) and the proposed mitigation measures to reduce the level of risk to as low as reasonably practicable. In conclusion, it is not expected that any changes to the land use planning zones arising out of the Project would interfere with PDPS's operations, type of products stored or likely use of their property.

For reference:

Planning advice web app: HSE's Planning Advice Web App - Login (hsl.gov.uk) which enables anyone (following verification with HSE's Land Use Planning Support Team) to obtain free confirmation of whether a proposed development site is within a HSE consultation zone of a major hazard site or a major accident hazard pipeline.

RR-025 – Royal Mail

The support of Royal Mail for the Project is noted and welcomed.

Royal Mail has requested that additional information is added into the final Construction Traffic Management Plan ("CTMP") to secure mitigation for Royal Mail's delivery office at Immingham.

The Development Consent Order ("DCO") application includes an **Outline Construction Traffic Management Plan ("OCTMP") [APP-223]** which outlines the controls that the contractor will put in place during the construction stage to manage traffic impacts associated with the Project. **Requirement 7** within **Schedule 2** of the **draft DCO [PDA-004]** sets out that construction cannot be commenced of any relevant part of the Project (outside of the UK marine area) until there is a construction traffic management plan for that part that has been submitted to and approved by the relevant planning authority. **Schedule 15** of the **draft DCO [PDA-004]** also lists the **OCTMP [APP-223]** as a document to be certified.

Paragraph 6.1.4 in **Section 6** of the **OCTMP [APP-223]** identifies Royal Mail as a party that may need to be consulted at least one month before any relevant works are anticipated to commence. The information provided to Royal Mail would include a copy of the final CTMP, information on working hours and proposals for traffic management or works on the highway network that may affect the parties being consulted.

Royal Mail has requested that:

1. "*the CTMP includes specific requirements that during the construction phase Royal Mail is notified by Associated British Ports or its contractors at least one month in advance on any proposed road closures / diversions / alternative access arrangements, hours of working*"
2. "*where road closures / diversions are proposed, Associated British Ports or its contractors liaise with Royal Mail at least one month in advance to identify and make available alternative highway routes for operational use, where possible*"

To address these points, it is proposed to amend **Section 6** of the **OCTMP [APP-223]** to add the following wording under the heading ' Royal Mail':

Royal Mail

A process of liaison with Royal Mail would be established prior to construction commencing on site (on any part outside of the UK marine area) and would remain in place throughout the construction period, or as long as is required in agreement with both parties. Royal Mail to provide a single point of contact for this process.

Royal Mail will be kept informed of any relevant construction activities including road closures, diversions and works to the highway, with at least one month's notice being given of any such activity that has the potential to impact their operations.

This proposed amendment to the **OCTMP [APP-223]** would directly address Royal Mail's request as it provides the appropriate notice for Royal Mail to consider its operations in the context of any road closures, diversions or works to the highway. Royal Mail also request that cumulative highways impacts from other major developments in the Immingham area are fully addressed during the Examination. It should be noted that traffic and transport cumulative effects have already been considered as part of the DCO Application and are set out in **Environmental Statement ("ES") Appendix 11.B: Traffic and Transport Cumulative Effects Assessment [APP-190]**. It should also be noted that the DCO includes a cumulative and in-combination effects assessment at **ES Chapter 25: Cumulative and In-Combination Effects [APP-067]**.

RR-026 – Stena Line BV

The Applicant notes the representation made by Stena Line BV (Stena). The Applicant considers that Stena are important members of the Immingham port community and as such recognises that Stena will be reviewing the implications of the Project upon Stena's proposed operations in the same way as do other stakeholders at the port. The Applicant welcomes the opportunity to further engage with Stena on the Project as the Examination process progresses.

RR-027 – Tronox Pigments UK Ltd

The Applicant notes Tronox Pigments UK Ltd's representation and welcomes the interest shown by a local business in the use of green hydrogen.

RR-028 – UK Health Security Agency

The Applicant notes the Interested Party's representation and welcomes the conclusion of both the UK Health Security Agency and the Office for Health Improvement and Disparities that they are satisfied with the methodology used to undertake the environmental assessment and satisfied that the proposed development should not result in any significant adverse impact on public health.

3 Appendices to the Applicant's Responses to Relevant Representations

RR-016 – Marine Management Organisation

Table 1. Schedule of proposed seasonal restrictions on construction activity

Construction activity	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Jetty head			☼ sunrise to sunset		☼ sunrise to sunset	☼ 07:00 to 19:00	☼ 07:00 to 19:00					☼ 07:00 to 19:00
Approach jetty	Dry only	Dry only	☼ sunrise to sunset		☼ sunrise to sunset	☼ 07:00 to 19:00	☼ 07:00 to 19:00 >200 m	>200 m	>200 m	>200 m	>200 m	☼ 07:00 to 19:00 >200 m

Please note:
- This table does not include other proposed mitigation measures that apply year-round (e.g., soft starts, noise suppression system etc.)

Key	Restriction detail	Receptor (relevant qualifying interest features in brackets)
	No restrictions – all construction activity allowed	N/A
☼	Night-time piling restriction – piling not allowed between sunset and sunrise or 19:00 and 07:00	Migratory fish (including river lamprey and sea lamprey which are qualifying features of the Humber Estuary SAC and Ramsar site)
	Piling reporting protocol: • Reports detailing the total duration of piling each day are to be submitted to the MMO on a weekly basis and the Applicant will hold fortnightly meetings with the MMO (unless otherwise agreed with the MMO) • A 60-minute contingency period is allowed as well as the 270 minutes per day maximum percussive pile driving scenario • In the event of an abnormal situation arising which triggers the contingency period, an environmental representative for the works will be notified who will agree a plan with the contractor to limit the duration of percussive piling to 330 minutes for that day, as well as measures to prevent a future recurrence • Circumstances that trigger the contingency period will be recorded and explained in the weekly reporting to the MMO – the Applicant proposes to use the fortnightly meeting to discuss and agree further corrective action with the MMO should it be required	Migratory fish (including river lamprey and sea lamprey which are qualifying features of the Humber Estuary SAC and Ramsar site)
	Percussive piling not allowed	Migratory fish (including river lamprey and sea lamprey which are qualifying features of the Humber Estuary SAC and Ramsar site)
Dry only	Percussive piling not allowed unless on dry intertidal areas outside of the waterbody at periods of low water	Migratory fish (including river lamprey and sea lamprey which are qualifying features of the Humber Estuary SAC and Ramsar site)
>200 m	Construction activity (including piling) not allowed within 200 m of exposed mudflat. Note: • Construction can take place on seaward sections of approach jetty when works are >200 m from exposed mudflat • Restriction applies until an acoustic barrier/visual screen has been installed on both sides of the semi-completed structure • With the addition of acoustic barriers, noise levels on the intertidal mudflat will be less than 70 dB(A)	Overwintering birds (including qualifying features of the Humber Estuary SPA and Ramsar site)

Figure 2. Predicted zone of instantaneous peak injury and behavioural effects on fish during impact piling

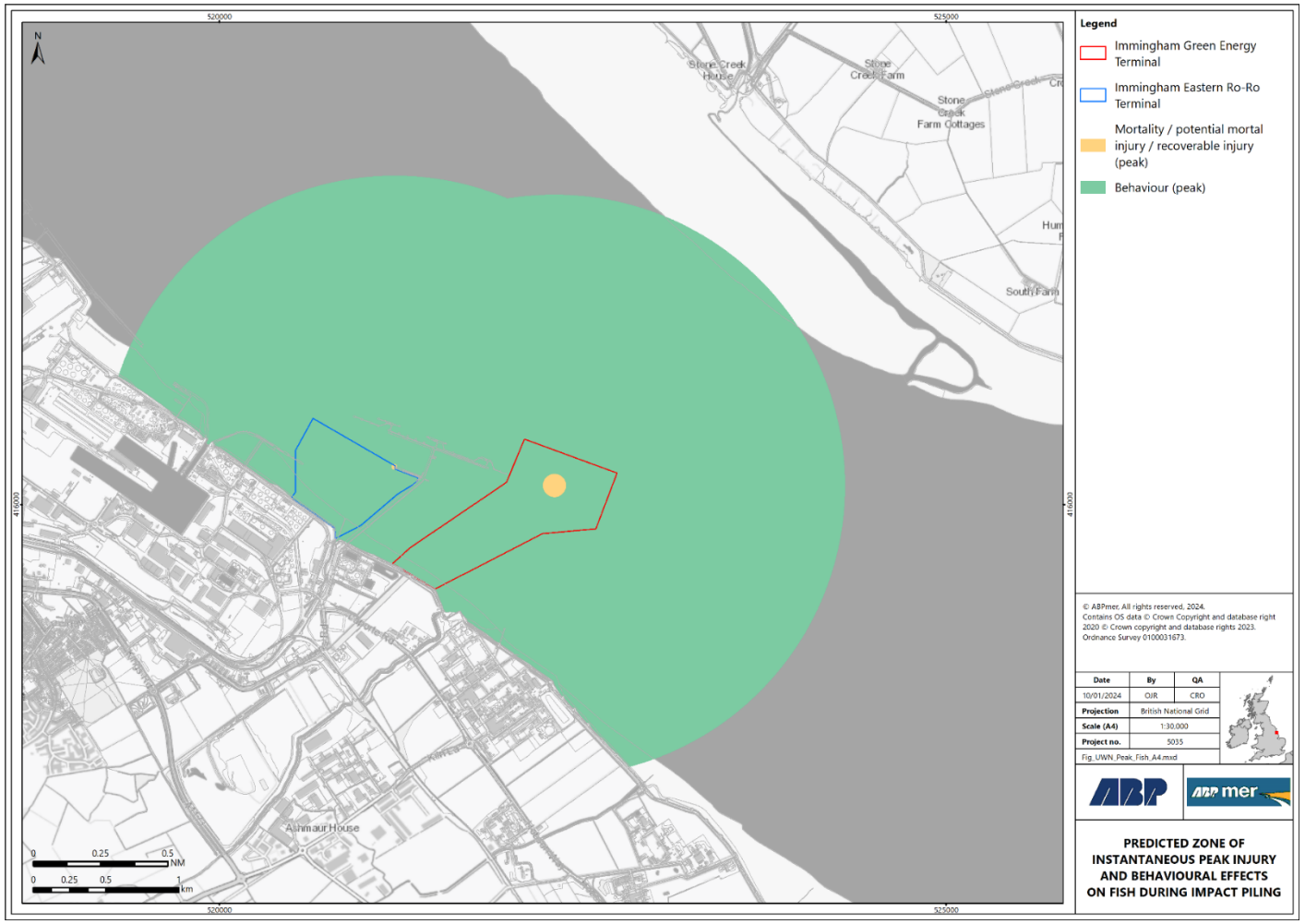


Figure 3. Predicted zone of cumulative SEL injury and TTS effects on fish during impact piling

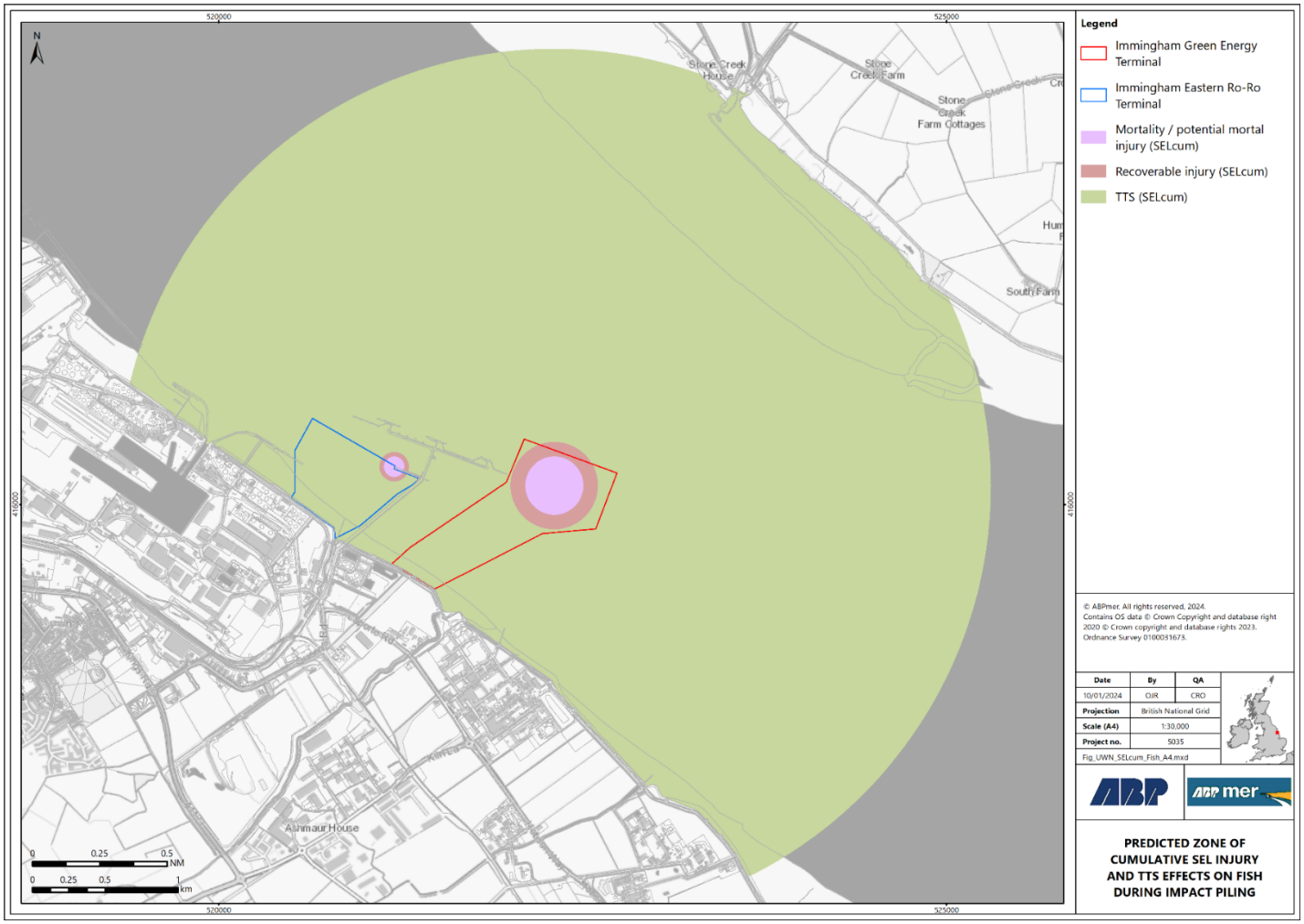


Figure 4. Illustration of potential minimum separation between piling rigs

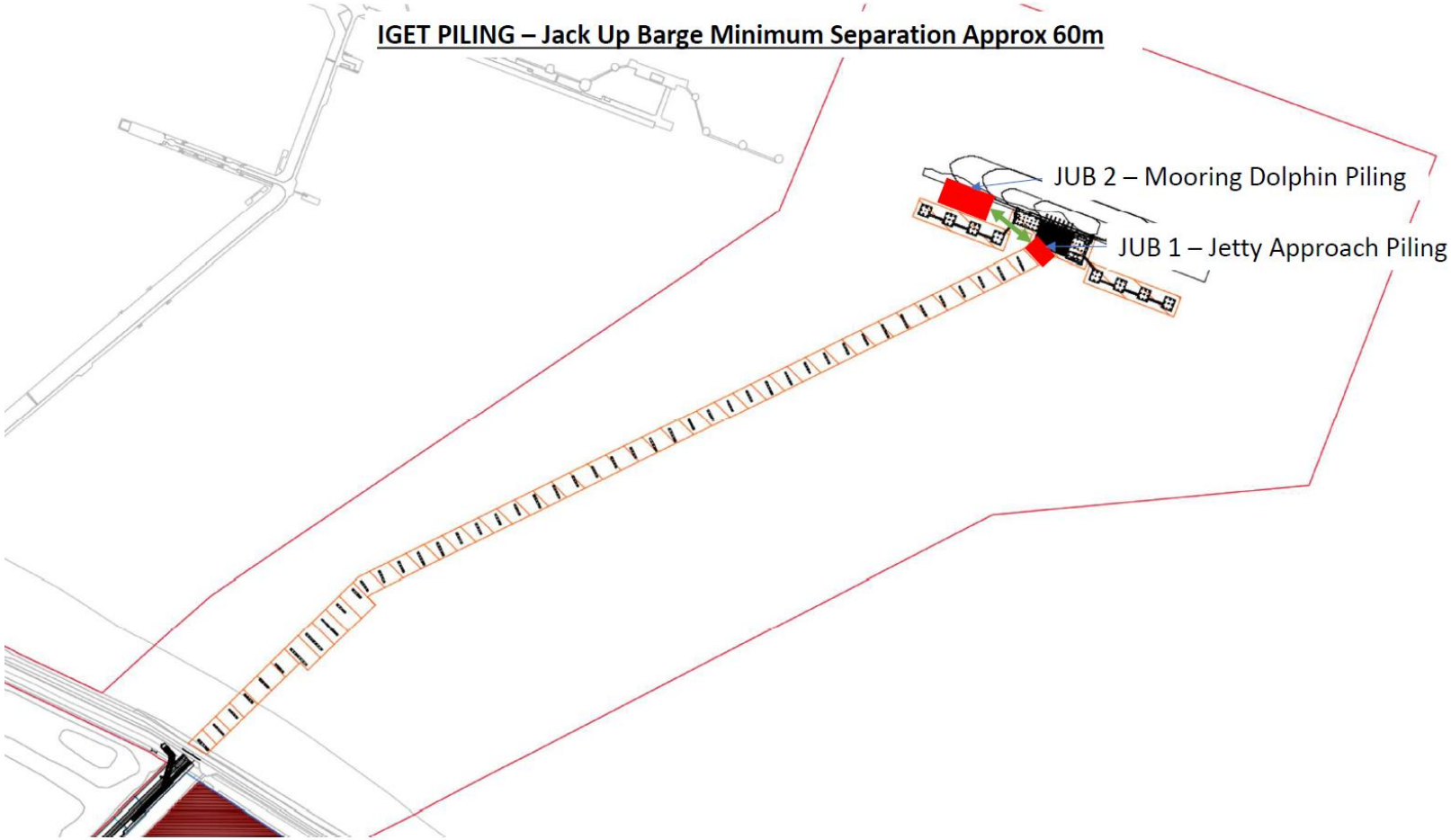


Figure 5. Illustration of potential maximum separation between piling rigs

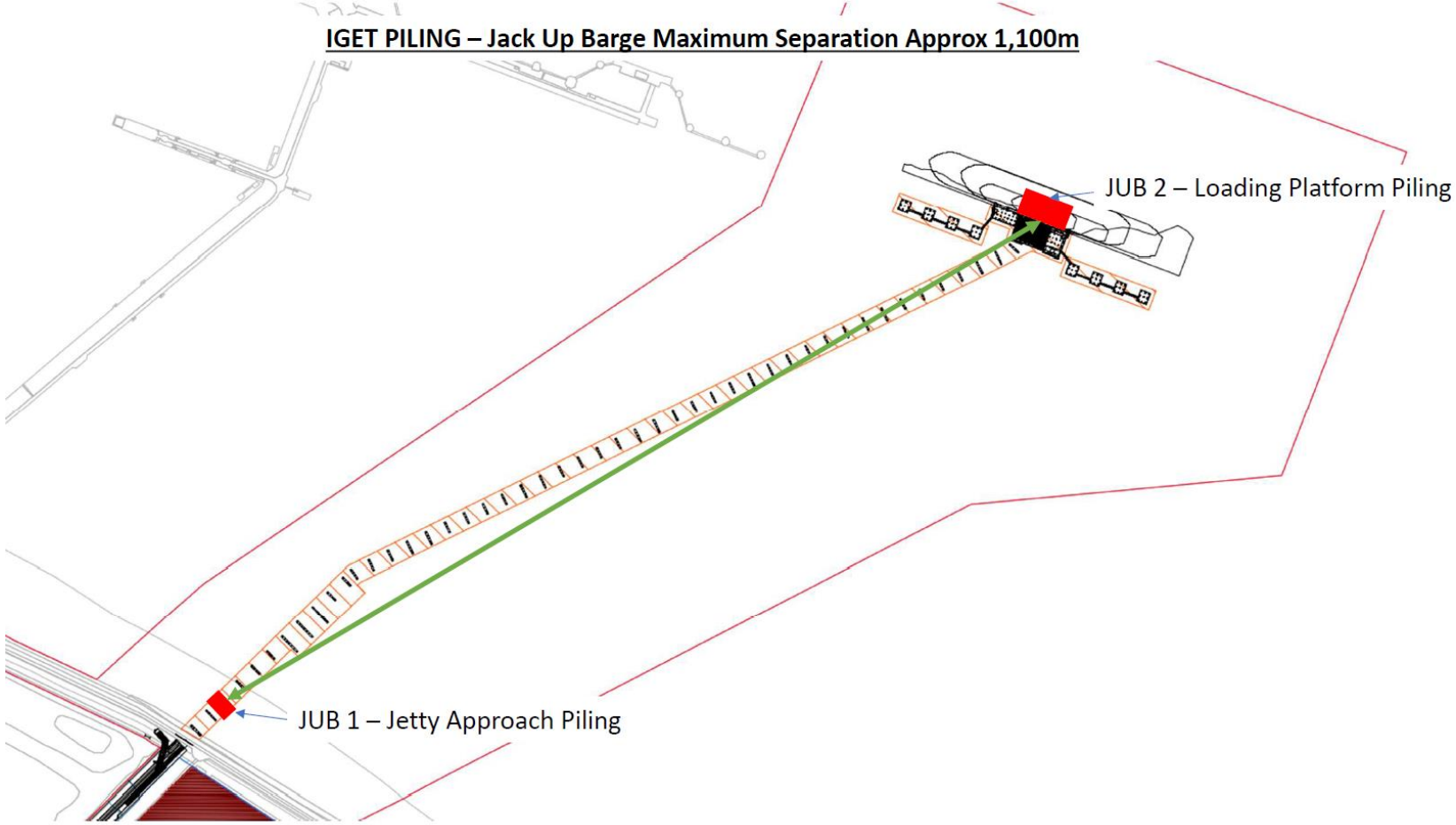
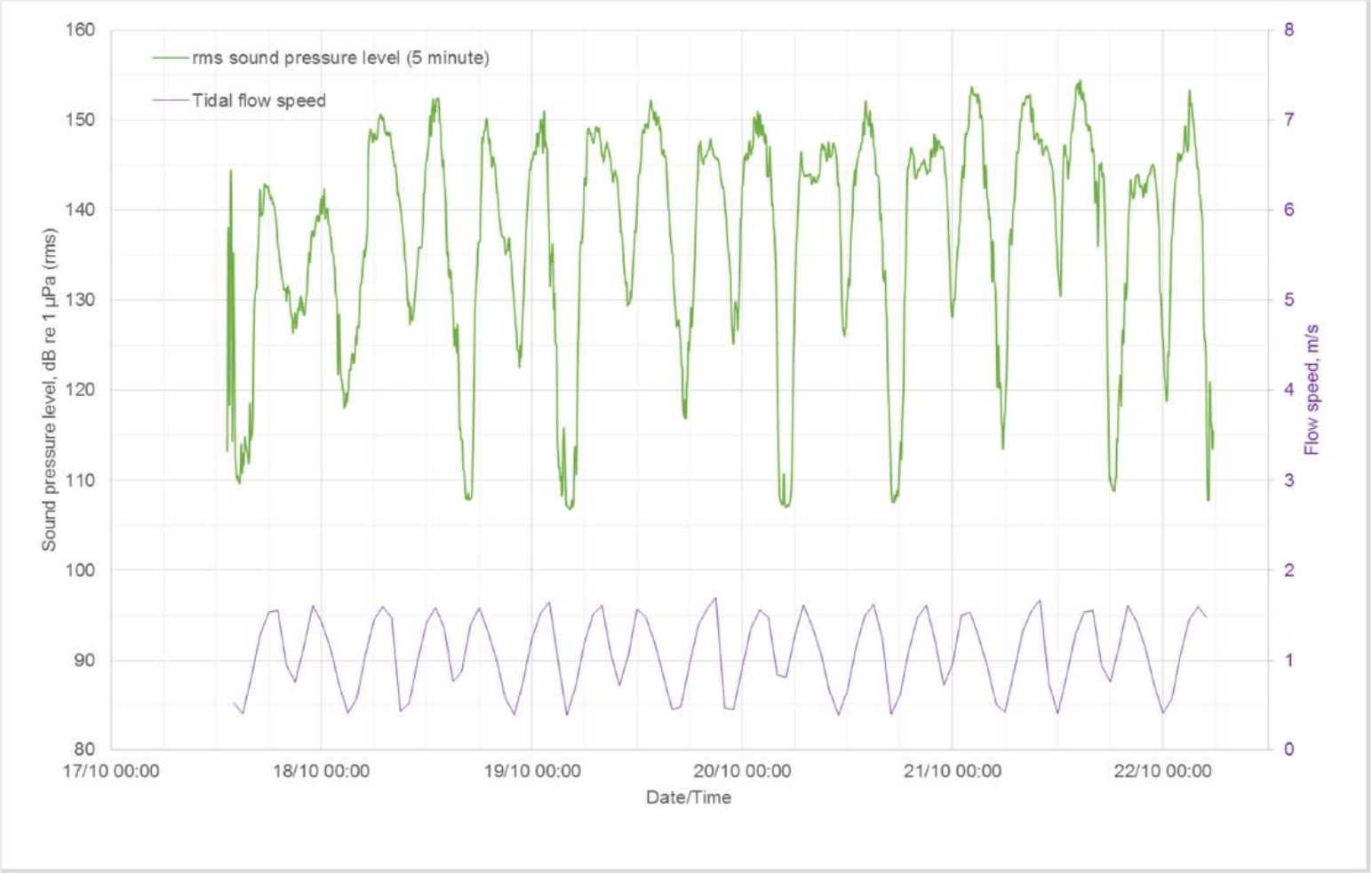
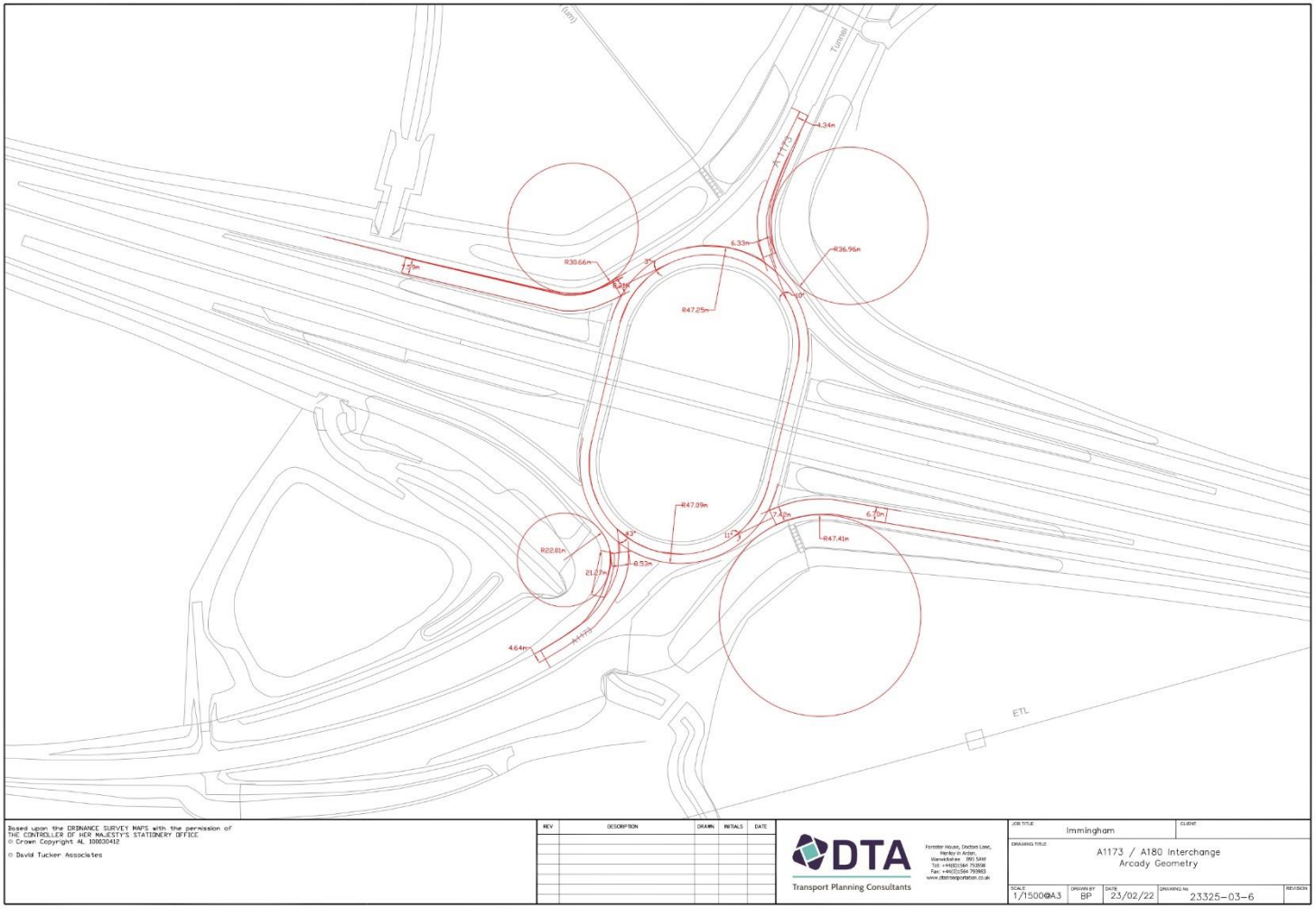


Figure 6. RMS sound pressure levels, with tidal flow speed plotted on secondary axis (Xodus, 2015)



RR-018 – National Highways

Figure 1. A1173 / A180 Interchange



The tables below show the results of the modelling at the A180/A1173 junction.

Base 2021

Table 2 shows the results of the Base 2021 at the A180/A1173 junction. These modelling results were obtained from the Immingham Eastern Ro-Ro Terminal, Transport Assessment Addendum produced in December 2023 by DTA.

Table 2: A180/A1173 junction modelling results – 2021 Base

ARM	Base 2021					
	AM			PM		
	Q	Delay	RFC	Q	Delay	RFC
A – A1173 N	0.2	2.00	0.11	0.8	2.35	0.42
B – A180 E	0.4	1.90	0.29	0.2	2.11	0.19
C – A1173 S	0.3	2.78	0.24	0.1	2.09	0.10
D – A180 W	0.4	3.13	0.23	0.2	2.34	0.11

TEMPRO factors

Growth Factor 2021–2016, which represents the year of peak construction activity for the Project:

AM: 1.0367
PM: 1.0359

Base 2026 – peak year of construction

Table 3 shows the results of the Base 2026 using the 2021–2026 TEMPRO growth factors set out above.

Table 3: A180/A1173 junction modelling results – 2026 Base

ARM	Base 2026					
	AM			PM		
	Q	Delay	RFC	Q	Delay	RFC
A – A1173 N	0.2	2.01	0.12	0.8	2.42	0.44
B – A180 E	0.5	2.02	0.31	0.3	2.16	0.20
C – A1173 S	0.3	2.82	0.25	0.1	2.12	0.10
D – A180 W	0.4	3.26	0.24	0.2	2.37	0.11

The results of the modelling indicate that there will be minimal queuing on each of the arms, with minimal delays on each approach and a Ratio of Flow to Capacity ("RFC") value indicating spare capacity on each of the arms. There is also minimal change between the Base 2021 and 2026.

Base 2026 + Committed Development + IERRT Development

Table 4 shows the results of Base 2026 + Committed Development as well as the Base 2026 + Committed Development + IERRT Development results.

Against the Base 2026 model, there has been a slight increase in queues and delays on most arms as well as the RFC values. However, all RFC values are below 0.85 which is generally considered as the maximum RFC.

Table 4: A180/A1173 junction modelling results – 2026 Base + Committed Development/2026 Base + Committed Development + IERRT Development

ARM	Base 2026 + Committed Development	Base 2026 + Committed Development + IERRT Development

	AM			PM			AM			PM		
	Q	Delay	RFC	Q	Delay	RFC	Q	Delay	RFC	Q	Delay	RFC
A – A1173 N	0.3	1.98	0.22	1.4	3.26	0.58	0.4	2.02	0.25	1.8	3.76	0.63
B – A180 E	0.8	2.61	0.43	0.4	2.68	0.30	0.9	2.83	0.45	0.5	3.02	0.32
C – A1173 S	0.7	4.43	0.41	0.2	2.46	0.16	0.8	5.03	0.44	0.2	2.72	0.18
D – A180 W	0.9	5.23	0.44	0.3	2.33	0.20	1.4	6.57	0.56	0.6	2.94	0.30

Base 2026 + Committed Development + IERRT Development + IGET

Table 5 shows the results of Base 2026 + Committed Development + IERRT Development + IGET. There are two sets of results as follows:

1. The IGET Actual Test, which was between the hours of 07:00–08:00 and 16:00–17:00.
2. The IGET Sensitivity Test, which uses the hours of 06:00–07:00 and 18:00–19:00, which represents the level of highest construction traffic generated by IGET in the AM and PM periods.

Table 5: A180/A1173 junction modelling results – 2026 Base + Committed Development + IERRT Development + IGET (Actual/Sensitivity)

ARM	Base 2026 + Committed Development + IERRT Development + IGET (*Actual*: 07:00–08:00, 16:00–17:00)						Base 2026 + Committed Development + IERRT Development + IGET (*Sensitivity:* 06:00–07:00, 18:00–19:00)					
	AM			PM			AM			PM		
	Q	Delay	RFC	Q	Delay	RFC	Q	Delay	RFC	Q	Delay	RFC
A – A1173 N	0.4	2.07	0.26	1.9	3.95	0.64	0.4	2.03	0.26	2.4	4.54	0.69

B – A180 E	1.0	3.04	0.48	0.5	3.14	0.34	1.0	3.00	0.48	0.6	3.28	0.35
C – A1173 S	1.0	5.84	0.49	0.2	2.78	0.18	1.0	5.93	0.50	0.2	2.82	0.18
D – A180 W	2.0	8.70	0.64	0.6	3.01	0.31	2.0	8.88	0.65	0.6	2.96	0.30

The results indicate that with the additional construction traffic there will only be negligible increases in the total queue and delay on each of the arms. This is also the case in terms of the predicted RFC values between the without construction and with construction scenarios, with again only minimal increases in RFC associated with the construction traffic.

It is therefore considered that the A180/A1173 junction will continue to operate satisfactorily with the addition of the Project construction traffic at the peak year of 2026.

RR-019 – Natural England

Table 6. Humber Estuary SPA Assemblage Species

This table provides a summary on the rationale for screening in SPA assemblage species as part of Stage 1 (Screening) of the **Shadow HRA (Section 3) [APP-238]**. The species list provided in the *Annex B: Humber Estuary Special Protection Area: non-breeding waterbird assemblage (Version 1.2, June 2023)* note provided by Natural England.

SPA Assemblage Feature	Signpost to Shadow HRA
Species listed individually under the assemblage feature on the SPA citation	
Avocet, *Recurvirostra avosetta* (non-breeding)	This species is recorded in the Immingham region but is considered rare in the vicinity of the Project with no Avocet recorded in the last five years (2018/19 to 2022/23) during the IOH monitoring on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project). This species has been screened out of the **Shadow HRA** due to the lack of a viable impact pathway (see **Table 2** of the **Shadow HRA [APP-238]** for further details).
Bar-tailed Godwit, *Limosa lapponica* (non-breeding)	Very low numbers (< 5 individuals, representing <1% of the estuary-wide WeBS five-year mean peak) have been recorded in the last five years (2018/19 to 2022/23) during the IOH monitoring on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project) (**Section 1.4** of **Appendix A** of the **Shadow HRA [APP-238]**). The area is, therefore, considered to be of very limited functional value for the qualifying species and has been screened out (see **Table 2** of the **Shadow HRA** for further details).

Bittern, *Botaurus stellaris* (non-breeding)	This species does not normally occur on open mudflat habitat and has not been recorded in the IOH bird monitoring that has been undertaken in the Immingham area. This species has been screened out of the **Shadow HRA** due to the lack of a viable impact pathway (see **Table 2** of the **Shadow HRA [APP-238]** for further details).
Black-tailed Godwit, *Limosa limosa islandica* (non-breeding)	Black-tailed Godwit have been regularly observed on the foreshore in the area of the Project with abundances of <100 individuals recorded (representing up to 2% of the estuary-wide WeBS five-year mean peak) in the last five years (2018/19 to 2022/23) during the IOH monitoring on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project) (**Section 1.4** of **Appendix A** of the **Shadow HRA [APP-238]**). This qualifying species has been screened into and assessed within the **Shadow HRA**.
Brent Goose, *Branta bernicla* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as it has not been recorded in the last five years (2018/19 to 2022/23) during the IOH monitoring on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project) (see **Section 1.4** of **Appendix A** of the **Shadow HRA [APP-238]**).
Curlew, *Numenius arquata* (non-breeding)	The numbers of Curlew recorded on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project) (**Section 1.4** of **Appendix A** of the **Shadow HRA [APP-238]**) are lower than 1% of the estuary-wide population (based on the WeBS five year mean peak). However, this species has been screened into and assessed as part of the waterbird assemblage within the **Shadow HRA** on a precautionary basis as this species is regularly recorded on the foreshore.

Dunlin, *Calidris alpina alpina* (non-breeding)	Low numbers (<100 individuals, representing <1% of the estuary-wide WeBS five-year mean peak) have been regularly recorded in the last five years (2018/19 to 2022/23) during the IOH monitoring on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project) (**Section 1.4** of **Appendix A** of the **Shadow HRA [APP-238]**). While this qualifying species has only been recorded in low numbers in the context of estuary-wide populations, given this species is regularly recorded, the feature has been screened in on a precautionary basis (see **Table 2** of the **Shadow HRA** for further details).
Golden Plover, *Pluvialis apricaria* (non-breeding)	The species is considered rare in the vicinity of the Project with no Golden Plover recorded in the last five years (2018/19 to 2022/23) during the IOH monitoring on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project). This species has been screened out of the **Shadow HRA** due to the lack of a viable impact pathway (see **Table 2** of the **Shadow HRA [APP-238]** for further details).
Goldeneye, *Bucephala clangula* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as it has not been recorded within the bird count sector adjacent to the proposed works (IOH Sector C) or in nearby offshore waters in the Port of Immingham area for the last five years during the IOH monitoring.
Greenshank, *Tringa Nebularia* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as this species is considered rare in the vicinity of the Project with no Greenshank recorded in the last five years (2018/19 to 2022/23) during the IOH monitoring on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project).

Grey Plover, *Pluvialis squatarola* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as Grey Plover are typically only recorded very infrequently and in low numbers (representing <1% of the estuary-wide WeBS five-year mean peak) during the IOH monitoring on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project).
Knot, *Calidris canutus* (non-breeding)	While this species is recorded on the foreshore in the Immingham area, the species is considered rare in the vicinity of the Project with no Knot recorded in the last five years (2018/19 to 2022/23) during the IOH monitoring on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project). The area is, therefore, considered to be of very limited functional value for the species and has been screened out (see **Table 2** of the **Shadow HRA [APP-238]** for further details).
Lapwing, *Vanellus vanellus* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as Lapwing are only recorded very infrequently and in low numbers (representing <1% of the estuary-wide WeBS five-year mean peak) during the IOH monitoring on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project).
Mallard, *Anas platyrhynchos* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as Mallard are typically only recorded very infrequently and in low numbers (representing <1% of the estuary-wide WeBS five-year mean peak) during the IOH monitoring on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project).

Oystercatcher, *Haematopus ostralegus* (non-breeding)	The numbers of Oystercatcher on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project) (**Section 1.4** of **Appendix A** of the **Shadow HRA [APP-238]**) are lower than 1% of the estuary-wide population (based on the WeBS five-year mean peak). However, this species has been screened in and assessed as part of the waterbird assemblage within the **Shadow HRA** on a precautionary basis as this species is regularly recorded on the foreshore.
Pochard, *Aythya farina* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as it has not been recorded within the bird count sector adjacent to the proposed works (IOH Sector C) or in nearby offshore waters in the Port of Immingham area for the last five years during the IOH monitoring.
Redshank, *Tringa totanus* (non-breeding)	Low numbers (<10–20 individuals, representing <1% of the estuary-wide WeBS five-year mean peak) have been regularly recorded in the last five years (2018/19 to 2022/23) during the IOH monitoring on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project) (**Section 1.4** of **Appendix A** of the **Shadow HRA [APP-238]**). While this qualifying species has only been recorded in low numbers in the context of estuary-wide populations, given this species is regularly recorded, the feature has been screened in on a precautionary basis.
Ringed Plover, *Charadrius hiaticula* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as Ringed Plover are typically only recorded very infrequently and in low numbers (representing <1% of the estuary-wide WeBS five-year mean peak) during the IOH monitoring on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project).

Ruff, *Philomachus pugnax* (non-breeding)	This species is rarely recorded on mudflat habitat in the Immingham area with no records of the species occurring in Sector C over the last five years of IOH monitoring (2018/19 to 2022/23). This species has been screened out of the **Shadow HRA** due to the lack of a viable impact pathway (see **Table 2** of the **Shadow HRA [APP-238]** for further details).
Sanderling, *Calidris alba* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as it has not been recorded within the bird count sector adjacent to the proposed works (IOH Sector C) for the last five years (see **Section 1.4** of **Appendix A** of the **Shadow HRA [APP-238]**).
Scaup, *Aythya marila* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as it has not been recorded within the bird count sector adjacent to the proposed works (IOH Sector C) or in nearby offshore waters in the Port of Immingham area for the last five years during the IOH monitoring.
Shelduck, *Tadorna tadorna* (non-breeding)	Low numbers (<10–20 individuals, representing <1% of the estuary-wide WeBS five-year mean peak) have been recorded in the last five years (2018/19 to 2022/23) during the IOH monitoring on the section of Sector C between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project) (**Section 1.4** of **Appendix A** of the **Shadow HRA [APP-238]**). While this qualifying species has only been recorded in relatively low numbers in the context of estuary-wide populations, given this species is regularly recorded, the feature has been screened in to and assessed within the **Shadow HRA** on a precautionary basis.

Teal, *Anas crecca* (non-breeding)	The numbers of Teal on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project) (**Section 1.4** of **Appendix A** of the **Shadow HRA [APP-238]**) are lower than 1% of the estuary-wide population (based on the WeBS five-year mean peak). However, this species has been screened in to and assessed as part of the waterbird assemblage within the **Shadow HRA** on a precautionary basis as this species is regularly recorded on the foreshore.
Turnstone, *Arenaria interpres* (non-breeding)	Turnstone have been recorded on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project) in abundances representing up to 10% of the estuary-wide population (based on the WeBS five-year mean peak). This species has been screened in to and assessed as part of the waterbird assemblage within the **Shadow HRA**.
Whimbrel, *Numenius phaeopus* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as Whimbrel are typically only recorded rarely and in very low numbers (representing <1% of the estuary-wide WeBS five-year mean peak) during the IOH monitoring on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project).
Wigeon, *Anas Penelope (*non-breeding)	This species was not specifically considered within the **Shadow HRA** as it has not been recorded within the bird count sector adjacent to the proposed works (IOH Sector C) for the last five years (see **Section 1.4** of **Appendix A** of the **Shadow HRA [APP-238]**).
Species which are not listed on the SPA citation but occur at site levels of more than 1% of the national population according to the most recent Humber Estuary WeBS five-year average count	

Green Sandpiper, *Tringa ochropus* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as it has not been recorded within the bird count sector adjacent to the proposed works (IOH Sector C) for the last five years (see **Section 1.4** of **Appendix A** of the **Shadow HRA [APP-238]**).
Greylag Goose, *Anser anser* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as Greylag Goose are typically only recorded very infrequently and in low numbers (representing <1% of the estuary-wide WeBS five-year mean peak) during the IOH monitoring on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project).
Little Egret, *Egretta garzetta* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as Little Egret are typically only recorded infrequently and in low numbers (representing <1% of the estuary-wide WeBS five-year mean peak) during the IOH monitoring on the section of Sector C foreshore between the IOT Jetty and the mudflat fronting North Beck drain (within approximately 400–500m of the Project).
Pink-footed Goose, *Anser brachyrhynchus* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as it has not been recorded within the bird count sector adjacent to the proposed works (IOH Sector C) for the last five years (see **Section 1.4** of **Appendix A** of the **Shadow HRA [APP-238]**).
Shoveler, *Anas clypeata* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as it has not been recorded within the bird count sector adjacent to the proposed works (IOH Sector C) for the last five years (see **Section 1.4** of **Appendix A** of the **Shadow HRA [APP-238]**).
Crane, *Grus grus* (non-breeding)	This species was not specifically considered within the **Shadow HRA** as it has not been recorded within the bird count sector adjacent to the proposed works (IOH Sector C) for the last five years (see **Section 1.4** of **Appendix A** of the **Shadow HRA [APP-238]**).

Non-breeding waterbirds but are listed on the citation qualifying under article 4.1 and 4.2 of the Directive	
Hen Harrier, *Circus cyaneus* (non-breeding)	This species has been screened out of the **Shadow HRA** due to the lack of a viable impact pathway (see **Table 2** of the **Shadow HRA [APP-238]** for further details).
Marsh Harrier, *Circus aeruginosus* (breeding)	This species has been screened out of the **Shadow HRA** due to the lack of a viable impact pathway (see **Table 2** of the **Shadow HRA [APP-238]** for further details).
Little Tern, *Sterna albifrons* (breeding)	Little Tern breed at Easington Lagoon, which is located approximately 20km from the proposed development, with data suggesting this species forages within 5km of nesting sites. This species is considered very rare within the Immingham area and has been screened out of the **Shadow HRA** due to the lack of a viable impact pathway (see **Table 2** of the **Shadow HRA [APP-238]** for further details).
Avocet, *Recurvirostra avosetta* (breeding)	This species has been screened out of the **Shadow HRA** due to the lack of a viable impact pathway (see **Table 2** of the **Shadow HRA [APP-238]** for further details).

Table 2. Humber Estuary SPA Assemblage Species

Study	Summary
Institute of Estuarine and Coastal Studies (IECS) (2009a). Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance. Institute of Estuarine and Coastal Studies Report to Humber INCA.	Disturbance monitoring along a 1.5km stretch of coastline near Pyewipe, Grimsby, of piling works centred on the South Humber Bank Power Station found that birds appeared indifferent to the noise of piling from the landward side of the seawall, and the numbers and distribution of birds on the mudflat at low tides was similar during periods of piling and periods with no piling. Piling on the seaward side of the seawall only resulted in minor disturbance to birds immediately adjacent to the seawall, but feeding flocks appeared tolerant of piling noise at a distance of approximately 200m (IECS, 2009).
Scott Wilson (2009). Estuarine Bird Monitoring (05 Dec 2008-19 Jan 2009) - TERRC Facility. Prepared for Hartlepool Borough Council.	Ornithological monitoring at Hartlepool found that birds feeding on mudflats at low tide were largely unaffected by marine piling activity to construct a new quay wall approximately 200m from the nearest mudflat, with only one significant disturbance event (causing a flock of gulls to leave the sector and not return) during the two-month winter monitoring period (Scott Wilson, 2009). All marine piling at the Hartlepool site employed a 'soft-start' procedure, where noise levels are gradually increased to minimise the impact of a sudden sharp increase in noise.
ABPmer (2013). Bury Marsh Bird Monitoring 2012-2014: Interim Report. ABP Marine Environmental Research Ltd, Report No. R.2123.	Bird monitoring as part of the marine licensing consent for a quay wall construction development at the Port of Southampton evaluated the disturbance effects of percussive piling on waterbird species using the mudflat habitat on Bury Marsh opposite the Port of Southampton (approximately 100m to 200m away) during the overwinter period. No bird disturbance behaviour (such as startling, rapid flight or abruptly stopping foraging) was observed during monitoring periods of percussive piling activity. However, disturbance to waterbirds was observed on several occasions due to vessels and kayaks within 50m of Bury Marsh (ABPmer, 2013).

Table 7. Schedule of proposed seasonal restrictions on construction activity

Construction activity	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Jetty head			☼ sunrise to sunset		☼ sunrise to sunset	☼ 07:00 to 19:00	☼ 07:00 to 19:00					☼ 07:00 to 19:00
Approach jetty	Dry only	Dry only	☼ sunrise to sunset		☼ sunrise to sunset	☼ 07:00 to 19:00	☼ 07:00 to 19:00 >200 m	>200 m	>200 m	>200 m	>200 m	☼ 07:00 to 19:00 >200 m

Please note:
- This table does not include other proposed mitigation measures that apply year-round (e.g., soft starts, noise suppression system etc.)

Key	Restriction detail	Receptor (relevant qualifying interest features in brackets)
	No restrictions – all construction activity allowed	N/A
☼	Night-time piling restriction – piling not allowed between sunset and sunrise or 19:00 and 07:00	Migratory fish (including river lamprey and sea lamprey which are qualifying features of the Humber Estuary SAC and Ramsar site)
	Piling reporting protocol: • Reports detailing the total duration of piling each day are to be submitted to the MMO on a weekly basis and the Applicant will hold fortnightly meetings with the MMO (unless otherwise agreed with the MMO) • A 60-minute contingency period is allowed as well as the 270 minutes per day maximum percussive pile driving scenario • In the event of an abnormal situation arising which triggers the contingency period, an environmental representative for the works will be notified who will agree a plan with the contractor to limit the duration of percussive piling to 330 minutes for that day, as well as measures to prevent a future recurrence • Circumstances that trigger the contingency period will be recorded and explained in the weekly reporting to the MMO – the Applicant proposes to use the fortnightly meeting to discuss and agree further corrective action with the MMO should it be required	Migratory fish (including river lamprey and sea lamprey which are qualifying features of the Humber Estuary SAC and Ramsar site)
	Percussive piling not allowed	Migratory fish (including river lamprey and sea lamprey which are qualifying features of the Humber Estuary SAC and Ramsar site)
Dry only	Percussive piling not allowed unless on dry intertidal areas outside of the waterbody at periods of low water	Migratory fish (including river lamprey and sea lamprey which are qualifying features of the Humber Estuary SAC and Ramsar site)
>200 m	Construction activity (including piling) not allowed within 200 m of exposed mudflat. Note: • Construction can take place on seaward sections of approach jetty when works are >200 m from exposed mudflat • Restriction applies until an acoustic barrier/visual screen has been installed on both sides of the semi-completed structure • With the addition of acoustic barriers, noise levels on the intertidal mudflat will be less than 70 dB(A)	Overwintering birds (including qualifying features of the Humber Estuary SPA and Ramsar site)

Figure 1. Maximum predicted zone of instantaneous peak PTS and TTS on grey seal during impact piling

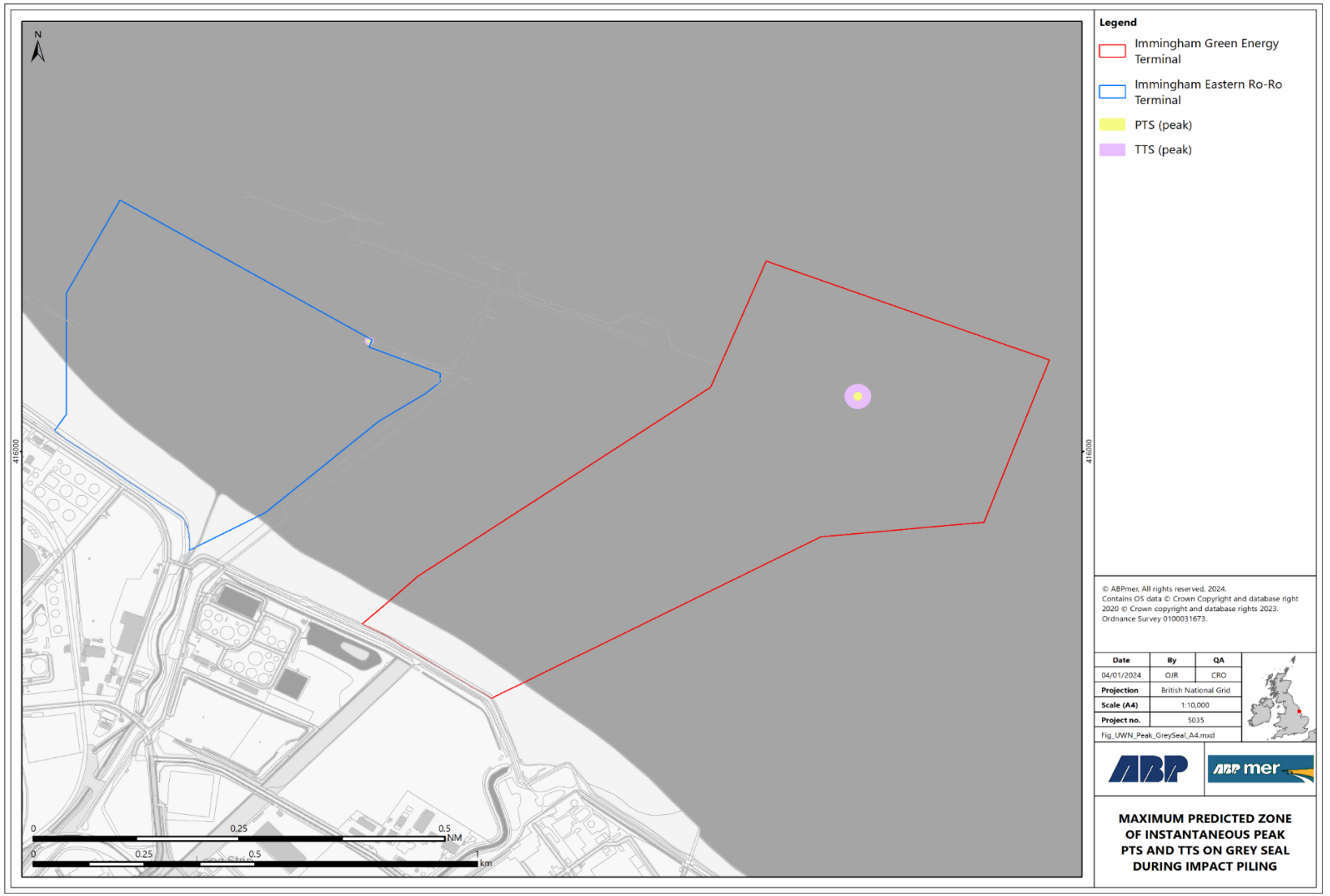
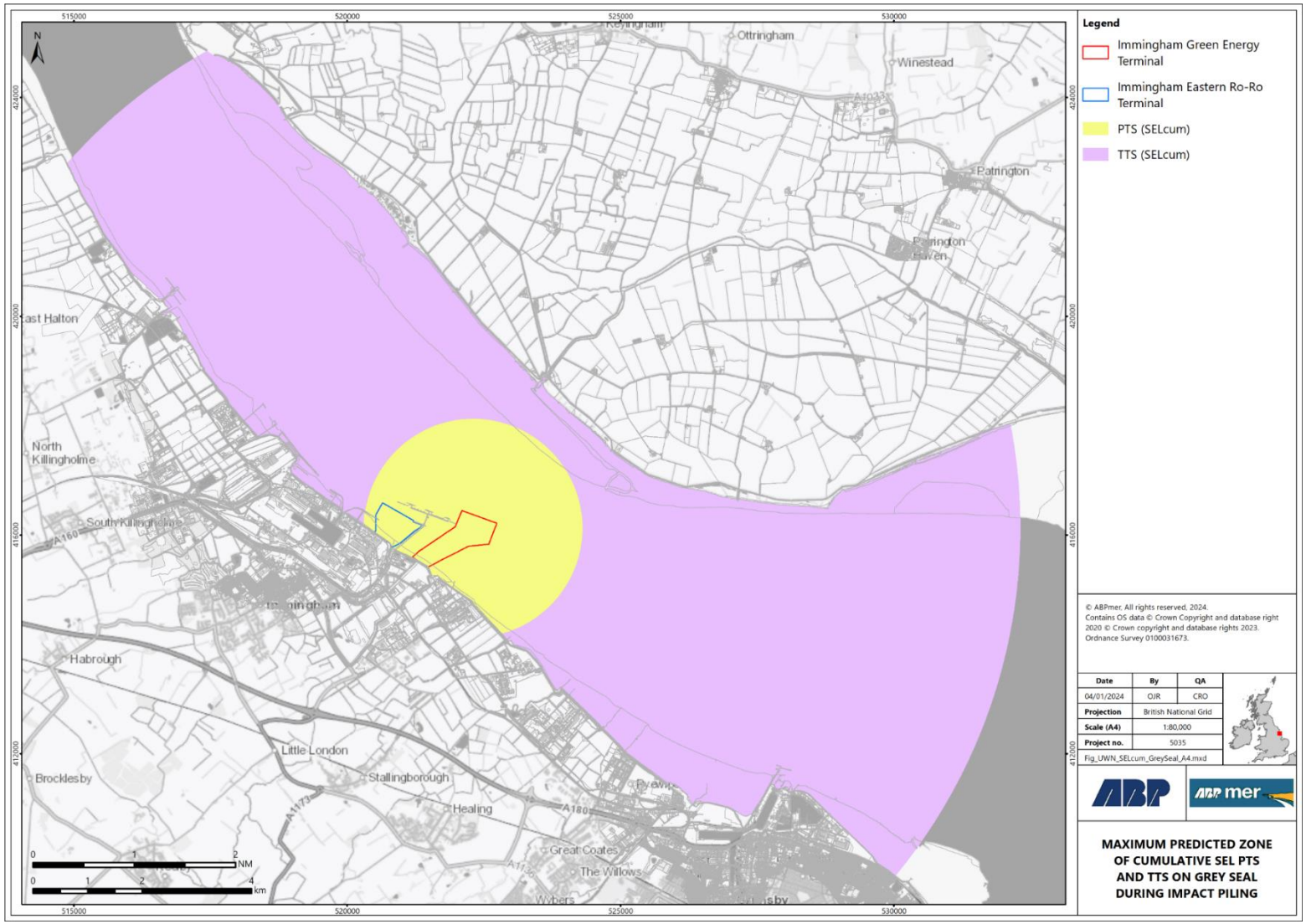


Figure 2. Maximum predicted zone of cumulative SEL PTS and TTS on grey seal during impact piling



4 Annex to the Applicant's Responses to Relevant Representations

A180 / A1173 - Junctions 10 Report

Junctions 10

ARCADY 10 - Roundabout Module

Version: 10.1.1.1905

For sales and distribution information, program advice and maintenance, contact TRL Software:
+44 (0)1344 379777 software@trl.co.uk trlsoftware.com

Filename: 3.A180_A1173_v2.j10
Path: L:\Legacy\UKLDS2PFPSW001\WIP\LE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\Transport\Post Submission November 23\Junctions 10
Report generation date: 22/02/2024 14:51:12

Summary of junction performance

	AM					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
	2026 Baseline									
1 - A1173 N	D11	0.2	2.01	0.12	A	D12	0.8	2.42	0.44	A
2 - A180 E		0.4	1.92	0.30	A		0.3	2.10	0.19	A
3 - A1173 S		0.3	2.85	0.25	A		0.1	2.14	0.10	A
4 - A180 W		0.4	3.26	0.24	A		0.2	2.46	0.12	A
	2026 Baseline + Committed Development									
1 - A1173 N	D13	0.4	2.41	0.22	A	D14	1.5	3.38	0.57	A
2 - A180 E		0.8	2.54	0.42	A		0.4	2.69	0.29	A
3 - A1173 S		0.7	4.45	0.41	A		0.2	2.53	0.16	A
4 - A180 W		1.0	5.51	0.43	A		0.4	2.93	0.21	A
	2026 Baseline + Committed + IERRT Development									
1 - A1173 N	D15	0.5	2.60	0.25	A	D16	1.9	3.98	0.63	A
2 - A180 E		0.8	2.77	0.44	A		0.5	3.06	0.32	A
3 - A1173 S		0.8	5.05	0.44	A		0.2	2.80	0.18	A
4 - A180 W		1.6	7.52	0.55	A		0.7	3.59	0.31	A
	2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM)									
1 - A1173 N	D17	0.5	2.64	0.26	A	D18	2.1	4.18	0.64	A
2 - A180 E		0.9	2.96	0.47	A		0.5	3.19	0.34	A
3 - A1173 S		1.0	5.84	0.49	A		0.2	2.86	0.18	A
4 - A180 W		2.1	9.43	0.61	A		0.7	3.68	0.32	A
	2026 Baseline + Committed + IGET (Sensitivity)									
1 - A1173 N	D19	0.5	2.59	0.26	A	D20	2.5	4.78	0.69	A
2 - A180 E		0.9	2.92	0.47	A		0.6	3.35	0.35	A
3 - A1173 S		1.0	5.92	0.50	A		0.2	2.89	0.19	A
4 - A180 W		2.1	9.53	0.61	A		0.7	3.62	0.31	A

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

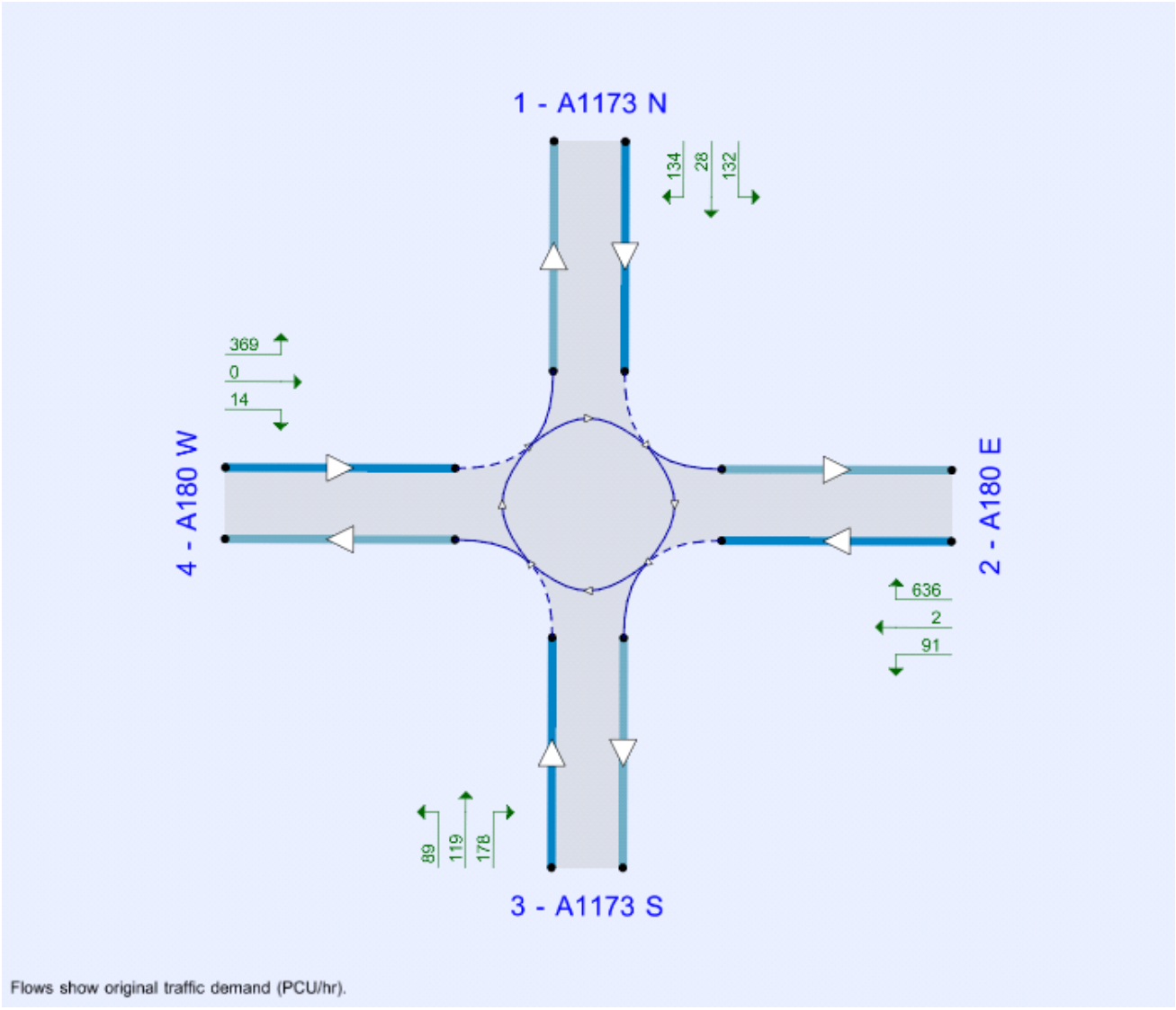
File summary

File Description

Title	
Location	
Site number	
Date	14/11/2023
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	EU\CleasbyD
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin



The junction diagram reflects the last run of Junctions.

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)	Use simulation for HCM roundabouts	Use iterations for HCM roundabouts
5.75						0.85	36.00	20.00		

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type
D1	2021	AM	ONE HOUR	07:00	08:30	15		
D2	2021	PM	ONE HOUR	17:00	18:30	15		
D3	2021 Committed Development	AM	ONE HOUR	07:00	08:30	15		
D4	2021 Committed Development	PM	ONE HOUR	17:00	18:30	15		
D5	2021 IERRT Development	AM	ONE HOUR	07:00	08:30	15		
D6	2021 IERRT Development	PM	ONE HOUR	17:00	18:30	15		
D7	IGET (Actual)	AM	ONE HOUR	07:00	08:30	15		
D8	IGET (Actual)	PM	ONE HOUR	17:00	18:30	15		
D9	IGET (Sensitivity)	AM	ONE HOUR	07:00	08:30	15		
D10	IGET (Sensitivity)	PM	ONE HOUR	17:00	18:30	15		
D11	2026 Baseline	AM	ONE HOUR	07:00	08:30	15	✓	Simple
D12	2026 Baseline	PM	ONE HOUR	17:00	18:30	15	✓	Simple
D13	2026 Baseline + Committed Development	AM	ONE HOUR	07:00	08:30	15	✓	Simple
D14	2026 Baseline + Committed Development	PM	ONE HOUR	17:00	18:30	15	✓	Simple
D15	2026 Baseline + Committed + IERRT Development	AM	ONE HOUR	07:00	08:30	15	✓	Simple
D16	2026 Baseline + Committed + IERRT Development	PM	ONE HOUR	17:00	18:30	15	✓	Simple
D17	2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM)	AM	ONE HOUR	07:00	08:30	15	✓	Simple
D18	2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM)	PM	ONE HOUR	17:00	18:30	15	✓	Simple
D19	2026 Baseline + Committed + IGET (Sensitivity)	AM	ONE HOUR	07:00	08:30	15	✓	Simple
D20	2026 Baseline + Committed + IGET (Sensitivity)	PM	ONE HOUR	17:00	18:30	15	✓	Simple

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

2026 Baseline , AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A1173 N - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Sets	D17 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , AM	Demand Set 17: Scenario Name includes Time Period Name ('AM'). Are you sure this is correct?
Warning	Demand Sets	D18 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , PM	Demand Set 18: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Set Relationship	D13 - 2026 Baseline + Committed Development , AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A180/A1773	Large Roundabout		1, 2, 3, 4	2.42	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	2.42	A

Arms

Arms

Arm	Name	Description	No give-way line
1	A1173 N		
2	A180 E		
3	A1173 S		
4	A180 W		

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Entry only	Exit only
1 - A1173 N	3.65	8.60	49.0	42.5	100.0	16.0		
2 - A180 E	6.70	7.40	15.0	47.0	100.0	11.0		
3 - A1173 S	3.65	8.50	21.0	22.0	100.0	43.0		
4 - A180 W	6.80	8.00	10.0	31.0	100.0	15.0		

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Has entry-to-exit separation	Entry-to-exit separation (m)
1 - A1173 N	205	✓	47.00
2 - A180 E	108	✓	105.00
3 - A1173 S	735	✓	34.00
4 - A180 W	976	✓	113.00

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - A1173 N	1.163	3128
2 - A180 E	1.198	3042
3 - A1173 S	0.864	2496
4 - A180 W	1.014	2885

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D11	2026 Baseline	AM	ONE HOUR	07:00	08:30	15	✓	Simple	D1 * 1.0367

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - A1173 N		ONE HOUR	✓	305	100.000
2 - A180 E		ONE HOUR	✓	756	100.000
3 - A1173 S		ONE HOUR	✓	400	100.000
4 - A180 W		ONE HOUR	✓	397	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	137	29	139
	2 - A180 E	659	0	94	2
	3 - A1173 S	123	185	0	92
	4 - A180 W	383	0	15	0

Proportions

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0.00	0.45	0.10	0.46
	2 - A180 E	0.87	0.00	0.12	0.00
	3 - A1173 S	0.31	0.46	0.00	0.23
	4 - A180 W	0.96	0.00	0.04	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	20	44	72
	2 - A180 E	5	0	5	0
	3 - A1173 S	4	1	0	4
	4 - A180 W	24	0	18	0

Average PCU Per Veh

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	1.000	1.200	1.440	1.720
	2 - A180 E	1.050	1.000	1.050	1.000
	3 - A1173 S	1.040	1.010	1.000	1.040
	4 - A180 W	1.240	1.000	1.180	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (PCU/hr)	Demand in PCU (PCU/hr)
1 - A1173 N	07:00-07:15	229	229
	07:15-07:30	274	274
	07:30-07:45	336	336
	07:45-08:00	336	336
	08:00-08:15	274	274
	08:15-08:30	229	229
2 - A180 E	07:00-07:15	569	569
	07:15-07:30	679	679
	07:30-07:45	832	832
	07:45-08:00	832	832
	08:00-08:15	679	679
	08:15-08:30	569	569
3 - A1173 S	07:00-07:15	301	301
	07:15-07:30	360	360
	07:30-07:45	441	441
	07:45-08:00	441	441
	08:00-08:15	360	360
	08:15-08:30	301	301
4 - A180 W	07:00-07:15	299	299
	07:15-07:30	357	357
	07:30-07:45	437	437
	07:45-08:00	437	437
	08:00-08:15	357	357
	08:15-08:30	299	299

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A1173 N	0.12	2.01	0.2	A	280	420
2 - A180 E	0.30	1.92	0.4	A	693	1040
3 - A1173 S	0.25	2.85	0.3	A	367	551
4 - A180 W	0.24	3.26	0.4	A	364	547

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	229	57	149	2954	0.078	229	875	0.0	0.1	1.872	A
2 - A180 E	569	142	137	2878	0.198	568	241	0.0	0.3	1.636	A
3 - A1173 S	301	75	601	1976	0.152	301	104	0.0	0.2	2.202	A
4 - A180 W	299	75	727	2148	0.139	298	175	0.0	0.2	2.407	A

07:15 - 07:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	274	68	179	2920	0.094	274	1047	0.1	0.1	1.929	A
2 - A180 E	679	170	164	2845	0.239	679	289	0.3	0.3	1.744	A
3 - A1173 S	360	90	719	1875	0.192	360	124	0.2	0.2	2.437	A
4 - A180 W	357	89	869	2004	0.178	357	210	0.2	0.3	2.705	A

07:30 - 07:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	336	84	219	2873	0.117	335	1282	0.1	0.2	2.011	A
2 - A180 E	832	208	201	2801	0.297	832	354	0.3	0.4	1.918	A
3 - A1173 S	441	110	881	1735	0.254	440	152	0.2	0.3	2.852	A
4 - A180 W	437	109	1064	1806	0.242	437	257	0.3	0.4	3.254	A

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	336	84	219	2873	0.117	336	1283	0.2	0.2	2.011	A
2 - A180 E	832	208	201	2801	0.297	832	354	0.4	0.4	1.918	A
3 - A1173 S	441	110	881	1735	0.254	441	152	0.3	0.3	2.853	A
4 - A180 W	437	109	1065	1805	0.242	437	257	0.4	0.4	3.256	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	274	68	179	2919	0.094	274	1049	0.2	0.1	1.929	A
2 - A180 E	679	170	164	2845	0.239	680	289	0.4	0.3	1.747	A
3 - A1173 S	360	90	720	1874	0.192	360	124	0.3	0.2	2.439	A
4 - A180 W	357	89	870	2003	0.178	357	210	0.4	0.3	2.708	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	229	57	150	2953	0.078	230	878	0.1	0.1	1.873	A
2 - A180 E	569	142	137	2877	0.198	569	242	0.3	0.3	1.637	A
3 - A1173 S	301	75	603	1975	0.153	302	104	0.2	0.2	2.206	A
4 - A180 W	299	75	729	2146	0.139	299	176	0.3	0.2	2.414	A

2026 Baseline , PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A1173 N - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Sets	D17 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , AM	Demand Set 17: Scenario Name includes Time Period Name ('AM'). Are you sure this is correct?
Warning	Demand Sets	D18 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , PM	Demand Set 18: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Set Relationship	D13 - 2026 Baseline + Committed Development , AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A180/A1773	Large Roundabout		1, 2, 3, 4	2.33	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	2.33	A

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Has entry-to-exit separation	Entry-to-exit separation (m)
1 - A1173 N	205	✓	47.00
2 - A180 E	108	✓	105.00
3 - A1173 S	735	✓	34.00
4 - A180 W	976	✓	113.00

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D12	2026 Baseline	PM	ONE HOUR	17:00	18:30	15	✓	Simple	D2 * 1.0359

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - A1173 N		ONE HOUR	✓	1136	100.000
2 - A180 E		ONE HOUR	✓	401	100.000
3 - A1173 S		ONE HOUR	✓	190	100.000
4 - A180 W		ONE HOUR	✓	267	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	624	164	349
	2 - A180 E	180	0	221	0
	3 - A1173 S	31	129	0	29
	4 - A180 W	195	1	71	0

Proportions

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0.00	0.55	0.14	0.31
	2 - A180 E	0.45	0.00	0.55	0.00
	3 - A1173 S	0.16	0.68	0.00	0.15
	4 - A180 W	0.73	0.00	0.27	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	2	6	25
	2 - A180 E	12	0	3	0
	3 - A1173 S	33	1	0	8
	4 - A180 W	78	0	8	0

Average PCU Per Veh

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	1.000	1.020	1.060	1.250
	2 - A180 E	1.120	1.000	1.030	1.000
	3 - A1173 S	1.330	1.010	1.000	1.080
	4 - A180 W	1.780	1.000	1.080	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (PCU/hr)	Demand in PCU (PCU/hr)
1 - A1173 N	17:00-17:15	856	856
	17:15-17:30	1022	1022
	17:30-17:45	1251	1251
	17:45-18:00	1251	1251
	18:00-18:15	1022	1022
	18:15-18:30	856	856
2 - A180 E	17:00-17:15	302	302
	17:15-17:30	360	360
	17:30-17:45	441	441
	17:45-18:00	441	441
	18:00-18:15	360	360
	18:15-18:30	302	302
3 - A1173 S	17:00-17:15	143	143
	17:15-17:30	170	170
	17:30-17:45	209	209
	17:45-18:00	209	209
	18:00-18:15	170	170
	18:15-18:30	143	143
4 - A180 W	17:00-17:15	201	201
	17:15-17:30	240	240
	17:30-17:45	294	294
	17:45-18:00	294	294
	18:00-18:15	240	240
	18:15-18:30	201	201

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A1173 N	0.44	2.42	0.8	A	1043	1564
2 - A180 E	0.19	2.10	0.3	A	368	552
3 - A1173 S	0.10	2.14	0.1	A	174	261
4 - A180 W	0.12	2.46	0.2	A	245	368

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	856	214	152	2951	0.290	854	305	0.0	0.4	1.864	A
2 - A180 E	302	75	439	2516	0.120	301	567	0.0	0.1	1.736	A
3 - A1173 S	143	36	398	2152	0.066	142	342	0.0	0.1	1.902	A
4 - A180 W	201	50	256	2625	0.077	201	284	0.0	0.1	2.246	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1022	255	182	2917	0.350	1021	365	0.4	0.6	2.065	A
2 - A180 E	360	90	525	2413	0.149	360	678	0.1	0.2	1.873	A
3 - A1173 S	170	43	476	2085	0.082	170	410	0.1	0.1	1.997	A
4 - A180 W	240	60	306	2574	0.093	240	340	0.1	0.2	2.333	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1251	313	222	2869	0.436	1250	447	0.6	0.8	2.417	A
2 - A180 E	441	110	643	2272	0.194	441	830	0.2	0.3	2.101	A
3 - A1173 S	209	52	582	1993	0.105	209	501	0.1	0.1	2.143	A
4 - A180 W	294	74	375	2505	0.117	294	416	0.2	0.2	2.463	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1251	313	222	2869	0.436	1251	447	0.8	0.8	2.419	A
2 - A180 E	441	110	643	2271	0.194	441	830	0.3	0.3	2.101	A
3 - A1173 S	209	52	583	1993	0.105	209	502	0.1	0.1	2.143	A
4 - A180 W	294	74	375	2504	0.118	294	416	0.2	0.2	2.464	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1022	255	182	2916	0.350	1023	365	0.8	0.6	2.069	A
2 - A180 E	360	90	526	2412	0.149	361	679	0.3	0.2	1.874	A
3 - A1173 S	170	43	476	2085	0.082	171	410	0.1	0.1	1.998	A
4 - A180 W	240	60	307	2574	0.093	240	340	0.2	0.2	2.334	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	856	214	152	2951	0.290	856	306	0.6	0.4	1.871	A
2 - A180 E	302	75	440	2515	0.120	302	568	0.2	0.1	1.740	A
3 - A1173 S	143	36	399	2152	0.066	143	343	0.1	0.1	1.906	A
4 - A180 W	201	50	257	2625	0.077	201	285	0.2	0.1	2.249	A

2026 Baseline + Committed Development , AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A1173 N - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Sets	D17 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , AM	Demand Set 17: Scenario Name includes Time Period Name ('AM'). Are you sure this is correct?
Warning	Demand Sets	D18 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , PM	Demand Set 18: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Set Relationship	D13 - 2026 Baseline + Committed Development , AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A180/A1773	Large Roundabout		1, 2, 3, 4	3.54	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	3.54	A

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Has entry-to-exit separation	Entry-to-exit separation (m)
1 - A1173 N	205	✓	47.00
2 - A180 E	108	✓	105.00
3 - A1173 S	735	✓	34.00
4 - A180 W	976	✓	113.00

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D13	2026 Baseline + Committed Development	AM	ONE HOUR	07:00	08:30	15	✓	Simple	D11 + D3

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - A1173 N		ONE HOUR	✓	543	100.000
2 - A180 E		ONE HOUR	✓	987	100.000
3 - A1173 S		ONE HOUR	✓	522	100.000
4 - A180 W		ONE HOUR	✓	567	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	227	41	275
	2 - A180 E	873	0	111	2
	3 - A1173 S	144	254	0	124
	4 - A180 W	545	0	23	0

Proportions

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0.00	0.42	0.08	0.51
	2 - A180 E	0.89	0.00	0.11	0.00
	3 - A1173 S	0.28	0.49	0.00	0.24
	4 - A180 W	0.96	0.00	0.04	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	25	37	72
	2 - A180 E	7	0	4	0
	3 - A1173 S	4	1	0	3
	4 - A180 W	30	0	11	0

Average PCU Per Veh

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	1.000	1.248	1.368	1.715
	2 - A180 E	1.066	1.000	1.042	1.000
	3 - A1173 S	1.041	1.007	1.000	1.029
	4 - A180 W	1.298	1.000	1.109	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (PCU/hr)	Demand in PCU (PCU/hr)
1 - A1173 N	07:00-07:15	409	409
	07:15-07:30	488	488
	07:30-07:45	598	598
	07:45-08:00	598	598
	08:00-08:15	488	488
	08:15-08:30	409	409
2 - A180 E	07:00-07:15	743	743
	07:15-07:30	887	887
	07:30-07:45	1086	1086
	07:45-08:00	1086	1086
	08:00-08:15	887	887
	08:15-08:30	743	743
3 - A1173 S	07:00-07:15	393	393
	07:15-07:30	469	469
	07:30-07:45	575	575
	07:45-08:00	575	575
	08:00-08:15	469	469
	08:15-08:30	393	393
4 - A180 W	07:00-07:15	427	427
	07:15-07:30	510	510
	07:30-07:45	624	624
	07:45-08:00	624	624
	08:00-08:15	510	510
	08:15-08:30	427	427

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A1173 N	0.22	2.41	0.4	A	498	747
2 - A180 E	0.42	2.54	0.8	A	905	1358
3 - A1173 S	0.41	4.45	0.7	A	479	719
4 - A180 W	0.43	5.51	1.0	A	520	781

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	409	102	207	2887	0.142	408	1173	0.0	0.2	2.119	A
2 - A180 E	743	186	254	2737	0.271	741	361	0.0	0.4	1.915	A
3 - A1173 S	393	98	864	1749	0.225	392	131	0.0	0.3	2.707	A
4 - A180 W	427	107	955	1917	0.223	425	301	0.0	0.4	3.109	A

07:15 - 07:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	488	122	248	2839	0.172	488	1403	0.2	0.3	2.233	A
2 - A180 E	887	222	304	2678	0.331	887	432	0.4	0.5	2.137	A
3 - A1173 S	469	117	1034	1603	0.293	469	157	0.3	0.4	3.241	A
4 - A180 W	510	127	1142	1727	0.295	509	360	0.4	0.5	3.809	A

07:30 - 07:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	598	149	303	2775	0.215	597	1717	0.3	0.4	2.412	A
2 - A180 E	1086	272	372	2596	0.419	1085	528	0.5	0.8	2.533	A
3 - A1173 S	575	144	1266	1403	0.410	574	192	0.4	0.7	4.431	A
4 - A180 W	624	156	1398	1468	0.425	623	441	0.5	0.9	5.484	A

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	598	149	304	2774	0.215	598	1720	0.4	0.4	2.412	A
2 - A180 E	1086	272	373	2595	0.419	1086	529	0.8	0.8	2.536	A
3 - A1173 S	575	144	1267	1402	0.410	575	193	0.7	0.7	4.448	A
4 - A180 W	624	156	1400	1466	0.426	624	442	0.9	1.0	5.515	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	488	122	249	2838	0.172	488	1407	0.4	0.3	2.235	A
2 - A180 E	887	222	305	2677	0.331	888	433	0.8	0.5	2.142	A
3 - A1173 S	469	117	1035	1602	0.293	471	157	0.7	0.4	3.254	A
4 - A180 W	510	127	1145	1725	0.296	511	361	1.0	0.5	3.833	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	409	102	208	2886	0.142	409	1177	0.3	0.2	2.120	A
2 - A180 E	743	186	255	2736	0.271	743	362	0.5	0.4	1.921	A
3 - A1173 S	393	98	867	1747	0.225	394	132	0.4	0.3	2.719	A
4 - A180 W	427	107	958	1914	0.223	428	302	0.5	0.4	3.124	A

2026 Baseline + Committed Development , PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A1173 N - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Sets	D17 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , AM	Demand Set 17: Scenario Name includes Time Period Name ('AM'). Are you sure this is correct?
Warning	Demand Sets	D18 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , PM	Demand Set 18: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Set Relationship	D13 - 2026 Baseline + Committed Development , AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A180/A1773	Large Roundabout		1, 2, 3, 4	3.08	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	3.08	A

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Has entry-to-exit separation	Entry-to-exit separation (m)
1 - A1173 N	205	✓	47.00
2 - A180 E	108	✓	105.00
3 - A1173 S	735	✓	34.00
4 - A180 W	976	✓	113.00

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D14	2026 Baseline + Committed Development	PM	ONE HOUR	17:00	18:30	15	✓	Simple	D12 + D4

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - A1173 N		ONE HOUR	✓	1450	100.000
2 - A180 E		ONE HOUR	✓	544	100.000
3 - A1173 S		ONE HOUR	✓	264	100.000
4 - A180 W		ONE HOUR	✓	447	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	789	186	476
	2 - A180 E	256	0	288	0
	3 - A1173 S	47	169	0	47
	4 - A180 W	344	1	102	0

Proportions

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0.00	0.54	0.13	0.33
	2 - A180 E	0.47	0.00	0.53	0.00
	3 - A1173 S	0.18	0.64	0.00	0.18
	4 - A180 W	0.77	0.00	0.23	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	3	6	30
	2 - A180 E	13	0	2	0
	3 - A1173 S	34	1	0	5
	4 - A180 W	73	0	8	0

Average PCU Per Veh

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	1.000	1.028	1.065	1.298
	2 - A180 E	1.134	1.000	1.023	1.000
	3 - A1173 S	1.340	1.008	1.000	1.048
	4 - A180 W	1.726	1.000	1.080	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (PCU/hr)	Demand in PCU (PCU/hr)
1 - A1173 N	17:00-17:15	1092	1092
	17:15-17:30	1304	1304
	17:30-17:45	1597	1597
	17:45-18:00	1597	1597
	18:00-18:15	1304	1304
	18:15-18:30	1092	1092
2 - A180 E	17:00-17:15	409	409
	17:15-17:30	489	489
	17:30-17:45	599	599
	17:45-18:00	599	599
	18:00-18:15	489	489
	18:15-18:30	409	409
3 - A1173 S	17:00-17:15	198	198
	17:15-17:30	237	237
	17:30-17:45	290	290
	17:45-18:00	290	290
	18:00-18:15	237	237
	18:15-18:30	198	198
4 - A180 W	17:00-17:15	337	337
	17:15-17:30	402	402
	17:30-17:45	492	492
	17:45-18:00	492	492
	18:00-18:15	402	402
	18:15-18:30	337	337

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A1173 N	0.57	3.38	1.5	A	1331	1996
2 - A180 E	0.29	2.69	0.4	A	499	749
3 - A1173 S	0.16	2.53	0.2	A	242	363
4 - A180 W	0.21	2.93	0.4	A	410	616

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1092	273	205	2889	0.378	1089	486	0.0	0.7	2.214	A
2 - A180 E	409	102	574	2354	0.174	409	720	0.0	0.2	1.983	A
3 - A1173 S	198	50	550	2021	0.098	198	432	0.0	0.1	2.097	A
4 - A180 W	337	84	355	2525	0.133	336	393	0.0	0.2	2.491	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1304	326	245	2842	0.459	1303	581	0.7	0.9	2.591	A
2 - A180 E	489	122	687	2220	0.220	489	862	0.2	0.3	2.230	A
3 - A1173 S	237	59	658	1928	0.123	237	517	0.1	0.1	2.260	A
4 - A180 W	402	101	425	2454	0.164	402	470	0.2	0.3	2.658	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1597	399	300	2778	0.575	1595	712	0.9	1.5	3.366	A
2 - A180 E	599	150	840	2035	0.294	598	1055	0.3	0.4	2.685	A
3 - A1173 S	290	73	805	1800	0.161	290	633	0.1	0.2	2.531	A
4 - A180 W	492	123	520	2358	0.209	492	575	0.3	0.4	2.924	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1597	399	301	2778	0.575	1597	712	1.5	1.5	3.377	A
2 - A180 E	599	150	841	2034	0.294	599	1056	0.4	0.4	2.689	A
3 - A1173 S	290	73	806	1799	0.161	290	634	0.2	0.2	2.532	A
4 - A180 W	492	123	521	2357	0.209	492	576	0.4	0.4	2.925	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1304	326	246	2842	0.459	1306	582	1.5	0.9	2.601	A
2 - A180 E	489	122	688	2218	0.220	490	864	0.4	0.3	2.236	A
3 - A1173 S	237	59	659	1926	0.123	237	518	0.2	0.1	2.264	A
4 - A180 W	402	101	425	2453	0.164	402	471	0.4	0.3	2.660	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1092	273	206	2888	0.378	1093	488	0.9	0.7	2.225	A
2 - A180 E	409	102	576	2352	0.174	410	723	0.3	0.2	1.988	A
3 - A1173 S	198	50	552	2019	0.098	199	434	0.1	0.1	2.099	A
4 - A180 W	337	84	356	2524	0.133	337	394	0.3	0.2	2.497	A

2026 Baseline + Committed + IERRT Development , AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A1173 N - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Sets	D17 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , AM	Demand Set 17: Scenario Name includes Time Period Name ('AM'). Are you sure this is correct?
Warning	Demand Sets	D18 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , PM	Demand Set 18: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Set Relationship	D13 - 2026 Baseline + Committed Development , AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A180/A1773	Large Roundabout		1, 2, 3, 4	4.34	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	4.34	A

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Has entry-to-exit separation	Entry-to-exit separation (m)
1 - A1173 N	205	✓	47.00
2 - A180 E	108	✓	105.00
3 - A1173 S	735	✓	34.00
4 - A180 W	976	✓	113.00

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D15	2026 Baseline + Committed + IERRT Development	AM	ONE HOUR	07:00	08:30	15	✓	Simple	D13 + D5

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - A1173 N		ONE HOUR	✓	639	100.000
2 - A180 E		ONE HOUR	✓	990	100.000
3 - A1173 S		ONE HOUR	✓	529	100.000
4 - A180 W		ONE HOUR	✓	721	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	230	45	364
	2 - A180 E	876	0	111	2
	3 - A1173 S	151	254	0	124
	4 - A180 W	699	0	23	0

Proportions

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0.00	0.36	0.07	0.57
	2 - A180 E	0.89	0.00	0.11	0.00
	3 - A1173 S	0.29	0.48	0.00	0.23
	4 - A180 W	0.97	0.00	0.03	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	24	38	74
	2 - A180 E	7	0	4	0
	3 - A1173 S	6	1	0	3
	4 - A180 W	39	0	11	0

Average PCU Per Veh

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	1.000	1.244	1.379	1.735
	2 - A180 E	1.066	1.000	1.042	1.000
	3 - A1173 S	1.056	1.007	1.000	1.029
	4 - A180 W	1.393	1.000	1.109	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (PCU/hr)	Demand in PCU (PCU/hr)
1 - A1173 N	07:00-07:15	481	481
	07:15-07:30	574	574
	07:30-07:45	703	703
	07:45-08:00	703	703
	08:00-08:15	574	574
	08:15-08:30	481	481
2 - A180 E	07:00-07:15	745	745
	07:15-07:30	890	890
	07:30-07:45	1090	1090
	07:45-08:00	1090	1090
	08:00-08:15	890	890
	08:15-08:30	745	745
3 - A1173 S	07:00-07:15	398	398
	07:15-07:30	476	476
	07:30-07:45	583	583
	07:45-08:00	583	583
	08:00-08:15	476	476
	08:15-08:30	398	398
4 - A180 W	07:00-07:15	543	543
	07:15-07:30	648	648
	07:30-07:45	794	794
	07:45-08:00	794	794
	08:00-08:15	648	648
	08:15-08:30	543	543

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A1173 N	0.25	2.60	0.5	A	586	879
2 - A180 E	0.44	2.77	0.8	A	908	1362
3 - A1173 S	0.44	5.05	0.8	A	486	728
4 - A180 W	0.55	7.52	1.6	A	662	992

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	481	120	207	2887	0.167	480	1296	0.0	0.3	2.235	A
2 - A180 E	745	186	324	2654	0.281	743	363	0.0	0.4	2.002	A
3 - A1173 S	398	100	933	1690	0.236	397	134	0.0	0.3	2.855	A
4 - A180 W	543	136	962	1909	0.284	541	368	0.0	0.5	3.628	A

07:15 - 07:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	574	144	248	2839	0.202	574	1550	0.3	0.4	2.376	A
2 - A180 E	890	222	388	2577	0.345	889	434	0.4	0.6	2.267	A
3 - A1173 S	476	119	1116	1532	0.311	475	161	0.3	0.5	3.494	A
4 - A180 W	648	162	1151	1718	0.377	647	440	0.5	0.8	4.641	A

07:30 - 07:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	703	176	303	2775	0.253	703	1896	0.4	0.5	2.598	A
2 - A180 E	1090	272	475	2473	0.441	1089	531	0.6	0.8	2.761	A
3 - A1173 S	583	146	1367	1315	0.443	581	197	0.5	0.8	5.023	A
4 - A180 W	794	198	1409	1457	0.545	791	539	0.8	1.6	7.434	A

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	703	176	304	2774	0.254	703	1901	0.5	0.5	2.599	A
2 - A180 E	1090	272	475	2473	0.441	1090	532	0.8	0.8	2.766	A
3 - A1173 S	583	146	1368	1314	0.443	583	197	0.8	0.8	5.049	A
4 - A180 W	794	198	1411	1455	0.546	794	540	1.6	1.6	7.525	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	574	144	249	2838	0.202	575	1556	0.5	0.4	2.378	A
2 - A180 E	890	222	388	2577	0.345	891	435	0.8	0.6	2.273	A
3 - A1173 S	476	119	1118	1530	0.311	477	161	0.8	0.5	3.514	A
4 - A180 W	648	162	1154	1715	0.378	651	441	1.6	0.8	4.691	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	481	120	208	2886	0.167	481	1301	0.4	0.3	2.239	A
2 - A180 E	745	186	325	2652	0.281	746	364	0.6	0.4	2.009	A
3 - A1173 S	398	100	936	1687	0.236	399	135	0.5	0.3	2.870	A
4 - A180 W	543	136	966	1906	0.285	544	369	0.8	0.6	3.658	A

2026 Baseline + Committed + IERRT Development , PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A1173 N - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Sets	D17 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , AM	Demand Set 17: Scenario Name includes Time Period Name ('AM'). Are you sure this is correct?
Warning	Demand Sets	D18 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , PM	Demand Set 18: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Set Relationship	D13 - 2026 Baseline + Committed Development , AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A180/A1773	Large Roundabout		1, 2, 3, 4	3.63	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	3.63	A

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Has entry-to-exit separation	Entry-to-exit separation (m)
1 - A1173 N	205	✓	47.00
2 - A180 E	108	✓	105.00
3 - A1173 S	735	✓	34.00
4 - A180 W	976	✓	113.00

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D16	2026 Baseline + Committed + IERRT Development	PM	ONE HOUR	17:00	18:30	15	✓	Simple	D14 + D6

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - A1173 N		ONE HOUR	✓	1582	100.000
2 - A180 E		ONE HOUR	✓	547	100.000
3 - A1173 S		ONE HOUR	✓	273	100.000
4 - A180 W		ONE HOUR	✓	654	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	792	191	600
	2 - A180 E	259	0	288	0
	3 - A1173 S	56	169	0	47
	4 - A180 W	551	1	102	0

Proportions

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0.00	0.50	0.12	0.38
	2 - A180 E	0.47	0.00	0.53	0.00
	3 - A1173 S	0.21	0.62	0.00	0.17
	4 - A180 W	0.84	0.00	0.16	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	3	7	38
	2 - A180 E	13	0	2	0
	3 - A1173 S	36	1	0	5
	4 - A180 W	79	0	8	0

Average PCU Per Veh

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	1.000	1.028	1.073	1.383
	2 - A180 E	1.133	1.000	1.023	1.000
	3 - A1173 S	1.363	1.008	1.000	1.048
	4 - A180 W	1.791	1.000	1.080	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (PCU/hr)	Demand in PCU (PCU/hr)
1 - A1173 N	17:00-17:15	1191	1191
	17:15-17:30	1423	1423
	17:30-17:45	1742	1742
	17:45-18:00	1742	1742
	18:00-18:15	1423	1423
	18:15-18:30	1191	1191
2 - A180 E	17:00-17:15	412	412
	17:15-17:30	492	492
	17:30-17:45	602	602
	17:45-18:00	602	602
	18:00-18:15	492	492
	18:15-18:30	412	412
3 - A1173 S	17:00-17:15	205	205
	17:15-17:30	245	245
	17:30-17:45	300	300
	17:45-18:00	300	300
	18:00-18:15	245	245
	18:15-18:30	205	205
4 - A180 W	17:00-17:15	493	493
	17:15-17:30	588	588
	17:30-17:45	720	720
	17:45-18:00	720	720
	18:00-18:15	588	588
	18:15-18:30	493	493

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A1173 N	0.63	3.98	1.9	A	1452	2178
2 - A180 E	0.32	3.06	0.5	A	502	753
3 - A1173 S	0.18	2.80	0.2	A	250	375
4 - A180 W	0.31	3.59	0.7	A	600	901

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1191	298	205	2889	0.412	1188	650	0.0	0.8	2.420	A
2 - A180 E	412	103	671	2239	0.184	411	722	0.0	0.2	2.110	A
3 - A1173 S	205	51	645	1939	0.106	205	436	0.0	0.1	2.226	A
4 - A180 W	493	123	364	2516	0.196	491	486	0.0	0.4	2.883	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1423	356	245	2842	0.500	1421	778	0.8	1.1	2.898	A
2 - A180 E	492	123	802	2081	0.236	491	864	0.2	0.3	2.428	A
3 - A1173 S	245	61	772	1829	0.134	245	522	0.1	0.2	2.436	A
4 - A180 W	588	147	436	2443	0.241	588	581	0.4	0.5	3.146	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1742	436	300	2778	0.627	1739	952	1.1	1.9	3.955	A
2 - A180 E	602	151	982	1866	0.323	601	1058	0.3	0.5	3.051	A
3 - A1173 S	300	75	945	1680	0.179	300	639	0.2	0.2	2.797	A
4 - A180 W	720	180	533	2344	0.307	720	711	0.5	0.7	3.591	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1742	436	301	2778	0.627	1742	954	1.9	1.9	3.979	A
2 - A180 E	602	151	983	1864	0.323	602	1059	0.5	0.5	3.058	A
3 - A1173 S	300	75	946	1679	0.179	300	639	0.2	0.2	2.799	A
4 - A180 W	720	180	534	2344	0.307	720	712	0.7	0.7	3.595	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1423	356	246	2842	0.501	1426	780	1.9	1.2	2.918	A
2 - A180 E	492	123	805	2078	0.237	492	867	0.5	0.3	2.436	A
3 - A1173 S	245	61	774	1827	0.134	245	523	0.2	0.2	2.440	A
4 - A180 W	588	147	436	2442	0.241	589	583	0.7	0.5	3.150	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1191	298	206	2888	0.412	1193	653	1.2	0.8	2.432	A
2 - A180 E	412	103	673	2235	0.184	412	725	0.3	0.2	2.118	A
3 - A1173 S	205	51	648	1936	0.106	205	438	0.2	0.1	2.229	A
4 - A180 W	493	123	365	2514	0.196	493	488	0.5	0.4	2.890	A

2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A1173 N - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Sets	D17 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , AM	Demand Set 17: Scenario Name includes Time Period Name ('AM'). Are you sure this is correct?
Warning	Demand Sets	D18 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , PM	Demand Set 18: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Set Relationship	D13 - 2026 Baseline + Committed Development , AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A180/A1773	Large Roundabout		1, 2, 3, 4	5.03	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	5.03	A

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Has entry-to-exit separation	Entry-to-exit separation (m)
1 - A1173 N	205	✓	47.00
2 - A180 E	108	✓	105.00
3 - A1173 S	735	✓	34.00
4 - A180 W	976	✓	113.00

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type
D17	2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM)	AM	ONE HOUR	07:00	08:30	15	✓	Simple

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - A1173 N		ONE HOUR	✓	664	100.000
2 - A180 E		ONE HOUR	✓	1050	100.000
3 - A1173 S		ONE HOUR	✓	558	100.000
4 - A180 W		ONE HOUR	✓	752	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	242	47	375
	2 - A180 E	936	0	111	2
	3 - A1173 S	180	254	0	124
	4 - A180 W	730	0	23	0

Proportions

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0.00	0.36	0.07	0.56
	2 - A180 E	0.89	0.00	0.11	0.00
	3 - A1173 S	0.32	0.45	0.00	0.22
	4 - A180 W	0.97	0.00	0.03	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	26	36	74
	2 - A180 E	7	0	4	0
	3 - A1173 S	5	1	0	3
	4 - A180 W	39	0	11	0

Average PCU Per Veh

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	1.000	1.261	1.357	1.740
	2 - A180 E	1.072	1.000	1.042	1.000
	3 - A1173 S	1.047	1.007	1.000	1.029
	4 - A180 W	1.394	1.000	1.109	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (PCU/hr)	Demand in PCU (PCU/hr)
1 - A1173 N	07:00-07:15	500	500
	07:15-07:30	597	597
	07:30-07:45	731	731
	07:45-08:00	731	731
	08:00-08:15	597	597
	08:15-08:30	500	500
2 - A180 E	07:00-07:15	790	790
	07:15-07:30	944	944
	07:30-07:45	1156	1156
	07:45-08:00	1156	1156
	08:00-08:15	944	944
	08:15-08:30	790	790
3 - A1173 S	07:00-07:15	420	420
	07:15-07:30	502	502
	07:30-07:45	615	615
	07:45-08:00	615	615
	08:00-08:15	502	502
	08:15-08:30	420	420
4 - A180 W	07:00-07:15	566	566
	07:15-07:30	676	676
	07:30-07:45	828	828
	07:45-08:00	828	828
	08:00-08:15	676	676
	08:15-08:30	566	566

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A1173 N	0.26	2.64	0.5	A	609	914
2 - A180 E	0.47	2.96	0.9	A	963	1445
3 - A1173 S	0.49	5.84	1.0	A	512	768
4 - A180 W	0.61	9.43	2.1	A	690	1035

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	500	125	207	2887	0.173	498	1386	0.0	0.3	2.262	A
2 - A180 E	790	198	334	2642	0.299	788	372	0.0	0.5	2.074	A
3 - A1173 S	420	105	986	1644	0.256	419	136	0.0	0.4	3.009	A
4 - A180 W	566	142	1029	1842	0.307	564	376	0.0	0.6	3.890	A

07:15 - 07:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	597	149	248	2840	0.210	596	1658	0.3	0.4	2.410	A
2 - A180 E	944	236	399	2563	0.368	943	445	0.5	0.6	2.373	A
3 - A1173 S	502	125	1180	1477	0.340	501	162	0.4	0.5	3.780	A
4 - A180 W	676	169	1231	1637	0.413	675	450	0.6	1.0	5.166	A

07:30 - 07:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	731	183	303	2775	0.263	730	2027	0.4	0.5	2.643	A
2 - A180 E	1156	289	489	2456	0.471	1155	544	0.6	0.9	2.953	A
3 - A1173 S	615	154	1445	1248	0.492	613	199	0.5	1.0	5.792	A
4 - A180 W	828	207	1506	1358	0.610	823	551	1.0	2.1	9.237	A

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	731	183	304	2774	0.263	731	2033	0.5	0.5	2.645	A
2 - A180 E	1156	289	489	2456	0.471	1156	545	0.9	0.9	2.959	A
3 - A1173 S	615	154	1446	1247	0.493	615	199	1.0	1.0	5.835	A
4 - A180 W	828	207	1509	1355	0.611	828	552	2.1	2.1	9.434	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	597	149	249	2838	0.210	597	1666	0.5	0.4	2.414	A
2 - A180 E	944	236	400	2563	0.368	945	446	0.9	0.6	2.381	A
3 - A1173 S	502	125	1182	1475	0.340	504	163	1.0	0.5	3.805	A
4 - A180 W	676	169	1234	1633	0.414	681	451	2.1	1.0	5.251	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	500	125	208	2886	0.173	500	1392	0.4	0.3	2.266	A
2 - A180 E	790	198	335	2641	0.299	791	373	0.6	0.5	2.080	A
3 - A1173 S	420	105	990	1641	0.256	421	136	0.5	0.4	3.024	A
4 - A180 W	566	142	1033	1838	0.308	568	378	1.0	0.6	3.924	A

2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A1173 N - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Sets	D17 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , AM	Demand Set 17: Scenario Name includes Time Period Name ('AM'). Are you sure this is correct?
Warning	Demand Sets	D18 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , PM	Demand Set 18: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Set Relationship	D13 - 2026 Baseline + Committed Development , AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A180/A1773	Large Roundabout		1, 2, 3, 4	3.78	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	3.78	A

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Has entry-to-exit separation	Entry-to-exit separation (m)
1 - A1173 N	205	✓	47.00
2 - A180 E	108	✓	105.00
3 - A1173 S	735	✓	34.00
4 - A180 W	976	✓	113.00

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type
D18	2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM)	PM	ONE HOUR	17:00	18:30	15	✓	Simple

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - A1173 N		ONE HOUR	✓	1622	100.000
2 - A180 E		ONE HOUR	✓	560	100.000
3 - A1173 S		ONE HOUR	✓	275	100.000
4 - A180 W		ONE HOUR	✓	667	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	811	197	615
	2 - A180 E	272	0	288	0
	3 - A1173 S	58	169	0	47
	4 - A180 W	564	1	102	0

Proportions

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0.00	0.50	0.12	0.38
	2 - A180 E	0.49	0.00	0.51	0.00
	3 - A1173 S	0.21	0.62	0.00	0.17
	4 - A180 W	0.84	0.00	0.15	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	4	7	39
	2 - A180 E	15	0	2	0
	3 - A1173 S	35	1	0	5
	4 - A180 W	79	0	8	0

Average PCU Per Veh

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	1.000	1.036	1.070	1.390
	2 - A180 E	1.151	1.000	1.023	1.000
	3 - A1173 S	1.347	1.008	1.000	1.048
	4 - A180 W	1.793	1.000	1.080	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (PCU/hr)	Demand in PCU (PCU/hr)
1 - A1173 N	17:00-17:15	1221	1221
	17:15-17:30	1458	1458
	17:30-17:45	1786	1786
	17:45-18:00	1786	1786
	18:00-18:15	1458	1458
	18:15-18:30	1221	1221
2 - A180 E	17:00-17:15	422	422
	17:15-17:30	503	503
	17:30-17:45	616	616
	17:45-18:00	616	616
	18:00-18:15	503	503
	18:15-18:30	422	422
3 - A1173 S	17:00-17:15	207	207
	17:15-17:30	247	247
	17:30-17:45	302	302
	17:45-18:00	302	302
	18:00-18:15	247	247
	18:15-18:30	207	207
4 - A180 W	17:00-17:15	502	502
	17:15-17:30	600	600
	17:30-17:45	735	735
	17:45-18:00	735	735
	18:00-18:15	600	600
	18:15-18:30	502	502

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A1173 N	0.64	4.18	2.1	A	1489	2233
2 - A180 E	0.34	3.19	0.5	A	514	771
3 - A1173 S	0.18	2.86	0.2	A	252	378
4 - A180 W	0.32	3.68	0.7	A	612	918

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1221	305	205	2889	0.423	1218	671	0.0	0.8	2.475	A
2 - A180 E	422	105	686	2220	0.190	421	737	0.0	0.3	2.162	A
3 - A1173 S	207	52	666	1920	0.108	206	441	0.0	0.1	2.251	A
4 - A180 W	502	126	375	2504	0.201	501	497	0.0	0.4	2.918	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1458	365	245	2842	0.513	1457	803	0.8	1.2	2.989	A
2 - A180 E	503	126	821	2058	0.245	503	881	0.3	0.3	2.502	A
3 - A1173 S	247	62	797	1807	0.137	247	527	0.1	0.2	2.471	A
4 - A180 W	600	150	449	2430	0.247	599	595	0.4	0.5	3.198	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1786	447	300	2778	0.643	1783	983	1.2	2.0	4.149	A
2 - A180 E	616	154	1005	1838	0.335	616	1078	0.3	0.5	3.182	A
3 - A1173 S	302	76	975	1653	0.183	302	645	0.2	0.2	2.855	A
4 - A180 W	735	184	550	2328	0.316	734	728	0.5	0.7	3.671	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1786	447	301	2778	0.643	1786	984	2.0	2.1	4.179	A
2 - A180 E	616	154	1007	1836	0.336	616	1080	0.5	0.5	3.190	A
3 - A1173 S	302	76	977	1652	0.183	302	646	0.2	0.2	2.858	A
4 - A180 W	735	184	550	2327	0.316	735	729	0.7	0.7	3.675	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1458	365	246	2842	0.513	1462	805	2.1	1.2	3.010	A
2 - A180 E	503	126	824	2055	0.245	504	884	0.5	0.4	2.510	A
3 - A1173 S	247	62	799	1805	0.137	247	528	0.2	0.2	2.475	A
4 - A180 W	600	150	450	2429	0.247	601	597	0.7	0.5	3.205	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1221	305	206	2888	0.423	1223	674	1.2	0.8	2.490	A
2 - A180 E	422	105	689	2216	0.190	422	739	0.4	0.3	2.171	A
3 - A1173 S	207	52	669	1918	0.108	207	442	0.2	0.1	2.256	A
4 - A180 W	502	126	377	2503	0.201	503	499	0.5	0.4	2.926	A

2026 Baseline + Committed + IGET (Sensitivity) , AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A1173 N - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Sets	D17 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , AM	Demand Set 17: Scenario Name includes Time Period Name ('AM'). Are you sure this is correct?
Warning	Demand Sets	D18 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , PM	Demand Set 18: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Set Relationship	D13 - 2026 Baseline + Committed Development , AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A180/A1773	Large Roundabout		1, 2, 3, 4	5.05	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	5.05	A

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Has entry-to-exit separation	Entry-to-exit separation (m)
1 - A1173 N	205	✓	47.00
2 - A180 E	108	✓	105.00
3 - A1173 S	735	✓	34.00
4 - A180 W	976	✓	113.00

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D19	2026 Baseline + Committed + IGET (Sensitivity)	AM	ONE HOUR	07:00	08:30	15	✓	Simple	D15 + D9

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - A1173 N		ONE HOUR	✓	646	100.000
2 - A180 E		ONE HOUR	✓	1057	100.000
3 - A1173 S		ONE HOUR	✓	569	100.000
4 - A180 W		ONE HOUR	✓	745	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	234	47	365
	2 - A180 E	943	0	111	2
	3 - A1173 S	191	254	0	124
	4 - A180 W	723	0	23	0

Proportions

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0.00	0.36	0.07	0.57
	2 - A180 E	0.89	0.00	0.11	0.00
	3 - A1173 S	0.34	0.45	0.00	0.22
	4 - A180 W	0.97	0.00	0.03	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	24	36	73
	2 - A180 E	6	0	4	0
	3 - A1173 S	4	1	0	3
	4 - A180 W	38	0	11	0

Average PCU Per Veh

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	1.000	1.239	1.357	1.732
	2 - A180 E	1.061	1.000	1.042	1.000
	3 - A1173 S	1.044	1.007	1.000	1.029
	4 - A180 W	1.375	1.000	1.109	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (PCU/hr)	Demand in PCU (PCU/hr)
1 - A1173 N	07:00-07:15	486	486
	07:15-07:30	581	581
	07:30-07:45	711	711
	07:45-08:00	711	711
	08:00-08:15	581	581
	08:15-08:30	486	486
2 - A180 E	07:00-07:15	796	796
	07:15-07:30	950	950
	07:30-07:45	1164	1164
	07:45-08:00	1164	1164
	08:00-08:15	950	950
	08:15-08:30	796	796
3 - A1173 S	07:00-07:15	428	428
	07:15-07:30	512	512
	07:30-07:45	627	627
	07:45-08:00	627	627
	08:00-08:15	512	512
	08:15-08:30	428	428
4 - A180 W	07:00-07:15	561	561
	07:15-07:30	670	670
	07:30-07:45	820	820
	07:45-08:00	820	820
	08:00-08:15	670	670
	08:15-08:30	561	561

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A1173 N	0.26	2.59	0.5	A	593	889
2 - A180 E	0.47	2.92	0.9	A	970	1455
3 - A1173 S	0.50	5.92	1.0	A	522	783
4 - A180 W	0.61	9.53	2.1	A	684	1026

Main Results for each time segment

07:00 - 07:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	486	122	207	2887	0.168	485	1394	0.0	0.3	2.228	A
2 - A180 E	796	199	326	2651	0.300	794	366	0.0	0.5	2.051	A
3 - A1173 S	428	107	984	1646	0.260	427	136	0.0	0.4	3.023	A
4 - A180 W	561	140	1042	1828	0.307	559	369	0.0	0.6	3.865	A

07:15 - 07:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	581	145	248	2840	0.204	580	1667	0.3	0.4	2.370	A
2 - A180 E	950	238	390	2574	0.369	949	438	0.5	0.6	2.344	A
3 - A1173 S	512	128	1177	1479	0.346	511	162	0.4	0.5	3.808	A
4 - A180 W	670	167	1247	1621	0.413	668	441	0.6	1.0	5.153	A

07:30 - 07:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	711	178	303	2775	0.256	711	2039	0.4	0.5	2.593	A
2 - A180 E	1164	291	478	2469	0.471	1162	536	0.6	0.9	2.914	A
3 - A1173 S	627	157	1441	1251	0.501	625	199	0.5	1.0	5.873	A
4 - A180 W	820	205	1526	1338	0.613	816	540	1.0	2.1	9.329	A

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	711	178	304	2774	0.256	711	2045	0.5	0.5	2.595	A
2 - A180 E	1164	291	478	2469	0.471	1163	537	0.9	0.9	2.919	A
3 - A1173 S	627	157	1443	1249	0.502	627	199	1.0	1.0	5.919	A
4 - A180 W	820	205	1528	1335	0.614	820	541	2.1	2.1	9.533	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	581	145	249	2838	0.205	581	1676	0.5	0.4	2.373	A
2 - A180 E	950	238	391	2573	0.369	951	439	0.9	0.6	2.353	A
3 - A1173 S	512	128	1179	1477	0.346	514	163	1.0	0.5	3.836	A
4 - A180 W	670	167	1251	1617	0.414	674	442	2.1	1.0	5.241	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	486	122	208	2886	0.168	487	1400	0.4	0.3	2.233	A
2 - A180 E	796	199	327	2650	0.300	796	367	0.6	0.5	2.058	A
3 - A1173 S	428	107	987	1643	0.261	429	136	0.5	0.4	3.041	A
4 - A180 W	561	140	1046	1824	0.308	562	370	1.0	0.6	3.899	A

2026 Baseline + Committed + IGET (Sensitivity), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	1 - A1173 N - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Demand Sets	D17 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , AM	Demand Set 17: Scenario Name includes Time Period Name ('AM'). Are you sure this is correct?
Warning	Demand Sets	D18 - 2026 Baseline + Committed + IERRT Development + IGET (Actual 7-8 AM, 4-5PM) , PM	Demand Set 18: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Set Relationship	D13 - 2026 Baseline + Committed Development , AM	Demand Set relationships are chained. This may slow down the file.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A180/A1773	Large Roundabout		1, 2, 3, 4	4.14	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	4.14	A

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Has entry-to-exit separation	Entry-to-exit separation (m)
1 - A1173 N	205	✓	47.00
2 - A180 E	108	✓	105.00
3 - A1173 S	735	✓	34.00
4 - A180 W	976	✓	113.00

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically	Relationship type	Relationship
D20	2026 Baseline + Committed + IGET (Sensitivity)	PM	ONE HOUR	17:00	18:30	15	✓	Simple	D16 + D10

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - A1173 N		ONE HOUR	✓	1741	100.000
2 - A180 E		ONE HOUR	✓	553	100.000
3 - A1173 S		ONE HOUR	✓	277	100.000
4 - A180 W		ONE HOUR	✓	656	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	872	232	638
	2 - A180 E	265	0	288	0
	3 - A1173 S	60	169	0	47
	4 - A180 W	553	1	102	0

Proportions

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0.00	0.50	0.13	0.37
	2 - A180 E	0.48	0.00	0.52	0.00
	3 - A1173 S	0.22	0.61	0.00	0.17
	4 - A180 W	0.84	0.00	0.16	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	0	4	6	38
	2 - A180 E	13	0	2	0
	3 - A1173 S	33	1	0	5
	4 - A180 W	79	0	8	0

Average PCU Per Veh

		To			
		1 - A1173 N	2 - A180 E	3 - A1173 S	4 - A180 W
From	1 - A1173 N	1.000	1.037	1.059	1.378
	2 - A180 E	1.129	1.000	1.023	1.000
	3 - A1173 S	1.331	1.008	1.000	1.048
	4 - A180 W	1.786	1.000	1.080	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (PCU/hr)	Demand in PCU (PCU/hr)
1 - A1173 N	17:00-17:15	1311	1311
	17:15-17:30	1565	1565
	17:30-17:45	1917	1917
	17:45-18:00	1917	1917
	18:00-18:15	1565	1565
	18:15-18:30	1311	1311
2 - A180 E	17:00-17:15	416	416
	17:15-17:30	497	497
	17:30-17:45	609	609
	17:45-18:00	609	609
	18:00-18:15	497	497
	18:15-18:30	416	416
3 - A1173 S	17:00-17:15	208	208
	17:15-17:30	249	249
	17:30-17:45	305	305
	17:45-18:00	305	305
	18:00-18:15	249	249
	18:15-18:30	208	208
4 - A180 W	17:00-17:15	494	494
	17:15-17:30	590	590
	17:30-17:45	723	723
	17:45-18:00	723	723
	18:00-18:15	590	590
	18:15-18:30	494	494

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A1173 N	0.69	4.78	2.5	A	1598	2397
2 - A180 E	0.35	3.35	0.6	A	507	761
3 - A1173 S	0.19	2.89	0.2	A	254	381
4 - A180 W	0.31	3.62	0.7	A	602	903

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1311	328	205	2889	0.454	1307	659	0.0	0.9	2.596	A
2 - A180 E	416	104	730	2168	0.192	415	782	0.0	0.3	2.199	A
3 - A1173 S	208	52	678	1910	0.109	208	467	0.0	0.1	2.265	A
4 - A180 W	494	124	372	2508	0.197	492	514	0.0	0.4	2.891	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1565	391	245	2842	0.551	1564	789	0.9	1.4	3.216	A
2 - A180 E	497	124	873	1996	0.249	497	936	0.3	0.4	2.572	A
3 - A1173 S	249	62	811	1795	0.139	248	558	0.1	0.2	2.493	A
4 - A180 W	590	147	444	2434	0.242	589	615	0.4	0.5	3.158	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1917	479	300	2778	0.690	1913	966	1.4	2.5	4.732	A
2 - A180 E	609	152	1068	1763	0.345	608	1145	0.4	0.6	3.339	A
3 - A1173 S	305	76	993	1638	0.186	304	683	0.2	0.2	2.890	A
4 - A180 W	723	181	544	2333	0.310	722	753	0.5	0.7	3.614	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1917	479	301	2778	0.690	1917	967	2.5	2.5	4.782	A
2 - A180 E	609	152	1070	1760	0.346	609	1147	0.6	0.6	3.349	A
3 - A1173 S	305	76	995	1637	0.186	305	685	0.2	0.2	2.894	A
4 - A180 W	723	181	545	2333	0.310	723	754	0.7	0.7	3.618	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1565	391	246	2842	0.551	1570	791	2.5	1.4	3.247	A
2 - A180 E	497	124	876	1992	0.250	498	939	0.6	0.4	2.581	A
3 - A1173 S	249	62	814	1793	0.139	249	560	0.2	0.2	2.499	A
4 - A180 W	590	147	445	2433	0.242	591	618	0.7	0.5	3.165	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A1173 N	1311	328	206	2888	0.454	1313	662	1.4	1.0	2.617	A
2 - A180 E	416	104	733	2164	0.192	417	786	0.4	0.3	2.209	A
3 - A1173 S	208	52	681	1908	0.109	208	469	0.2	0.1	2.270	A
4 - A180 W	494	124	373	2507	0.197	495	516	0.5	0.4	2.895	A