

IMMINGHAM EASTERN RO-RO TERMINAL



Environmental Statement Addendum

Document 10.3.8

APFP Regulations 2009 – Regulation 5(2)(a)

PINS Reference – TR030007

November 2023

Document Information

Document Information	
Project	Immingham Eastern Ro-Ro Terminal
Document title	Environmental Statement Addendum
Commissioned by	Associated British Ports
Document ref	10.3.8
APFP Regs	5(2)(a)
Prepared by	ABP Project Team

Date	Version	Revision Details
11/2023	01 Changes Application	Changes Application

Executive Summary

An application seeking a development consent order (DCO) for the Immingham Eastern Ro-Ro Terminal (IERRT) was submitted by Associated British Ports (ABP) to the Secretary of State for Transport via the Planning Inspectorate on 10 February 2023 and accepted for Examination on 6 March 2023.

ABP is proposing four changes to the proposed development during the Examination stage. These proposed changes are:

- **Proposed Change 1:** Realignment of the Approach Jetty and Related Works to the Marine Infrastructure;
- **Proposed Change 2:** A Realignment and Shortening of the Length of the Internal Link Bridge and Consequential Works;
- **Proposed Change 3:** The Rearrangement of the UK Border Force Facilities; and
- **Proposed Change 4:** The Possible Provision of an Additional Impact Protection Measure – in Conjunction with Enhanced Operational Marine Management Controls for Vessels Arriving at Berth 1 of the IERRT.

This Environmental Statement Addendum presents an assessment of any new or different significant effects that are likely to result from the Proposed Changes to the project and to support the Examining Authority (ExA) in developing an informed view of the likely significant environmental effects of the proposed scheme.

Environmental assessment conclusions

The environmental effects identified in the Environmental Statement (ES) submitted with the DCO application have been reviewed in light of the Proposed Changes. The following aspects of the environment and impact pathways were identified as having the potential to be affected:

- Physical processes – local changes to hydrodynamic regime, wave regime and sediment transport pathways, and potential impacts on existing features;
- Marine ecology – direct and indirect losses of intertidal and subtidal habitat, and changes to coastal waterbird habitat;
- Commercial and recreational navigation – allision of vessels with marine infrastructure;
- Air quality – onsite emission sources during the operational phase;
- Airborne noise and vibration - noise and vibration impacts during construction and operation, including on an additional noise sensitive receptor (the relocated Malcolm West building);
- Socio-economic – effects on existing businesses during the construction and operational phases; and
- Climate change – greenhouse gas emissions during construction.

For these aspects of the environment the assessment of effects has been reassessed to take into consideration the Proposed Changes.

The assessments have concluded there are no new or different environmental effects compared with that presented in the original ES (i.e., the level of significance for each impact pathway remains the same). Furthermore, given the Proposed Changes do not give rise to any new or materially different environmental effects, no additional mitigation (other than that which is related to vibration effects in respect of the PAM building) is considered necessary.

Contents

1	Introduction.....	1
1.1	Background.....	1
1.2	Scope and purpose of Environmental Statement Addendum	2
1.3	Structure of Environmental Statement Addendum.....	3
2	Changes to Proposed Development (Chapter 2).....	5
2.1	Introduction.....	5
2.2	Proposed Change 1: The Realignment of the Approach Jetty and Related Works to the Marine Infrastructure	8
2.3	Proposed Change 2: A Realignment and Shortening of the Length of the Internal Link Bridge and Consequential Works	11
2.4	Proposed Change 3: The Rearrangement of the UK Border Force Facilities.....	13
2.5	Proposed Change 4: The Possible Provision of an Additional Impact Protection Measure – in Conjunction with Enhanced Operational Marine Management Controls for Vessels Arriving at Berth 1 of the IERRT.....	15
2.6	Updates required to figures.....	16
2.7	Updates required to appendices.....	16
3	Changes to Details of Project Construction and Operation (Chapter 3)	17
3.1	Introduction.....	17
3.2	Construction.....	17
3.3	Operation	19
3.4	Updates required to figures.....	23
3.5	Updates required to appendices.....	23
4	Need and Alternatives (Chapter 4).....	25
4.1	Introduction.....	25
4.2	Consultation.....	25
4.3	Updates required to ES Chapter 4	26
4.4	Updates required to figures.....	26
4.5	Updates required to appendices	26
5	Legislation, Policy and Consenting Framework (Chapter 5).....	27
5.1	Introduction	27
5.2	Consultation.....	27
5.3	Updates to ES Chapter 5	27
5.4	Updates required to figures.....	27
5.5	Updates required to appendices	27
6	Impact Assessment Approach (Chapter 6).....	28
6.1	Introduction.....	28
6.2	Consultation.....	28
6.3	Updates required to ES Chapter 6	28
6.4	Updates required to figures.....	28
6.5	Updates required to appendices.....	28

7	Physical Processes (Chapter 7)	29
	7.1 Introduction	29
	7.2 Consultation	29
	7.3 Updates required to impact assessment	34
	7.4 Updates required to figures	37
	7.5 Updates required to appendices	38
	7.6 Impact assessment summary	38
8	Water and Sediment Quality (Chapter 8)	48
	8.1 Introduction	48
	8.2 Consultation	48
	8.3 Updates required to impact assessment	49
	8.4 Updates required to figures	49
	8.5 Updates required to appendices	49
	8.6 Impact assessment summary	50
9	Nature Conservation and Marine Ecology (Chapter 9)	53
	9.1 Introduction	53
	9.2 Consultation	53
	9.3 Updates required to impact assessment	56
	9.4 Updates required to figures	60
	9.5 Updates required to appendices	60
	9.6 Impact assessment summary	60
	9.7 Updates required to Habitats Regulations Assessment Report	60
10	Commercial and Recreational Navigation (Chapter 10)	68
	10.1 Introduction	68
	10.2 Consultation	68
	10.3 Updates required to impact assessment	78
	10.4 Updates required to figures	78
	10.5 Updates required to appendices	79
11	Coastal Protection, Flood Risk and Drainage (Chapter 11)	80
	11.1 Introduction	80
	11.2 Consultation	80
	11.3 Updates required to impact assessment	82
	11.4 Updates required to figures	82
	11.5 Updates required to appendices	82
	11.6 Impact assessment summary	82
12	Ground Conditions, Including Land Quality (Chapter 12)	89
	12.1 Introduction	89
	12.2 Consultation	89
	12.3 Updates required to impact assessment	90
	12.4 Updates required to figures	90
	12.5 Updates required to appendices	90
	12.6 Impact assessment summary	90
13	Air Quality (Chapter 13)	99
	13.1 Introduction	99
	13.2 Consultation	99
	13.3 Updates required to impact assessment	99
	13.4 Updates required to figures	106

	13.5	Updates required to appendices	106
	13.6	Impact assessment summary	106
14		Noise and Vibration (Chapter 14)	112
	14.1	Introduction	112
	14.2	Consultation	112
	14.3	Updates required to impact assessment	112
	14.4	Updates required to figures	125
	14.5	Updates required to appendices	125
	14.6	Impact assessment summary	125
15		Cultural Heritage and Marine Archaeology (Chapter 15)	133
	15.1	Introduction	133
	15.2	Consultation	133
	15.3	Updates required to impact assessment	134
	15.4	Updates required to figures	134
	15.5	Updates required to appendices	134
	15.6	Impact assessment summary	134
16		Socio-economic (Chapter 16)	137
	16.1	Introduction	137
	16.2	Consultation	137
	16.3	Updates required to impact assessment	139
	16.4	Updates required to figures	140
	16.5	Updates required to appendices	140
	16.6	Impact assessment summary	140
17		Traffic and Transport (Chapter 17)	143
	17.1	Introduction	143
	17.2	Consultation	143
	17.3	Updates required to impact assessment	145
	17.4	Updates required to figures	145
	17.5	Updates required to appendices	145
	17.6	Impact assessment summary	145
18		Land Use Planning (Chapter 18)	148
	18.1	Introduction	148
	18.2	Consultation	148
	18.3	Updates required to impact assessment	149
	18.4	Updates required to figures	149
	18.5	Updates required to appendices	149
	18.6	Impact assessment summary	149
19		Climate Change (Chapter 19)	151
	19.1	Introduction	151
	19.2	Consultation	151
	19.3	Updates required to impact assessment	151
	19.4	Updates required to figures	153
	19.5	Updates required to appendices	153
	19.6	Impact assessment summary	153
20		Cumulative and In-combination Effects (Chapter 20)	156
	20.1	Introduction	156
	20.2	Consultation	156

20.3	Updates required to impact assessment.....	156
20.4	Updates required to figures.....	156
20.5	Updates required to appendices.....	156
21	Summary.....	157
	References.....	158
	Abbreviations/Acronyms.....	159
	Annex A: Concept Lighting Design Stage Summary Report.....	161
	Annex B: Building Schedule.....	185
	Annex C: Navigational Risk Assessment Addendum.....	188
	Annex D: Construction Noise Levels and Assumptions.....	225

Figures

Figure 2.1.	General Arrangement Plan as submitted for the DCO application.....	6
Figure 2.2.	General Arrangement Plan showing Proposed Changes.....	7
Figure 2.3.	Proposed Change relating to marine infrastructure (Proposed Change 1 and Proposed Change 4).....	10
Figure 2.4.	Proposed Change 2: Realignment and shortening of the IERRT internal bridge.....	12
Figure 2.5.	Proposed Change 3: Rearrangement of the UK Border Force facilities.....	14
Figure 3.1.	Demolition works associated with the Immingham Eastern Ro-Ro Terminal.....	24
Figure 7.1.	Peak flood baseline flow speed and predicted change.....	41
Figure 7.2.	Peak ebb baseline flow speed and predicted change.....	42
Figure 7.3.	Modelled bed level change over a mean spring-neap cycle.....	43
Figure 7.4.	Predicted change to BSS on flood and ebb tides.....	44
Figure 7.5.	Baseline wave height and effect of scheme for 0.5 yr wave event from northeast and east directions.....	45
Figure 7.6.	Baseline wave height and effect of scheme for 0.5 yr wave event from southeast and 50-yr wave event from northeast directions.....	46
Figure 7.7.	Baseline wave height and effect of scheme for 50 yr wave event from east and southeast directions.....	47
Figure 13.1.	Air quality study area.....	110
Figure 13.2.	Air quality operational phase assessment.....	111
Figure 14.1.	Sound monitoring locations.....	132

Tables

Table 3.1.	Estimate of waste associated with the materials used or handled during construction	18
Table 3.2.	Proposed towage requirements for IERRT	20
Table 4.1.	Summary of consultation relevant to need and alternatives.....	25
Table 7.1.	Summary of consultation relevant to physical processes.....	30
Table 7.2.	Physical processes impact assessment summary	39
Table 8.1.	Summary of consultation relevant to water and sediment quality	49
Table 8.2.	Water and sediment quality impact assessment summary	51
Table 9.1.	Summary of consultation relevant to marine ecology	54
Table 9.2.	Nature conservation and marine ecology impact assessment summary	62
Table 10.1.	Summary of consultation relevant to commercial and recreational navigation	69
Table 11.1.	Summary of consultation relevant to coastal protection, flood risk and drainage assessment.....	81
Table 11.2.	Coastal protection, flood risk and drainage impact assessment summary	83
Table 12.1.	Ground conditions, including land quality impact assessment summary	91
Table 13.1.	Updated Background Pollutant Data.....	101
Table 13.2.	Updated annual mean NO _x statistics from onsite sources (nature conservation receptors)	102
Table 13.3.	Updated annual mean NH ₃ statistics from onsite sources (nature conservation receptors)	103
Table 13.4.	Updated nitrogen deposition rate statistics from onsite sources (nature conservation receptors)	104
Table 13.5.	Air quality impact assessment summary	107
Table 14.1.	Predicted construction noise levels - residential NSRs	114
Table 14.2.	Predicted construction noise levels – on-site non-residential NSRs .	115
Table 14.3.	Magnitude of impact – construction vibration building damage.....	120
Table 14.4.	Resultant PPV for percussive and vibratory piling	121
Table 14.5.	Operational noise – on-site activities	123
Table 14.6.	Noise and vibration impact assessment summary.....	126
Table 15.1.	Cultural heritage and marine archaeology impact assessment summary	135
Table 16.1.	Summary of consultation relevant to socio-economic assessment...	138
Table 16.2.	Socio-economic impact assessment summary	141
Table 17.1.	Summary of consultation relevant to the traffic and transport assessment.....	144
Table 17.2.	Traffic and transport impact assessment summary	146
Table 18.1.	Summary of consultation relevant to the land use planning assessment.....	148
Table 18.2.	Land use planning impact assessment summary	150
Table 19.1.	Climate change impact assessment summary.....	154
Table B.1.	Proposed new construction buildings for the Immingham Eastern Ro-Ro Terminal (IERRT)	185
Table D.1.	Indicative construction plant and associated sound power levels	226

1 Introduction

1.1 Background

- 1.1.1 This Change Application relates to an application submitted by Associated British Ports (ABP) (the Applicant) to the Secretary of State for Transport (through the Planning Inspectorate) for a development consent order (DCO) under the Planning Act 2008. ABP, the owner and operator of the Port of Immingham, is proposing to construct a new Ro-Ro facility within the Port which will be known as the Immingham Eastern Ro-Ro Terminal (IERRT). This facility is designed to service the embarkation and disembarkation of principally commercial cargo carried either by accompanied trailer or on unaccompanied trailers which will be collected at the port of disembarkation. In addition to this wheeled cargo, the new facility will be designed to accommodate an element of passenger use, albeit only during those periods when the demands of the Ro-Ro cargo operation allow.
- 1.1.2 A DCO application for the proposed scheme was accepted for examination by the Planning Inspectorate (on behalf of the Secretary of State for Transport) on the 6 March 2023. The proposed scheme is currently in examination which started on the 25 July 2023 and is due to close on the 25 January 2024.
- 1.1.3 Since the DCO application was made, the Applicant has continued to engage and refine designs to identify opportunities to further improve the proposals. As a result of this, the Applicant is proposing four changes to the proposed development (the Proposed Changes) during the Examination stage in order to address suggestions by interested parties and to implement improvements to the proposed development.
- 1.1.4 The Change Application comprises the Applicant's request to the Examining Authority (appointed by the Planning Inspectorate on behalf of the Secretary of State for Transport) to accept into the Examination of the DCO Application four changes to the Proposed Development for which development consent is sought.
- 1.1.5 On the 19 October 2023, in accordance with paragraph 3.2 of 'Advice Note 16: Requests to change applications after they have been submitted for examination' (AN16), the Applicant submitted its Change Notification to the Examining Authority (ExA) [AS-026 – AS-032] (Change Notification). The Change Notification set out the Applicant's intention to make a change request, detailed its consultation proposals and confirmed the likely date for the Change Application to be submitted as the week commencing 27 November 2023. The Change Notification also provided the details and background to the Applicant's request for the Proposed Changes as required by Figure 2a of AN16.

1.1.6 The Applicant is now submitting its formal Change Application to the ExA ('the Change Application'). The Change Application sets out the confirmed description of the Proposed Changes, and a confirmed statement setting out the rationale and need for making these changes. The Change Application provides the information required by Figure 2b of the AN16, and elaborates further on the information that was provided in the original Change Notification. The Proposed Changes in summary are:

- **Proposed Change 1:** The Realignment of the Approach Jetty and Related Works to the Marine Infrastructure;
- **Proposed Change 2:** A Realignment and Shortening of the Length of the Internal Link Bridge and Consequential Works;
- **Proposed Change 3:** The Rearrangement of the UK Border Force Facilities; and
- **Proposed Change 4:** The Possible Provision of an Additional Impact Protection Measure – in Conjunction with Enhanced Operational Marine Management Controls for Vessels Arriving at Berth 1 of the IERRT.

1.2 Scope and purpose of Environmental Statement Addendum

1.2.1 The purpose of this Environmental Statement Addendum (ESA) is to present an assessment of any new or different significant effects that are likely to result from the Proposed Changes and to support the Examining Authority in developing an informed view of the likely significant environmental effects of the IERRT project.

1.2.2 This ESA covers changes to the Environmental Statement (ES) submitted for the DCO application, including changes made to any figures and appendices to the ES, and as such is intended to be read alongside the original ES [APP-035 to APP-109] as well as subsequent submissions into the Examination process (which can be found in the Examination Library). It also covers changes to the Habitats Regulations Assessment (HRA) Report [REP5-020]. If no change is listed in this ESA, then the conclusions are the same as those presented in the ES and HRA or the environmental information submitted into the Examination. However, updated versions of the Non-Technical Summary [APP-035] and Chapter 2 and Chapter 3 of the ES [APP-038 to APP-039] are also provided alongside the Change Application to make it clear what the proposed development consists of with the Proposed Changes included.

1.2.3 It should be noted that some of the figures in Volume 2 of the ES [APP-058] and Volume 3 of the ES [APP-075] show the IERRT layout as submitted in the DCO application. Where there are no changes to information presented in a figure (aside from the layout of the development) they have not been

updated. However, where the information presented in the figure has changed (e.g., assessment results) as a result of the Proposed Changes, the figure has been updated and is presented in this ESA. The following figures have been updated as part of this ESA:

- Environmental Statement - Volume 2 - Chapter 1 - Introduction (Figure 1.2 and Figure 1.3) [APP-059];
- Environmental Statement - Volume 2 - Chapter 3 - Details of Project Construction and Operation (Figure 3.1) [APP-061];
- Environmental Statement - Volume 2 - Chapter 7 - Physical Processes (figures 7.8, 7.9, 7.19, 7.20, 7.22, 7.23 and 7.24 only) [APP-063];
- Environmental Statement - Volume 2 - Chapter 13 - Air Quality (figures 13.1(b) and 13.3(a) only) [APP-069]; and
- Environmental Statement - Volume 2 - Chapter 14 - Airborne Noise and Vibration (Figure 14.1) [APP-070].

1.2.4 The following appendices have been updated as part of this ESA:

- Environmental Statement - Volume 3 - Appendix 2.2 - Concept Lighting Design Stage Summary Report [APP-077];
- Environmental Statement - Volume 3 - Appendix 2.3 - Building Schedule [AP-078]; and
- Environmental Statement - Volume 3 - Appendix 14.2 - Construction Noise Levels and Assumptions [APP-103].

1.2.5 Plans submitted with the DCO application have been updated for the DCO Change Application where relevant to the Proposed Changes. The following plans are submitted as part of the Change Application. If the Proposed Changes are accepted by the ExA, then these documents will supersede the versions of those plans already in the Examination Library:

- Works Plans [APP-007];
- General Arrangement Plans [APP-009];
- Engineering Sections Drawings and Plans [AS-007]; and
- Lighting Plan [APP-012].

1.3 Structure of Environmental Statement Addendum

1.3.1 This ESA follows the same structure as the ES submitted with the DCO application, albeit with more detail included in the sections on the topics that have changed as a result of the Proposed Changes.

1.3.2 Where relevant, this ESA cross refers to the submitted ES or other DCO application materials to explain how the Proposed Changes have changed the original submitted documents. In these instances, if the Proposed Changes are accepted, the information contained in the ESA which will be

submitted with the Changes Application will supersede the information presented in the original submitted documents.

1.3.3 The structure of this ESA is as follows:

- **Chapter 1 Introduction:** A brief introduction about the IERRT project and the Proposed Changes to the DCO application;
- **Chapter 2 Changes to Proposed Development:** A description of the Proposed Changes to the proposed IERRT development;
- **Chapter 3 Changes to Details of Project Construction and Operation:** A description of the Proposed Changes to the works involved during construction and operation of the IERRT;
- **Chapter 4 Need and Alternatives:** An explanation as to any implications of the Proposed Changes to the identified need for the IERRT project together with the consideration of possible alternative solutions;
- **Chapter 5 Legislation, Policy and Consenting Framework:** A consideration of the implications the Proposed Changes have on information requirements associated with key legislation and policy of relevance to the proposed IERRT development;
- **Chapter 6 Impact Assessment Approach:** A description of any changes to the scope of the assessments and the overarching impact assessment methodology;
- **Chapters 7 to 19 Environmental Topic Assessments:** A consideration of any changes to the likely impacts and effects of the proposed development in light of the Proposed Changes;
- **Chapter 20 Cumulative and In-Combination Effects:** A consideration of any changes to cumulative and in combination effects of the IERRT in light of the Proposed Changes; and
- **Chapter 21 Summary:** A summary of the key findings of the ESA.

1.3.4 Appendices referred to within each chapter of this ESA are provided at the end of the document in Annex A to Annex D.

2 Changes to Proposed Development (Chapter 2)

2.1 Introduction

2.1.1 This ESA covers four Proposed Changes to the design, which, in summary, are:

- **Proposed Change 1:** The Realignment of the Approach Jetty and Related Works to the Marine Infrastructure;
- **Proposed Change 2:** A Realignment and Shortening of the Length of the Internal Link Bridge and Consequential Works;
- **Proposed Change 3:** The Rearrangement of the UK Border Force Facilities; and
- **Proposed Change 4:** The Possible Provision of an Additional Impact Protection Measure – in Conjunction with Enhanced Operational Marine Management Controls for Vessels Arriving at Berth 1 of the IERRT.

2.1.2 The above proposed design updates are described below in Sections 2.2 to 2.5 of this ESA and are reflected in the relevant sheets of the updated draft General Arrangement Plans that have been prepared for the Change Notification.

2.1.3 As stated at paragraph 1.2.2 above, an updated version of Chapter 2 has been provided as part of the Change Application. This Chapter of the ESA provides a summary of how the development was originally described in Chapter 2 as submitted with the Application [APP-038], and contrasts this with the subsequent amendments that are made as part of the Change Application.

2.1.4 For ease of reference, Figure 2.1 shows the General Arrangement Plan as submitted for the DCO application. Figure 2.2 then shows the General Arrangement Plan with the Proposed Changes. This provides an update to Figure 1.3 of the ES [APP-059].

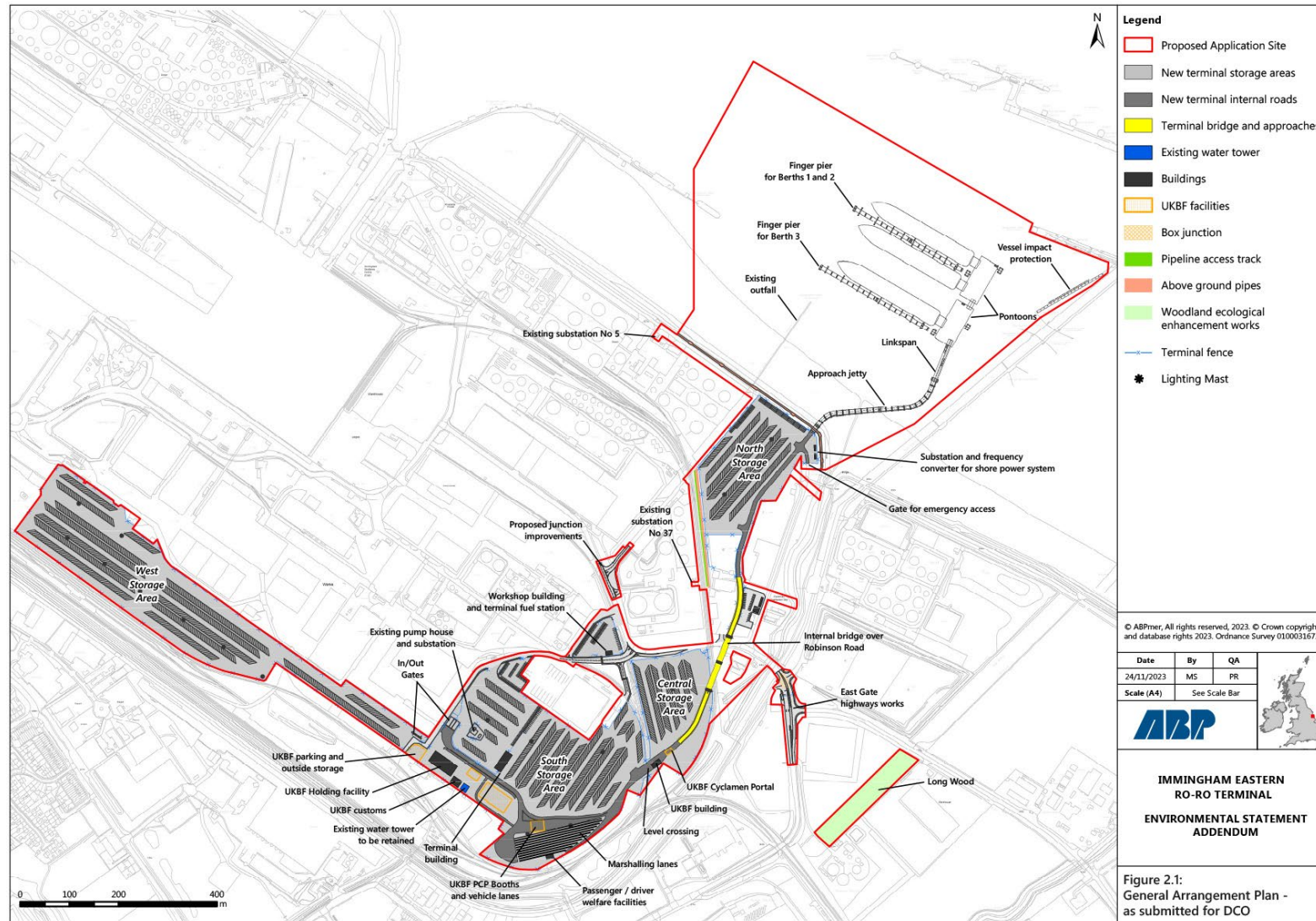


Figure 2.1. General Arrangement Plan as submitted for the DCO application

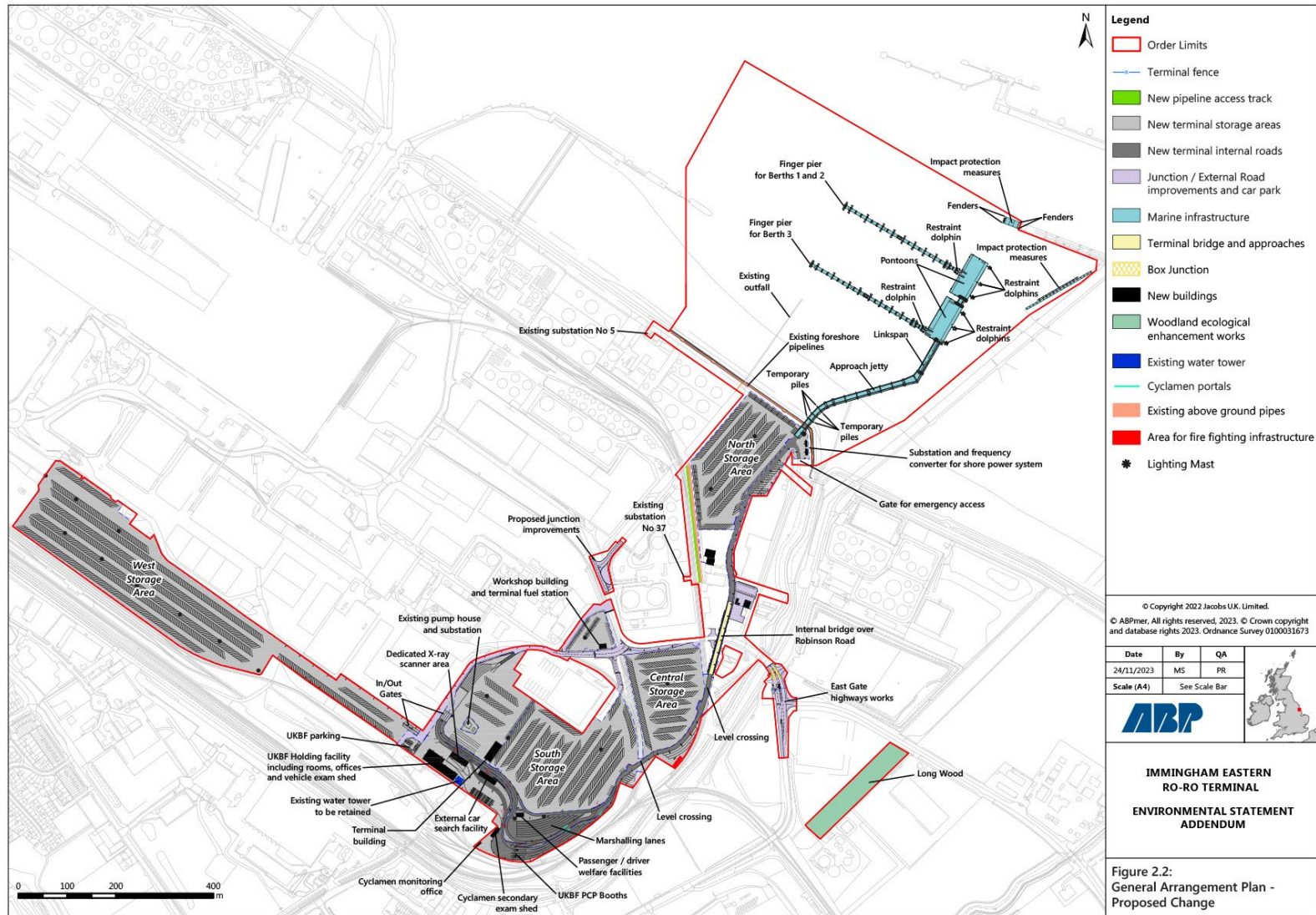


Figure 2.2. General Arrangement Plan showing Proposed Changes

2.2 Proposed Change 1: The Realignment of the Approach Jetty and Related Works to the Marine Infrastructure

Realignment of the approach jetty and related works

- 2.2.1 The function of the approach jetty is described in Chapter 2 of the ES. The approach jetty is designed to transport vehicles and wheeled cargo between the shore and berthing infrastructure. The changes to the jetty alignment have not changed the function or the point at which the jetty meets the land or berthing infrastructure (pontoons).
- 2.2.2 The approach jetty as submitted as part of the DCO application was described, in paragraph 2.3.12 of Chapter 2 of the ES, as being a maximum of 290 m in length, 10 m in width (though wider, up to 11 m, at the positions of the piles), and 12 m in height above chart datum (CD). It was stated that the deck would be supported by a maximum of 46 piles with a maximum diameter of 1,422 mm, plus another six piles for the abutment structure on the seaward side of the sea defence and pipelines and another six piles for the linkspan bank seat (totalling 58 piles).
- 2.2.3 As part of the Proposed Changes, the approach jetty alignment has been straightened which moves the approach jetty away from Immingham Oil Terminal (IOT) marine infrastructure whilst still accommodating a suitable swept path for vehicular movement. A comparison of the alignments is shown in Figure 2.3. This provides an update to Figure 1.2 of the ES [APP-059].
- 2.2.4 Paragraphs 2.3.12 and 2.3.13 of Chapter 2 of the ES have been amended to reflect the following revisions. The approach jetty itself will now be a maximum of 250 m in length, 12.5 m in width (though wider, up to 13 m, at the positions of the piles and up to 17 m at the last set of piles before the linkspan (this is to accommodate the swept path of HGVs)), and 13.5 m in height above chart datum (CD). The rest of the deck will be supported by a maximum of 46 piles. The abutment structure on the seaward side of the defences will also be repositioned and reduced from six piles to three (this is described in more detail below at paragraph 2.2.8). Six piles will be used for the linkspan bank seat (as per the originally proposed scheme). Therefore, the maximum number of piles for the approach jetty now totals 55. It should also be noted that, whilst the maximum diameter of piles for the approach jetty and finger piers remains 1,422 mm, a number of piles have also been reduced in diameter.
- 2.2.5 A series of transverse rigid frames will be used to form the jetty which aligns with the original proposal (paragraph 2.3.12 of the ES). However, the deck may now be constructed from a combination of concrete and steel, rather than just concrete as originally proposed. The rigid frames have also now

been combined to double the spans from 12.5 m (as originally proposed) to spans of 25 m; this will increase efficiency and reduce construction times.

- 2.2.6 Due to the minimal draught available along the approximately 60 m-long section of the approach jetty closest to land, the initial section of the approach jetty is proposed to be built using the 'end-over-end' construction technique. This requires the spans to be slightly closer together, 12.5 m, to favour this method of construction.

Bridging of foreshore pipelines

- 2.2.7 At the interface between the landside and marine infrastructure, the jetty will bridge a series of pipelines. On the landside of the pipelines, the abutment consisting of six driven vertical and raking steel tubular piles (as described in paragraph 2.3.12 of Chapter 2 of the ES) has been replaced with three vertical continuous flight auger piles, which will support a 22 m long half-trough steel bridge spanning the pipelines.
- 2.2.8 On the foreshore side of the pipelines to the north, the first set of supporting piles have been moved to a position of 15 m away from the pipelines and raking piles have been removed so that the abutment now consists of three piles rather than six. An increased clearance height of 2.1 m has been provided to facilitate inspection of the pipelines.
- 2.2.9 At the highest levels of the foreshore closest to sea wall, it will not be possible to bring in marine plant to install piles as there will be insufficient draught for the vessels. Therefore, six temporary piles of 0.5 m diameter will be placed from the landside to support a piling gate to be used for the installation of the permanent piles. This is further described in Section 3.2 of this ESA. These temporary piles will be removed after the construction of the permanent bridge spanning the pipelines.

Restraint dolphins

- 2.2.10 Up to two additional restraint dolphins are proposed for each of the pontoons to improve stability. Originally, as described in paragraphs 2.3.15 of Chapter 2 of the ES, two dolphins consisting of six piles plus a guiding pile was proposed for each pontoon. Now, for each pontoon, three dolphins consisting of four piles and a guiding pile, plus a fourth dolphin consisting of six piles and a guiding pile is proposed. This results in a net increase of eight piles per pontoon. The maximum diameter of these piles has also increased from 1,422 mm to 1,520 mm.

Finger pier adjustments

- 2.2.11 Through a process of design refinement, the finger pier levels have been reduced to 10.9 m height above CD and an additional two piles have been also added to each of the finger piers to support mooring bollards and improve mooring performance. When constructed, each finger pier will now be supported by up to 56 piles.

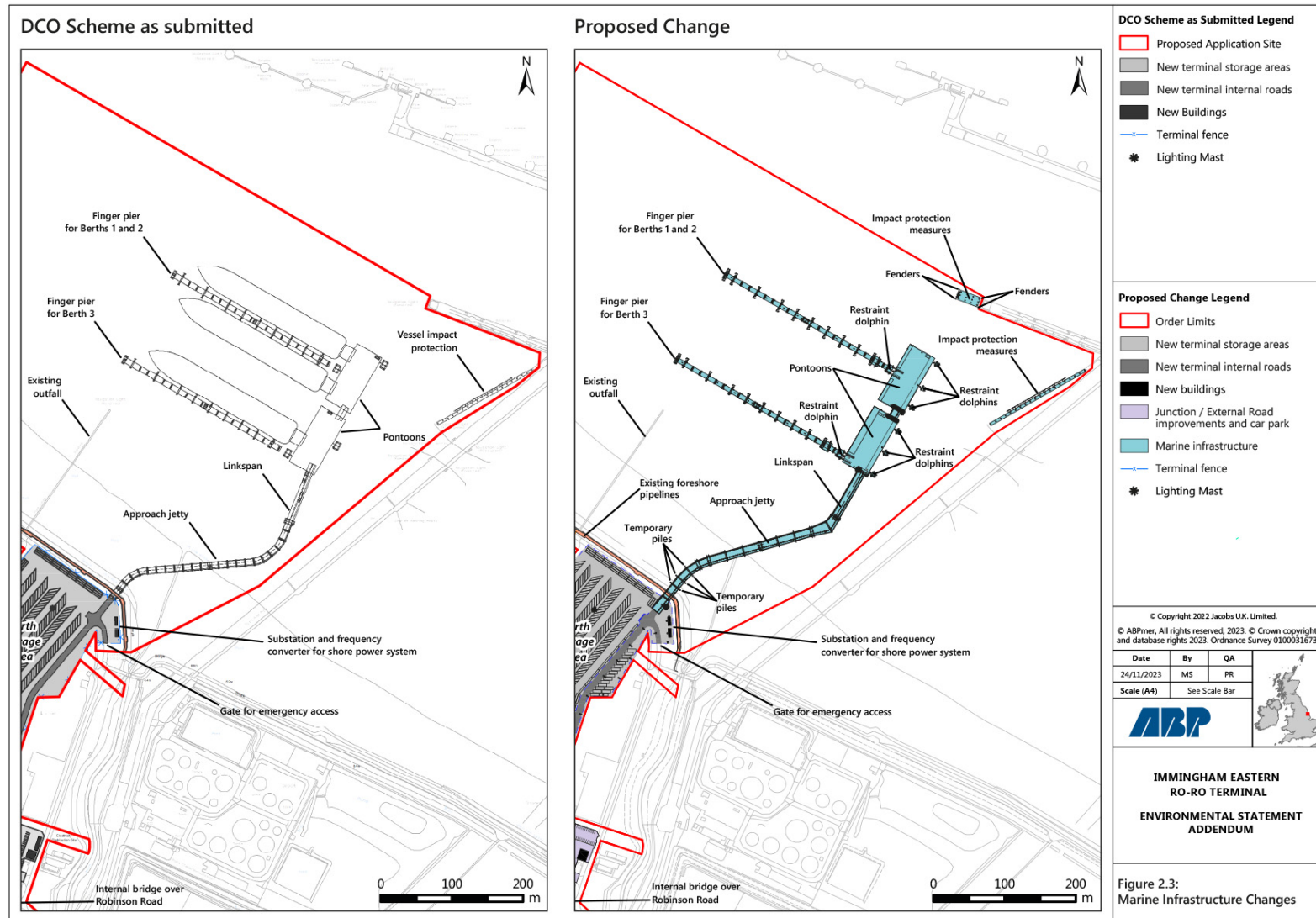


Figure 2.3. Proposed Change relating to marine infrastructure (Proposed Change 1 and Proposed Change 4)

2.3 Proposed Change 2: A Realignment and Shortening of the Length of the Internal Link Bridge and Consequential Works

- 2.3.1 In the design submitted as part of the DCO application, the bridge spanning Robinson Road is described in paragraph 2.3.41 of Chapter 2 of the ES as a two-span bridge with a maximum deck length of 120 m and a maximum width of 12 m which will span Robinson Road – an existing internal dock road – and an ABP controlled railway spur line. The bridge is proposed to be, at its highest point, a maximum of 11 m above the surrounding ground.
- 2.3.2 As part of the changes to the DCO application, it is proposed that this design is amended so that the bridge spans Robinson Road but not the ABP controlled railway spur line (Figure 2.4). The railway would instead be crossed via an at-grade (i.e., ground level) level crossing. The proposed bridge deck length has been shortened to 86 m. The maximum width of the bridge would not increase and there is no change to the maximum height of the bridge, being 11 m above the surrounding ground.
- 2.3.3 It is necessary to make a minor amendment to the alignment of the southern end of the bridge, moving the alignment eastwards requiring an amendment to the limit of deviation shown in Works Order no 7 [APP-007]. This is to ensure there is sufficient space for the bridge to cross the railway line at ground level.
- 2.3.4 Paragraph 2.3.42 of Chapter 2 of the ES has been amended to include the demolition of a welding shop and the construction of two new structures for Drury Engineering Services Limited with a maximum size of 15 m x 13 m x 8 m and 20 m x 15 m x 8 m respectively. These are also shown at Figure 3.1 to this ESA.

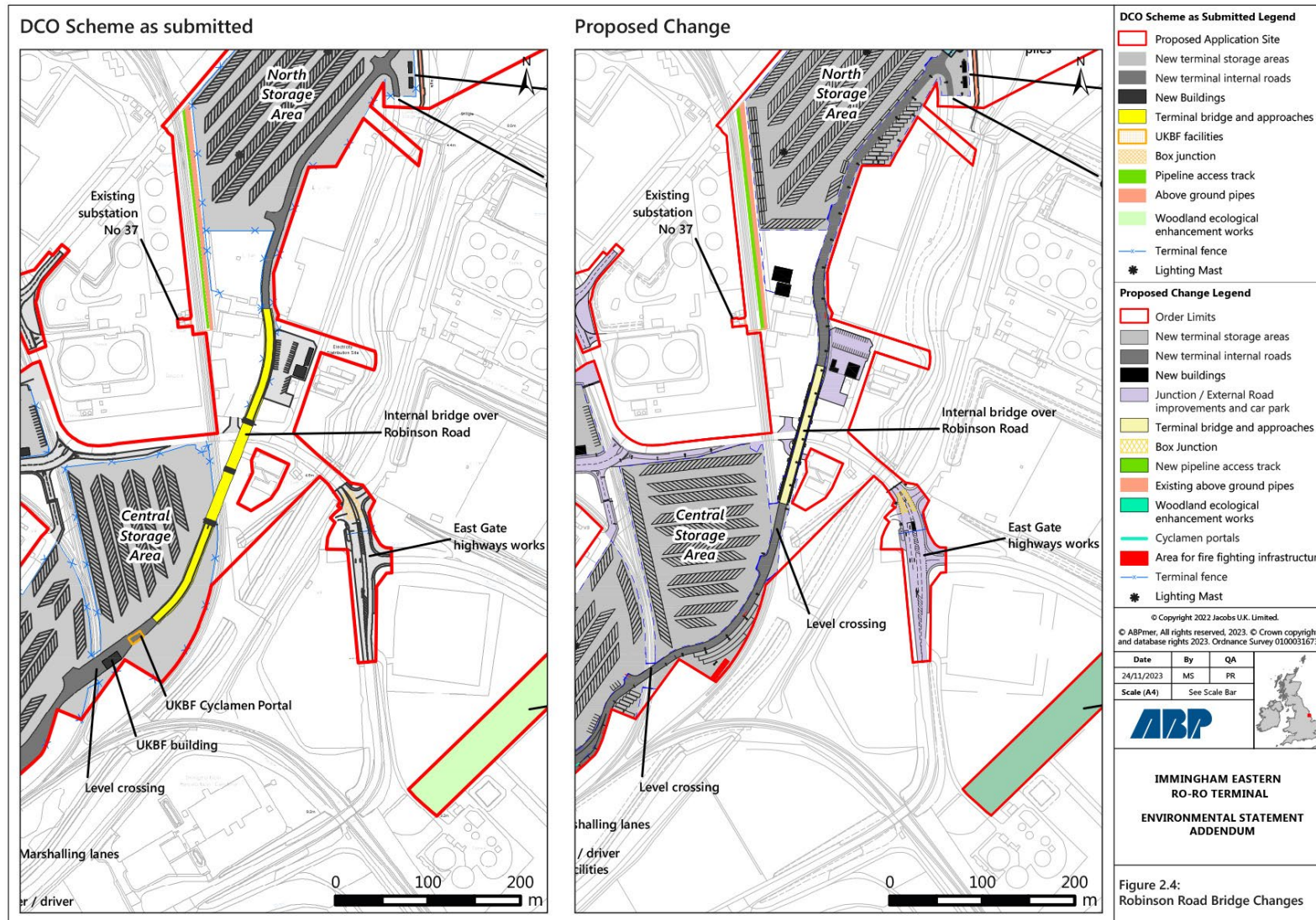


Figure 2.4. Proposed Change 2: Realignment and shortening of the IERRT internal bridge

2.4 Proposed Change 3: The Rearrangement of the UK Border Force Facilities

- 2.4.1 The dimensions and locations of the building originally proposed to be constructed in the DCO application is presented in Appendix 2.3 of the ES [APP-078].
- 2.4.2 In consultation with the UK Border Force (UKBF), it is proposed that the Customs Building (20 m x 15 m as submitted as part of the DCO application) and Holding Facility Building (55 m x 25 m as submitted as part of the DCO application) described in paragraph 2.3.38 of Chapter 2 of the ES are combined into one larger building to support more efficient customs operations. The footprint of this proposed combined facility is a maximum of 25.5 m in x 79 m x 10.5 m and remains within the limits of deviation as set out in Works Order no. 5. Additionally, new facilities are to be provided for UKBF, which are listed below. Again, these remain within the limit of deviation as set out in Works Order no. 5.
- Customs car search bays (41 m x 10.5 m);
 - Vehicle X-ray scanner building (33 m x 8.5 m) (to replace vehicle X-ray scanning area as previously provided); and
 - Cyclamen Monitoring Office (12 m x 4 m).
- 2.4.3 Amendments are also being made to the location of the UKBF facilities listed below, although these remain within the maximum footprint stated in Appendix 2.3 [APP-078] and in Chapter 2 of the ES and within the limit of deviation as set out in Works Order no. 5:
- Cyclamen Secondary Exam Building: A minor relocation of the building is proposed within the limits of deviation with no change in size;
 - Cyclamen Portals: A minor relocation of the previously shown portal closer to the UKBF buildings is proposed within the limits of deviation to improve operational efficiency with no change in size; and an additional portal to a bypass lane, required by UKBF for operational segregation of domestic and international traffic and security; and
 - Passport Control Booths: A minor relocation of the building is proposed within the limits of deviation with no change in size.
- 2.4.4 In consultation with UKBF, changes are also proposed to the operational layout. The inbound road and associated passport control booth (noted above) have been moved to the southern boundary requiring the shift of the marshalling lanes to move slightly northwards. Additionally, a new unaccompanied lane has been created between the passport control booth and the marshalling lanes to allow continues transit of unaccompanied freight and improve customs operations.
- 2.4.5 These changes are shown in Figure 2.5.

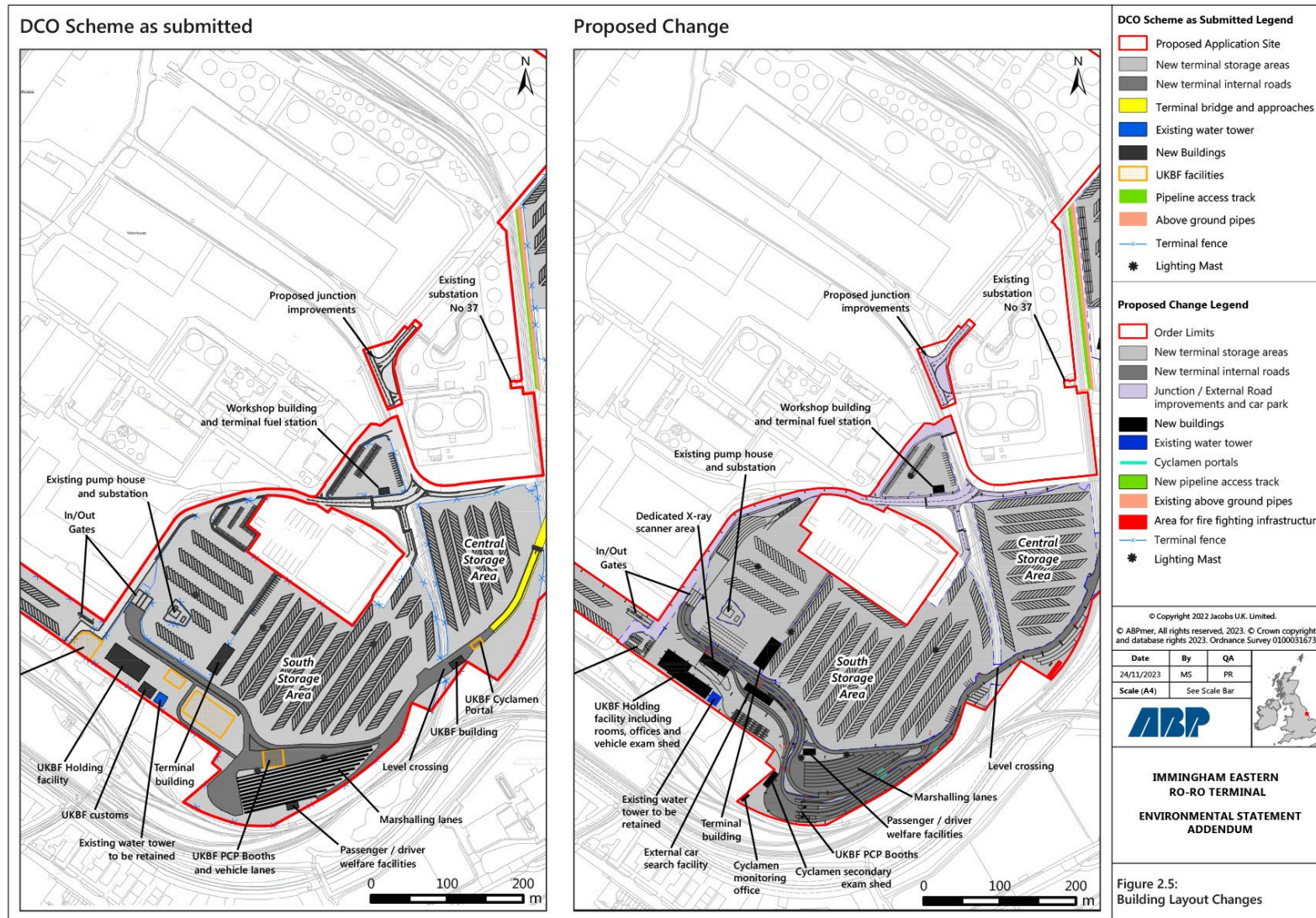


Figure 2.5. Proposed Change 3: Rearrangement of the UK Border Force facilities

2.5 Proposed Change 4: The Possible Provision of an Additional Impact Protection Measure – in Conjunction with Enhanced Operational Marine Management Controls for Vessels Arriving at Berth 1 of the IERRT

- 2.5.1 The proposed enhanced operational marine controls are described in Chapter 3, Section 3.3.
- 2.5.2 As part of ongoing negotiations with the IOT Operators, ABP has been considering a number of options for the impact protection measures. The original impact protection measures are described in paragraph 2.3.18 to 2.3.20 in Chapter 2 of the ES [APP-038], at Works Order no. 3 of the Applicant's draft DCO [REP3-002] and are shown at Sheet 1 of the General Arrangement Plans [APP-009].
- 2.5.3 It is proposed that the additional impact protection measures would consist of, if required, an impact protection structure at the western end of the IOT finger pier (see Figure 2.3). This will be in addition to the linear impact protection structure as originally described in paragraph 2.3.18 to 2.3.20 in Chapter 2 of the ES [APP-038] and included in Works Order no. 3 [APP-007]. The only change to the existing linear impact protection structure is that the pile diameter is proposed to be increased from 1,422 mm to 1,520 mm and filled with reinforced concrete or structural fill material.
- 2.5.4 The IOT finger pier impact protection will be a piled dolphin structure consisting of a maximum of 12 piles of 1,520 mm diameter, filled with reinforced concrete or structural fill material. The piles will be spread over an overall footprint of 14 m x 30 m. The piles will be connected by a capping slab at the top of the piles. A 5 m gap will be allowed between the end of the IOT finger pier and the new impact protection measures. In addition, four piles of 1,422 mm diameter will be installed at each corner of the piled dolphin structure. These will be located 1 m away from the structure in line with the berthing face of the IOT finger pier. These will act as fenders for vessels approaching and departing from berths on the IOT finger pier. Donut roller fenders will be placed on the piles to assist the safe manoeuvring of vessels moving along the finger pier. The exact layout and form of these measures is still being finalised; however, the above parameters are considered to be the worst case which has informed the assessment set out in Chapters 7 to 20 in this ESA.
- 2.5.5 In the unlikely event of an allision with vessel impact protection measures, if required to be installed at some time in the future, suitable marine operational controls will be put in place by the SHA whilst necessary repairs (if any) are undertaken. This is to ensure appropriate risk controls would be in place for the IOT infrastructure.

2.6 Updates required to figures

- 2.6.1 No figures in Volume 2 of the ES relating to Chapter 2 of the ES require updating following the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

2.7 Updates required to appendices

- 2.7.1 The appendices relating to Chapter 2 of the ES are as follows:

- Appendix 2.1 Waste Hierarchy Assessment [APP-076]; and
- Appendix 2.2 Concept Lighting Design Stage Summary Report [APP-077]; and
- Appendix 2.3 Building Schedule [APP-078].

- 2.7.2 Appendix 2.1 is not affected by the Proposed Changes and does not require updating. Appendix 2.2 and Appendix 2.3 have been updated as a result of the Proposed Changes. These are provided in Annex A and Annex B of this ESA respectively.

3 Changes to Details of Project Construction and Operation (Chapter 3)

3.1 Introduction

3.1.1 Chapter 3 of the ES [APP-039] sets out the construction methodology for the IERRT project and describes how the proposed terminal will be operated.

3.1.2 Changes to the construction methodology are limited to those associated with the approach jetty and marine works. No other changes to the construction methodology are proposed. Construction material quantities and associated waste have also been updated to reflect the Proposed Changes. This is described in Section 3.2 below.

3.1.3 As stated at paragraph 1.2.2 above, an updated version of Chapter 3 has been provided as part of the Change Application. This Chapter of the ESA provides a summary of how the project construction and operation was originally described in Chapter 3 as submitted with the Application [APP-039], and contrasts this with the subsequent amendments that are made as part of the Change Application.

3.1.4 Further information on terminal operations is also provided in Section 3.3.

3.2 Construction

Approach jetty

3.2.1 Abutment structures will be constructed on either side of the pipelines and the sea defence which runs along the frontage. The landside abutment and associated approach ramp will be constructed from continuous flight auger (CFA) piles which will be installed with a CFA piling rig. The approach ramp itself will be installed on the CFA piles and consist of a reinforced concrete retaining structure with granular backfill. This approach is similar, albeit slightly different, to that which was originally described in paragraph 3.1.8 of Chapter 3 of the ES.

3.2.2 The seaward side abutment for the bridge spanning structure will consist of driven steel tubular piles. A change to the construction methodology is the use of temporary piles to install the abutment and the first section of the approach jetty. The temporary piles will be installed adjacent and prior to the permanent pile installation and will be used to support the construction plant for the installation of the permanent piles. These temporary piles will be removed upon completion of the construction activities. Temporary piles are required as there is insufficient depth for marine plant to reach this area of the foreshore, so access is required from the landside. The bridge spanning

the pipelines will be constructed as a steel structure placed up on the abutments.

- 3.2.3 For the rest of the approach jetty, the construction methodology for piling will remain the same as originally set out in Chapter 3 of the ES using a combination of vibro and percussive piling from a crane or jack-up barge as described in paragraph 3.1.11 to 3.1.14 of Chapter 3 of the ES. As noted in paragraph 3.1.12, for the first 60 m of the jetty, it is expected that the piles and decking will be placed using “end over end construction” where a section of piles and deck structure are constructed and then used to support the construction plant for the next section of construction.
- 3.2.4 The approach jetty deck will be formed from a combination of pre-cast reinforced concrete slabs and beams as originally described in paragraph 3.1.9 of Chapter 3 of the ES. As part of the Proposed Changes, an option to use an alternative steel bridging structure to span between piles is also allowed for, to enable the contractor to utilise the most efficient approach.

Impact Protection Measures

- 3.2.5 If constructed, for the additional vessel impact protection measures at the end of the IOT finger pier, the construction methodology for piling will remain the same as set out in Chapter 3 of the ES using a combination of vibro and percussive piling from a crane or jack-up barge as described in paragraph 3.1.22 to 3.1.24 of Chapter 3 of the ES.

Construction waste

- 3.2.6 Construction waste estimates associated with the IERRT project are described in paragraph 3.1.58 to 3.1.60 and Table 3.1 of Chapter 3 of the ES. Minor adjustments to these estimates as a result of the Proposed Changes summarised in Chapter 2 of this ESA are provided in Table 3.1 below.

Table 3.1. Estimate of waste associated with the materials used or handled during construction

Material	Estimate quantity	Estimated waste
Steel piles	8,600 tonnes	2 %
Concrete (Redi mix)	23,500 m ³	8 %
Concrete (Precast)	7,800 m ³	5 %
Reinforcement	20,200 tonnes	5 %
Steel pontoons	8,000 tonnes	2%
Steel buildings	6,000 tonnes	2 %
Cement stabilised subgrade and sands	150,000 m ³	8 %
Aggregates	60,000 m ³	10 %

Material	Estimate quantity	Estimated waste
Asphalt	81,000 tonnes	8 %
Demolition material	7,000 m ³	75 %
Waste or spoil	94,000 m ³	50 %

3.3 Operation

UKBF terminal operations

- 3.3.1 Paragraphs 3.2.7 and 3.2.8 of Chapter 3 of ES [APP-039] outline the outbound cargo access arrangements. In consultation with the UKBF, the terminal operations have been refined. Further information has been provided to show the automatic check in lanes and kiosks, which reduces the need for pre-booked heavy good vehicle (HGV) drivers to access the main terminal building. This will improve the inbound traffic flow to the terminal.
- 3.3.2 Paragraphs 3.2.9 and 3.2.10 of Chapter 3 of ES outline the inbound cargo arrangements. The updated drawings now show an additional by-pass lane requested by UKBF to improve the flow and segregation of unaccompanied and accompanied traffic during times of vessel disembarkation. An additional Cyclamen Portal has been requested by UKBF on this bypass lane.
- 3.3.3 Additionally, a camera based smart gate system has been introduced on the final exit gate to ensure that all departures of accompanied and unaccompanied trailers comply with security and customs checks.

Operational marine management controls

- 3.3.4 The Applicant is proposing enhanced navigational management controls with a view to regulating the management of vessels arriving at or departing from the IERRT berths. The Applicant's NRA [APP-089] concludes that the risk to the IOT is tolerable and As Low as Reasonably Practicable (ALARP) without the provision of the enhanced controls, however, these are being proposed as an additional measure in relation to the concerns raised by IOT Operators.

Towage

- 3.3.5 Table 3.2 shows the possible towage requirements for the operation of IERRT based on experience of similar vessels and similar operations. The towage requirement will be set by the Statutory Harbour Authority (SHA) for the operation of the proposed development and will be informed by further assessments undertaken prior to the operation of the IERRT, such as navigational simulations and soft-start processes. The information in the

table is presented here indicatively and the actual requirements will be determined by the SHA, taking into account the specific operating parameters (e.g., vessel and propulsion specifications, wind, tide etc.). However, the *enhanced* towage requirements proposed by the Applicant, as presented in red, will be committed to as explained below.

- 3.3.6 The Applicant's NRA identified both '*Project specific adaptive procedures*' and '*Specific berthing criteria for each of the three berths*' as Applied Controls to be applied during the operation of IERRT. This includes adaptive procedures during a familiarisation period (soft start) as operational experience is gained and tidal limits for tug use applied to each berth.
- 3.3.7 While some requirements may be relaxed or increased by the SHA (for example once the soft-start period has been satisfactorily completed for the new vessels using IERRT, or in response to a change in vessel), the controls highlighted in red will remain in place as an enhanced operational control. The Applicant's NRA does not deem these to be necessary to reach ALARP for any of the navigational risks, however, they are presented as a specific operational commitment by the Applicant to demonstrate its commitment to the safe operations of the IERRT development in response to the examination submissions made by the IOT Operators.

Table 3.2. Proposed towage requirements for IERRT

IERRT berth number	Tide and wind conditions	Tug requirement – arrivals	Tug requirement – departures	Notes
Berth 1	Ebb tide < 2.5 knots	1 tug forward	-	See note 1
	Ebb tide > 2.5 knots	1 tug forward & 1 tug aft	1 tug forward	See note 2
	Flood tide < 2.5 knots	-	-	See note 3
	Flood tide > 2.5 knots	1 tug forward & 1 tug aft	1 tug forward	See note 6
Berth 2 & 3	Ebb tide < 2.5 knots	-	-	See note 4
	Ebb tide > 2.5 knots	1 tug forward & 1 tug aft	1 tug forward	See note 6
	Flood tide < 2.5 knots	-	-	See note 5
	Flood tide > 2.5 knots	1 tug forward & 1 tug aft	1 tug forward	See note 6
All berths	Mean 'Beam' Wind speeds >20 knots	1 tug forward & 1 tug aft	1 tug forward	See note 6

Note 1 – For ebb arrivals to Berth 1 in tidal current conditions less than 2.5 knots, a minimum of one tug forward will be provided. For ebb departures from Berth 1 in tidal current conditions less than 2.5 knots, tugs are not deemed necessary as the vessel is starting from a position of zero inertia and increasing distance and speed away from IERRT/IOT infrastructure. Should there be a breakdown of machinery, the forward momentum will provide sufficient time for the vessel to enact remedial action in a controlled manner.

Note 2 - For all ebb arrivals in tidal current conditions greater than 2.5 knots, to Berth 1, one or more tugs, depending on circumstances, may be required. For example, should there be a breakdown of machinery, the tug(s) can hold the vessel in position allowing remedial action to be undertaken in a controlled manner.

Note 3 - For arrivals and departures from Berth 1 on a flood tide in current conditions less than 2.5 knots, a tug is not deemed necessary as, should there be a breakdown of machinery, the tide will push the vessel away from IOT infrastructure.

Note 4 - For arrivals and departures from Berth 2 & 3 on an ebb tide in current conditions less than 2.5 knots, a tug is not deemed necessary as, should there be a breakdown of machinery during manoeuvring, the vessel would contact the IERRT berth infrastructure.

Note 5 - For arrivals and departures from Berth 2 & 3 on a flood tide in current conditions less than 2.5 knots, a tug is not deemed necessary as, should there be a breakdown of machinery, the tide will push the vessel away from IOT infrastructure.

Note 6 - Where tugs are required for any state of tide or wind conditions, these requirements are in line with the most stringent requirements in place at other RoRo berths on the river and may be reduced by the SHA.

3.3.8 These enhanced controls will be imposed by either the issue of a General Direction/Notice to Mariners or a revision to the Immingham Marine Operations Manual. The Applicant will seek to agree these additional navigational management controls with the IOT Operators.

Standard Operating Procedures (SOPs) including Berth Limits

3.3.9 Prior to the commencement of operations at the terminal, further simulations will be undertaken by the SHA, as is normal practice with any new marine infrastructure within the Humber ports, to establish the operating procedures of each berth under varying environmental conditions. Initially, there will be a soft-start period where procedures and limits will be over-cautious until experience in the intricacies of manoeuvring at the terminal is developed. This

is common industry practice when operating at a new terminal or when introducing a new vessel at an existing terminal. As an example, this practice was employed by the SHA at Green Port Hull, Humber Sea Terminal and the Immingham Outer Harbour.

3.3.10 These procedures will be enacted through a soft start approach when the berths first become operable. The SHA will monitor and oversee the safe completion of the manoeuvres during the soft-start period and over time, with increasing experience, the operational procedures and limits will be amended where necessary to ensure the safe operation of the terminal continues.

3.3.11 Vessel Traffic Services (VTS) Humber and the Immingham Dock Master will update their SOPs if required.

Vessel Traffic Management

3.3.12 As explained above, when operations commence at IERRT, a soft start approach will be employed where arrivals and departures at IERRT will be managed around normal river traffic. Humber Estuary Services (HES) and VTS will be responsible for ensuring that IERRT traffic does not interact with other traffic for the preliminary operating period.

Pilotage and PEC requirements

3.3.13 Prior to commencement of operations at the terminal, Pilots & PECs will receive bespoke simulator training. Initially, a select group of pilots will undergo this training alongside vessel masters who intend to obtain a Pilotage Exemption Certificate (PEC) for the berths. As operations at the berth progress, over-time this group will train other Pilots and PECs to undertake these manoeuvres as is common practice.

3.3.14 As operations develop, all Pilots who are of the appropriate authorisation will undertake the bespoke simulator training to ensure the number of Pilots authorised for the terminal is beyond what is deemed as required of normal operation.

3.3.15 PEC holders and Pilots will be required to demonstrate a thorough understanding of the operating procedures and manoeuvring practices through the examination and authorisation process.

Storage areas

3.3.16 Further design refinements have been undertaken in order to further maximise the number of trailer bay across the four storage areas (Northern Storage Area, Central Storage Area, Southern Storage Area, and Western Storage Area) described in paragraphs 2.3.33, 2.3.35 and 2.3.36 of Chapter 2 of the ES [APP-038]. The number of trailer bays has increased across the

Terminal to approximately 1,700 (up from 1,430); whilst container ground slots have increased to approximately 65 (up from 40).

3.4 Updates required to figures

- 3.4.1 Figure 3.1 of the ES [APP-061] requires updating following the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA. This is provided at the end of this chapter and is referred to as Figure 3.1.

3.5 Updates required to appendices

- 3.5.1 There are no appendices relating to Chapter 3 of the ES. Therefore, no appendices require updating in light of the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

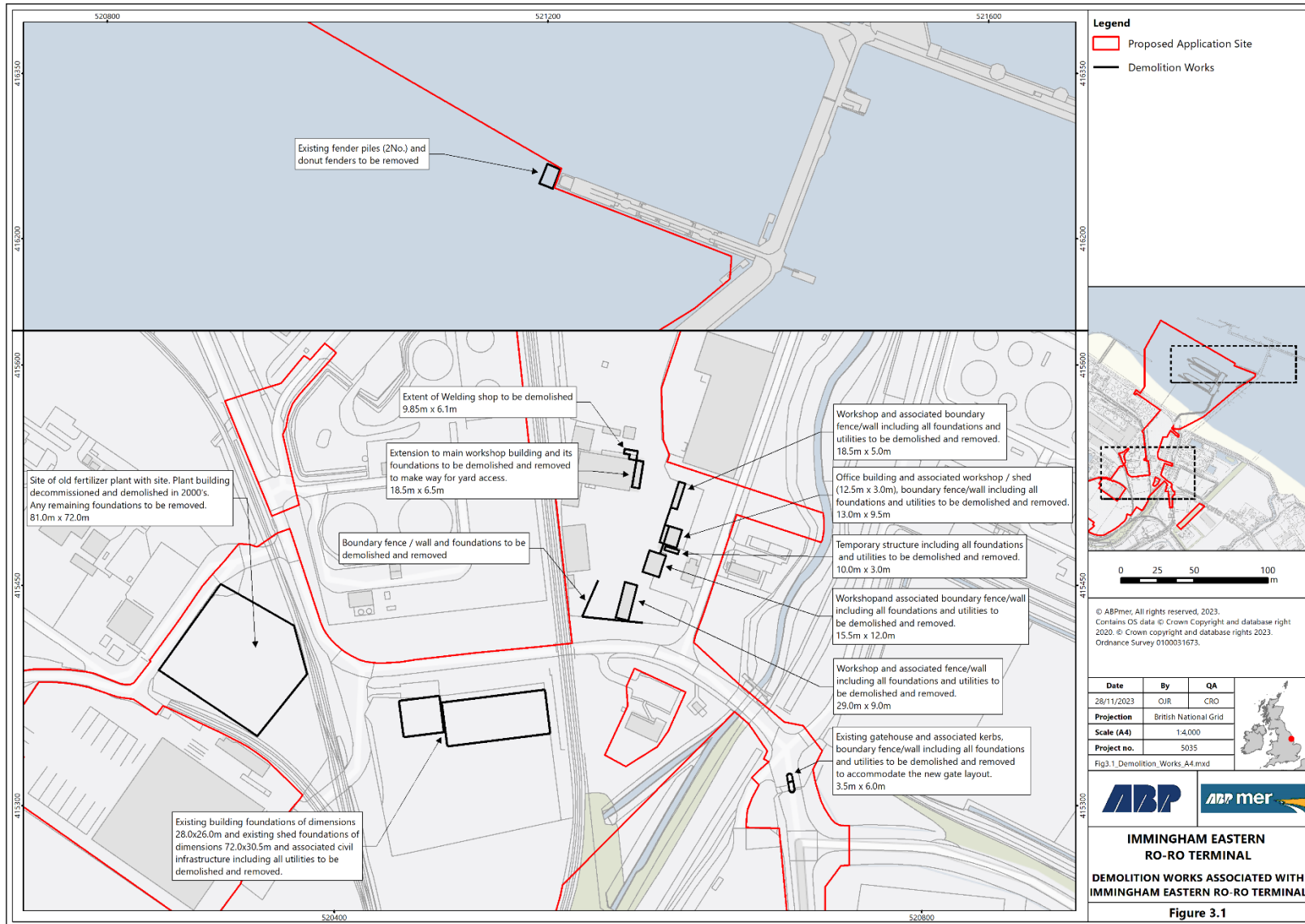


Figure 3.1. Demolition works associated with the Immingham Eastern Ro-Ro Terminal

4 Need and Alternatives (Chapter 4)

4.1 Introduction

4.1.1 Chapter 4 of the IERRT ES [APP-040] considers the issues of need and alternatives. It is explained that in addition to ES Chapter 4, other documents also submitted as part of the IERRT DCO application build upon the information contained within Chapter 4 to demonstrate the overall case for the IERRT project.

4.2 Consultation

4.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. The outcome of the consultation that has been undertaken, along with how it has influenced the need and alternatives assessment, is presented in Table 4.1 of this chapter of the ESA.

Table 4.1. Summary of consultaiton relevant to need and alternatives

Consultee	Reference, Date	Summary of Response	How comments have been addressed or considered in this chapter
CLdN (CA 39)	Change Application Consultation 20.11.23	CLdN have confirmed that their response to the change application consultation is provided within the submissions it made at Deadline 6 of the Examination. The response provided relates to their ongoing assertion that there is not an urgent and imperative need for the Proposed Development.	CLdN's response relates to points on dwell times and alleged capacity. The Applicant does not agree with the position that is being alleged by CLdN in its submission and will be responding in submissions at Deadline 7 of the Examination. The Applicant has, in any event, explained to the Examination that, in summary, the need for the proposed development – including as now proposed to be changed – is established through the National Policy Statement for Ports (NPSfP) but that it has, in any event, also identified a need for the proposed development and that the need is greater than simply one of meeting demand.

4.3 Updates required to ES Chapter 4

- 4.3.1 The Proposed Changes to the IERRT project and the reasoning behind why they are being sought by ABP are explained in the Proposed Changes Application Report.
- 4.3.2 The Proposed Changes do not have any implications for Chapter 4 of the ES in respect of need matters. In respect of alternatives matters, the Proposed Changes represent a further beneficial evolution of the IERRT proposal.

4.4 Updates required to figures

- 4.4.1 The Proposed Changes do not have any implications for Figures 4.1 to 4.7, presented in Volume 2 of the ES [APP-062].

4.5 Updates required to appendices

- 4.5.1 Chapter 4 of the ES is supported by:
- ES Appendix 4.1 – Humber Shortsea Market Study [APP-079]; and
 - ES Appendix 4.2 – Supplementary Consultation Report [APP-080].
- 4.5.2 The Proposed Changes do not have any implications for Appendix 4.1 and Appendix 4.2 of the ES.

5 Legislation, Policy and Consenting Framework (Chapter 5)

5.1 Introduction

5.1.1 Chapter 5 of the IERRT ES [APP-041] sets out an overarching summary of the legislation, policy and consenting framework of relevance to the principle of the IERRT project.

5.2 Consultation

5.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. No specific comments were received in relation to legislation, policy and consenting matters.

5.3 Updates to ES Chapter 5

5.3.1 Within the overarching policy context section of Chapter 5, reference is made to various policy documents and statements. The current position in respect of these documents remains as it was at the time Chapter 5 of the ES was written, with the exception of the National Planning Policy Framework (NPPF), which was updated on the 5 September 2023. However, none of the September 2023 updates to the NPPF alter those parts of the NPPF referred to in Chapter 5 of the ES.

5.3.2 Whilst there have been some other minor updates to other topic specific policy of potential relevance to the consideration of the IERRT project, these have been addressed within the Applicant's separate submissions to the IERRT Examination.

5.3.3 For the above reasons, therefore, it is not considered necessary to address in detail updates to legislation and policy in this ESA, matters which in any event are separate considerations to the environmental assessment of the changes.

5.4 Updates required to figures

5.4.1 There are no figures relating to Chapter 5 of the ES. Therefore, no figures require updating in light of the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

5.5 Updates required to appendices

5.5.1 There are no appendices relating to Chapter 5 of the ES. Therefore, no appendices require updating in light of the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

6 Impact Assessment Approach (Chapter 6)

6.1 Introduction

6.1.1 Chapter 6 of the ES [APP-042] presents the outcome of the scoping and statutory consultation phase of the EIA process and details the general impact assessment methodology that has been followed in the ES in order to identify and assess the significant environmental effects likely to be generated by the IERRT.

6.2 Consultation

6.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. No specific comments were received in relation to the approach to the impact assessment.

6.3 Updates required to ES Chapter 6

6.3.1 There is no change to the assessment scope reported in Chapter 6 of the ES [APP-042]. All environmental topics and receptors have been considered for the Proposed Changes. Additional assessment work has been undertaken, where necessary, to assess the environmental impacts as detailed in Chapter 7 to Chapter 20 of this ESA.

6.3.2 There is no change to the assessment approach or methodology for determining significant effects as set out in each of the topic assessment chapters of this ES [APP-043 to APP-056].

6.4 Updates required to figures

6.4.1 There are no figures relating to Chapter 6 of the ES. Therefore, no figures require updating in light of the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

6.5 Updates required to appendices

6.5.1 The appendices relating to Chapter 6 of the ES are as follows:

- Appendix 6.1 Scoping Opinion;
- Appendix 6.2 Preliminary Ecological Appraisal; and
- Appendix 6.3 EIA Competency Statement.

6.5.2 These appendices are not affected by the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA and do not require updating.

7 Physical Processes (Chapter 7)

7.1 Introduction

- 7.1.1 Chapter 7 of the ES [APP-043] provided an assessment of the potential significant effects of the proposed IERRT on physical processes in the marine environment, specifically hydrodynamics (water flows), sediment transport, plume dispersion (from sediment disturbed by dredging) and waves.
- 7.1.2 Baseline conditions were characterised through a desk-based study, and project-specific surveys and assessments, including bathymetric (seabed depth) and topographic (LiDAR) survey data, geophysical survey of the seabed, hydrodynamic and wave data using wave and current profilers and water quality sensors, and collection of site-specific marine sediment samples.
- 7.1.3 The Humber Estuary has a macro (large) tidal range, fast flows and a high background suspended sediment concentration (SSC). This means the bed of the estuary is very dynamic in its form and can vary on both short-term and longer time scales. The dominant influences on estuary structure are tides, waves and freshwater flows, tidal surges and biological activity.
- 7.1.4 Flows at Immingham are aligned approximately east-southeast on the ebb to west-northwest on the flood. The proposed development site is generally protected from large waves approaching from the North Sea. Across the 20 sediment samples collected to inform the IERRT study, the average bed composition is 78% mud, 22% sand and no gravel material.
- 7.1.5 In Chapter 7 of the ES [APP-043], the assessment undertaken in relation to physical processes identified the potential ‘exposure to change’ resulting from the impact pathways, but not the significance of any effects. The consequent significance of effects resulting from changes to physical processes on other environmental features/receptors were assessed in other topic-specific chapters of the ES, namely Water and Sediment Quality (Chapter 8) [APP-044], Nature Conservation and Marine Ecology (Chapter 9) [APP-045], Commercial and Recreational Navigation (Chapter 10) [APP-046] and Coastal Protection, Flood Defence and Drainage (Chapter 11) [APP-047].

7.2 Consultation

- 7.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. The outcome of the consultation that has been undertaken, along with how it has influenced the physical processes assessment, is presented in Table 7.1 of this chapter of the ESA.

Table 7.1. Summary of consultation relevant to physical processes

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
Environment Agency	Change Application Consultation 17.11.23	<p>Concern regarding further increase in wave height due to the changes, for the 50-year wave event from east and southeast directions. Although suspected to be minimal, there is the potential to impact the discharge of the Habrough Marsh Drain with any increase in sedimentation resulting in further maintenance being required to keep fluvial flows from the outfall discharging. However, we are satisfied that monitoring of the Habrough Marsh Drain is already secured in the draft DCO together with a requirement for remediation of any impacts/obstruction for a period of 10 years.</p>	<p>Predicted changes to significant wave height as a result of the updated scheme are described in this chapter of the ESA and presented in Figures 7.5, 7.6 and 7.7. For each wave approach direction and return period, the results from the updated scheme remain very similar to those presented in the original ES document [APP-043] and, for the most part, indicate an overall reduction in wave height as a result of the combined marine elements of the IERRT scheme. The magnitude and extent of predicted impacts on wave height as a result of the proposed changes are no larger (and in some cases impact is reduced) than the results presented in the ES document [APP-043]. Where increases to wave height are predicted, the extent is no larger and the magnitude remains less than 0.06 m.</p> <p>As noted in paragraph 7.3.14 of this chapter, <i>‘the assessment of potential impact on existing features remains as described in the ES’</i>. Paragraph 7.8.80 of the ES [APP-043] notes <i>‘The predicted impacts at the existing marine terminals (including IOT, HST, Immingham Eastern and Western Jetties, IOH and IGT) are (where predicted) generally small in magnitude. This is also the case for the areas fronting the North East Lindsey Internal Drainage Board (IDB) Habrough Marsh Drain and the Anglian Water Immingham Sea outfalls. With distance from the proposed development, the predicted impacts reduce further and are not predicted to occur over the far-field region.’</i> In further response to the</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
			comment, and with specific reference to the Habrough Marsh Drain Outfall, the assessment presented in this chapter includes consideration of changes to local erosion and accretion, with results presented in Figure 7.3. This assessment indicates no predicted change in bed thickness at the Habrough Marsh Drain outfall and slightly less accretion along the lower foreshore (and shallow subtidal) fronting the drain. Consequently, it is concluded that the likelihood of increased sedimentation resulting in further maintenance being required to keep fluvial flows from the outfall discharging is negligible.
Marine Management Organisation (MMO) (CA 32)	Change Application Consultation 17.11.23	The wording regarding the dredging in Sections 7.2.3 and 7.2.6 of the ES addendum (submitted as part of the Proposed Change Notification) states there are no proposed changes to the extent, depth and volume of the capital dredging works. However, Section 7.2.5 states that the magnitude of change is a result of the larger proposed dredge depths. The MMO requests that this is clarified.	No changes to the extent, depth and volume of the capital dredging works associated with the IERRT project are proposed. The reference to larger dredge depths relates to that proposed under the original scheme and as reported in the original ES [APP-043]. The wording has been amended in paragraph 7.3.5 of this chapter to clarify this point.
		A table showing the changes in volume of the material to be dredged by area and actual difference in disposal volume to offshore disposal site should be provided together with an assessment of whether the receiving site can adequately accommodate any	No changes to the extent, depth and volume of the capital dredging works associated with the IERRT project are proposed, nor are changes anticipated to the future maintenance dredge requirement set out in ES. As such, a table is not required.

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
		<p>increased capital or future maintenance dredge requirement volume.</p>	
		<p>The MMO has noticed that Figure 7.1 (Peak Flood Baseline Flows) appears to show a reduction in flow speed differences relative to the original Figure 7.8 in the ES while Figure 7.2 (Peak Flood Baseline Flows) suggests a much larger impact than the original Figure 7.9. It would be of value if this difference could be explained.</p>	<p>The predicted changes to peak flood and ebb flow speeds are generally very similar in magnitude and extent between the ES and those presented in this chapter as a result of the Proposed Changes. There are slight differences between the two where changes flip into the '-0.05 to -0.15 m/s' band on the colour scale, as a result of the changes to the marine layout (pile locations). Overall, the magnitude and extent of change remains similar and the assessment conclusions are unchanged.</p>
		<p>None of the plots presented in the addendum show the impact with the vessels in place (as in Figures 7.17 and 7.18 of the original ES). Because the impacts of the new scheme (without the vessels) are of a similar magnitude to the original scheme with vessels, it would also be of value to demonstrate whether the assessed impacts would also remain unchanged in this case. Similarly, it would also be of value if it were clarified whether vessel occupancy of the berths has been accounted for in the modelling of the bed level changes over the spring neap cycle (Figure 7.3 of the addendum / Figure 7.19 of the ES).</p>	<p>Given the similarity in the results for the scheme with the Proposed Changes compared with the scheme originally submitted for the DCO application (without vessels on berth), additional modelling of the updated scheme 'with vessels' has not been conducted. Given the relative impacts of the marine elements (the dredge pocket, and the piles) and the vessels on berth, it is concluded that the impacts described in the ES, and the associated assessment conclusions, remain valid for the updated scheme with Proposed Changes.</p> <p>With inclusion of vessels on berth, the flow speeds within the berth pocket increase (in comparison to the empty berth scenario), as a result of the constricted flow beneath the vessel's hull. The sediment transport modelling is based on 'no vessels', as this provides the worst case for sediment build-up in the dredged berths.</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
		<p>Documents and change descriptions must be amended to clarify whether capital dredge changes are proposed, whether they are included in the modelling results. Without this clarity it is not possible to fully endorse the conclusions of the addendum to the ES in relation to coastal processes.</p>	<p>No changes to the extent, depth and volume of the capital dredging works associated with the IERRT project are proposed, nor are changes anticipated to the future maintenance dredge requirement set out in ES. The wording set out in this chapter of the ESA has been amended to clarify this point.</p>

7.3 Updates required to impact assessment

7.3.1 There are no additional impact pathways in relation to physical processes introduced by the Proposed Changes (described in Chapter 2 and Chapter 3 of this ESA). Furthermore, the following pathways assessed in Section 7.8 of Chapter 7 of the ES [APP-043] are not affected by the revisions to the IERRT project:

- Increased SSC and potential sedimentation over the extent of the disturbance plume as a result of the construction of the new piers (piling) and capital dredging works;
- Increased SSC and potential sedimentation as a result of the deposit of capital dredge material at a licensed offshore disposal site;
- Changes in seabed bathymetry and composition as a result of deposition of dredged/disposal material within the area of the respective plumes;
- Construction vessel activity – impacts on local hydrodynamics and sediment transport arising from ship wash and vessel propulsion;
- Increased SSC and potential sedimentation in the area of dispersal plume as a result of maintenance dredging;
- Increased SSC and potential sedimentation as a result of deposition of maintenance dredge material at a licensed disposal site; and
- Changes in seabed bathymetry and composition as a result of deposition of dredged/disposed maintenance dredge material.

7.3.2 The impact pathways in Section 7.8 of Chapter 7 of the ES [APP-043] that have the potential to be affected by Proposed Change 1 and Proposed Change 4 are listed below. The following sections provide the updated impact assessment for these pathways in light of the Proposed Changes.

- Local changes to hydrodynamic regime (flow speed and direction) as a result of the piers (piling) and capital dredging;
- Local changes to the wave regime, as a result of the piers (piling) and capital dredging;
- Associated local changes to the sediment transport pathways, as a result of localised changes to the driving hydrodynamic (and wave) forcing; and
- Potential impact on existing features, including marine infrastructure, outfalls and estuary banks and channels.

Local changes to hydrodynamic regime (flow speed and direction) as a result of the piers (piling) and capital dredging

7.3.3 Whilst there are no proposed changes to the extent, depth and volume of the capital dredging works, the proposed changes to the pile locations (associated with Proposed Change 1 and Proposed Change 4) could result in changes to the predicted impact of the scheme on the local hydrodynamic regime. In order to assess this, the numerical modelling tools (as described

in Chapter 7 of the ES) were used to reassess the development using the proposed updated pile arrangement.

- 7.3.4 Following assessment of the updated scheme layout, the magnitude and extent of predicted impacts on tidal flow speeds remains consistent with those described in the submitted ES. Maximum changes to flow speeds remain around ± 0.2 to 0.3 m/s (limited in extent to within a few tens of metres of the dredge pocket). Outside of the berth pocket, changes to peak flow speeds on both flood and ebb tides are typically less than 5% of baseline flows. The results of the assessment of the updated scheme layout are provided in Figure 7.1 and Figure 7.2 in this ESA, which show the baseline flows and predicted changes over peak flood and ebb tides, respectively.
- 7.3.5 Following the updated impact assessment, the conclusion reached in the ES still holds true. In summary, as stated in the ES, marginal changes to hydrodynamics (local flow speeds) are likely to result from the IERRT within, and adjacent to, the proposed berth pocket. Slight changes in flow speed are predicted to extend up-estuary to Immingham Outer Harbour (IOH) and down-estuary past the IOT jetty. The largest predicted magnitude of change is anticipated within the berth pocket itself (particularly towards the landward edge, as a result of the larger change in depth as a result of the dredge). Overall, the probability of occurrence is considered high, although the magnitude of change is assessed as small, giving rise to an overall **low** exposure to change.

Local changes to the wave regime, as a result of the piers (piling) and capital dredging

- 7.3.6 Whilst there are no proposed changes to the extent, depth and volume of the capital dredging works, the proposed changes to the pile locations (associated with Proposed Change 1 and Proposed Change 4) could result in changes to the predicted impact of the scheme on the local wave regime. In order to assess this, the numerical modelling tools (as described in Chapter 7 of the ES) were used to reassess the development using the proposed updated pile arrangement.
- 7.3.7 As with the re-assessment of changes to hydrodynamics, the nature of the Proposed Changes result in an assessment of changes to waves that remains consistent with that presented in the ES. In summary, as stated in the ES, marginal changes to significant wave height are predicted within (and adjacent to) the proposed berth pocket. For the range of wave events assessed, slight changes in wave height (typically less than 5% of baseline values) are predicted to extend up-estuary as far as the Immingham Bellmouth (for waves approaching from the southeast). The largest predicted magnitude of change is predicted within, and adjacent to, the berth pocket itself. The results of the assessment of the updated scheme layout

are provided in Figure 7.5, Figure 7.6, and Figure 7.7 in this ESA, which show the baseline wave heights and predicted changes over the range of wave return period events and approach directions.

- 7.3.8 Overall, the probability of occurrence is considered high, although the magnitude of change is assessed as small, giving rise to an overall **low** exposure to change.

Associated local changes to the sediment transport pathways, as a result of localised changes to the driving hydrodynamic (and wave) forcing

- 7.3.9 The local and regional sediment transport pathways are driven by the hydrodynamic and wave regimes across the study area. Consequently, with the proposed updates resulting in no change to the assessment outcomes for either of the driving forces (as described above), the assessment of impact on sediment transport pathways also remains as described in the ES.
- 7.3.10 In summary, as stated in the ES, hydrodynamic and wave forcing within (and adjacent to) the proposed IERRT will only be marginally altered and, therefore, changes in the sediment pathways will be small. Predicted changes to future sediment transport are greatest within the proposed dredge pocket itself, which will require future maintenance dredging to ensure sufficient under keel clearance for vessels on berth. The rate of infill is likely to be similar to that already experienced within the existing Immingham berths. Outside the proposed berth pocket, the proposed scheme generally has limited impact on the baseline sedimentation and erosion rates.
- 7.3.11 As with the previous scheme layout (as described in paragraph 7.8.59 of Chapter 7 of the ES [APP-043]), in addition to the predicted increased accretion within parts of the proposed berth pocket, slight increases in local peak ebb current speed landward of the berth pocket (Figure 7.2 in this ESA) result in associated increases to bed shear stress (BSS) (Figure 7.4 in this ESA). These increases lead to a limited amount of predicted erosion of the bed along part of the lower intertidal (at the elevation of mean low water springs (MLWS)) beneath the landward end of the proposed approach jetty. Figure 7.3 in this ESA shows the difference in bed thickness change against the baseline, with negative values indicating areas of either increased erosion or of reduced accretion.
- 7.3.12 Over a mean spring neap cycle, the predicted erosion is around 0.05 m, resulting in a potential indirect loss in intertidal area of approximately 0.02 ha. This is an increase compared to that presented in Chapter 7 of the ES [APP-043], which reported a potential indirect loss in intertidal area of approximately 0.01 ha. However, as described in paragraph 7.8.59 of

Chapter 7 of the ES, the assessment indicates that once this part of the softer upper layer is removed, the harder, more consolidated, underlayer of bed material is unlikely to erode further. This calculation represents a worst-case assessment of potential elevation changes and has been considered on a precautionary basis. The level of predicted change is at the limit of the accuracy of the modelled data and, in real terms, is likely to be immeasurable against the context of natural variability (as a result of storm events, for example).

- 7.3.13 As a result, the probability of occurrence is considered to be high, and the magnitude of change is assessed as small, resulting in an overall **low** exposure to change.

Potential impact on existing features, including marine infrastructure, outfalls and estuary banks and channels

- 7.3.14 Identified changes to the existing (baseline) hydrodynamics, waves and associated sediment transport pathways have the potential to impact existing features. As described above, the Proposed Changes do not significantly alter the assessment outcomes for any of these; consequently, the assessment of potential impact on existing features remains as described in the ES.
- 7.3.15 In summary, as stated in the ES, changes to flows and waves (and associated sediment transport pathways) are likely to result from the IERRT marine facilities within, and adjacent to, the proposed berth pocket and jetty infrastructure. These changes are predicted to be greatest in closest proximity to the development, reducing in magnitude with distance. Across the near-field, the probability of occurrence is considered high, although the magnitude of change is assessed as small giving rise to an overall **low** exposure to change. Across the far-field, the probability of occurrence is considered low, and the magnitude of change is assessed as negligible, giving rise to an overall **negligible** exposure to change.

7.4 Updates required to figures

- 7.4.1 Following the updated assessment of the Proposed Changes, the following figures are provided at the end of this chapter (the corresponding figure of Chapter 7 of the ES [APP-063] that has been updated is noted in brackets):
- Figure 7.1 Peak flood baseline flow speed and predicted change (updates Figure 7.8 of Chapter 7 of the ES);
 - Figure 7.2 Peak ebb baseline flow speed and predicted change (updates Figure 7.9 of Chapter 7 of the ES);
 - Figure 7.3 Modelled bed level change over a mean spring-neap cycle (updates Figure 7.19 of Chapter 7 of the ES);

- Figure 7.4 Predicted change to BSS on flood and ebb tides (updates Figure 7.20 of Chapter 7 of the ES);
- Figure 7.5 Baseline wave height and effect of scheme for 0.5-yr wave event from northeast and east directions (updates Figure 7.22 of Chapter 7 of the ES);
- Figure 7.6 Baseline wave height and effect of scheme for 0.5-yr wave event from southeast and 50-yr wave event from northeast directions (updates Figure 7.23 of Chapter 7 of the ES); and
- Figure 7.7 Baseline wave height and effect of scheme for 50-yr wave event from east and southeast directions (updates Figure 7.24 of Chapter 7 of the ES).

7.5 Updates required to appendices

7.5.1 The appendices relating to Chapter 7 of the ES are as follows:

- Appendix 7.1 Numerical Model Calibration Report [APP-084];
and
- Appendix 7.2 Marine Geophysical Survey Report [APP-085].

7.5.2 These appendices are not affected by the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA and do not require updating.

7.6 Impact assessment summary

7.6.1 Table 7.2 summarises the impact assessment presented in the physical processes chapter (Chapter 7) of the ES [APP-043], and how the Proposed Changes alter the significance of the impacts.

Table 7.2. Physical processes impact assessment summary

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Physical processes				
	Exposure to change ¹	Significance		
<i>Construction phase</i>				
Increased suspended sediment concentration (SSC) and potential sedimentation over the extent of the disturbance plume as a result of the construction of the new piers (piling) and capital dredging works	Low	N/A	N/A	None
Increased SSC and potential sedimentation as a result of the deposit of capital dredge material at a licensed offshore disposal site	Low	N/A	N/A	None
Changes in seabed bathymetry and composition as a result of deposition of dredged/disposal material within the area of the respective plumes	Low	N/A	N/A	None
Construction vessel activity – impacts on local hydrodynamics and sediment transport arising from ship wash and vessel propulsion	Low/negligible	N/A	N/A	None

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

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
<i>Operational phase</i>				
Local changes to hydrodynamic regime (flow speed and direction) as a result of the piers (piling) and capital dredging	Low	N/A	N/A	None
Local changes to the wave regime, as a result of the piers (piling) and capital dredging	Low	N/A	N/A	None
Associated local changes to the sediment transport pathways, as a result of localised changes to the driving hydrodynamic (and wave) forcing	Low	N/A	N/A	None
Potential impact on existing features, including marine infrastructure, outfalls and estuary banks and channels	Low/negligible	N/A	N/A	None
Increased SSC and potential sedimentation in the area of dispersal plume as a result of maintenance dredging	Low	N/A	N/A	None
Increased SSC and potential sedimentation as a result of deposition of maintenance dredge material at a licensed disposal site	Low	N/A	N/A	None
Changes in seabed bathymetry and composition as a result of deposition of dredged/disposed maintenance dredge material	Low	N/A	N/A	None

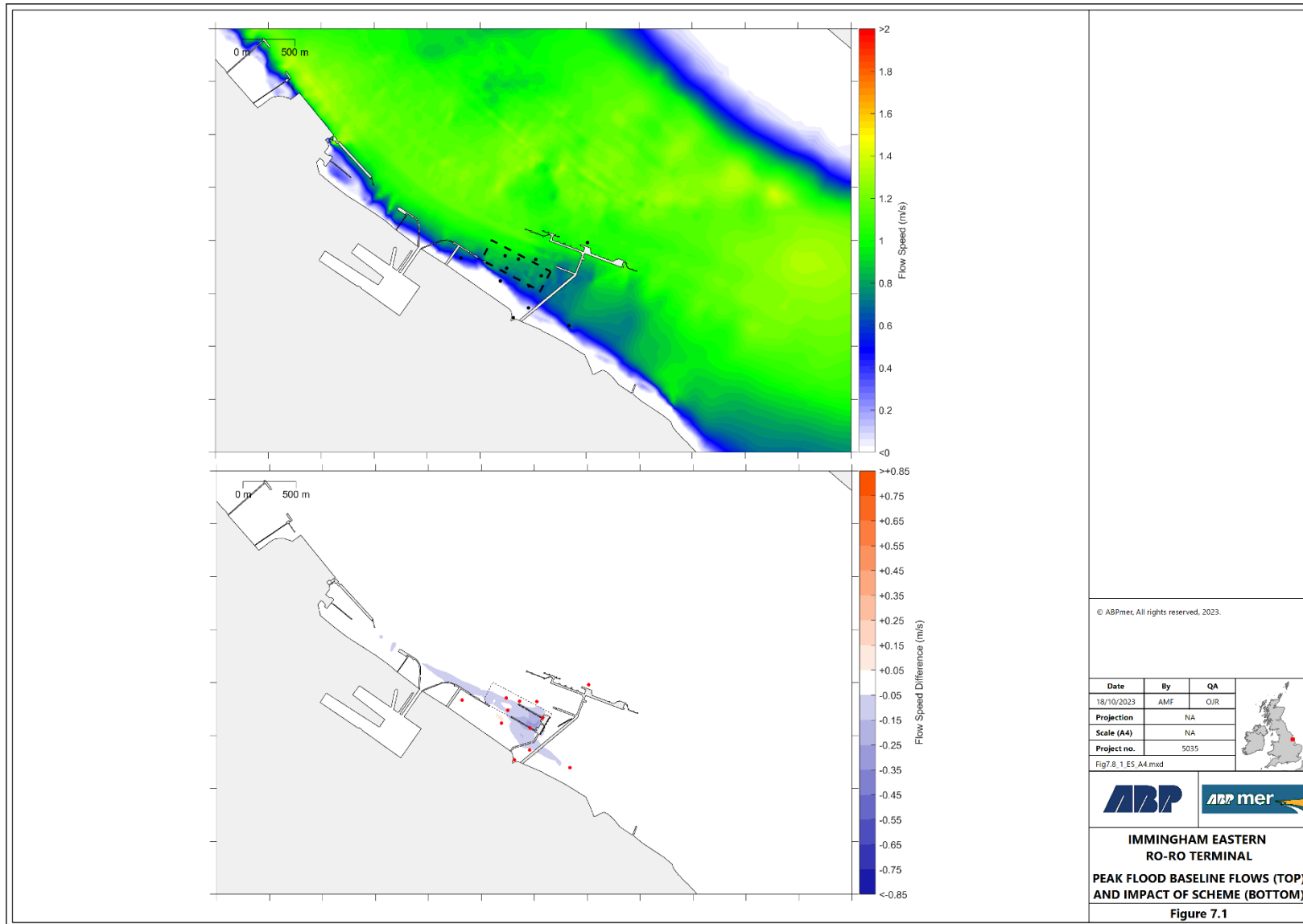


Figure 7.1. Peak flood baseline flow speed and predicted change

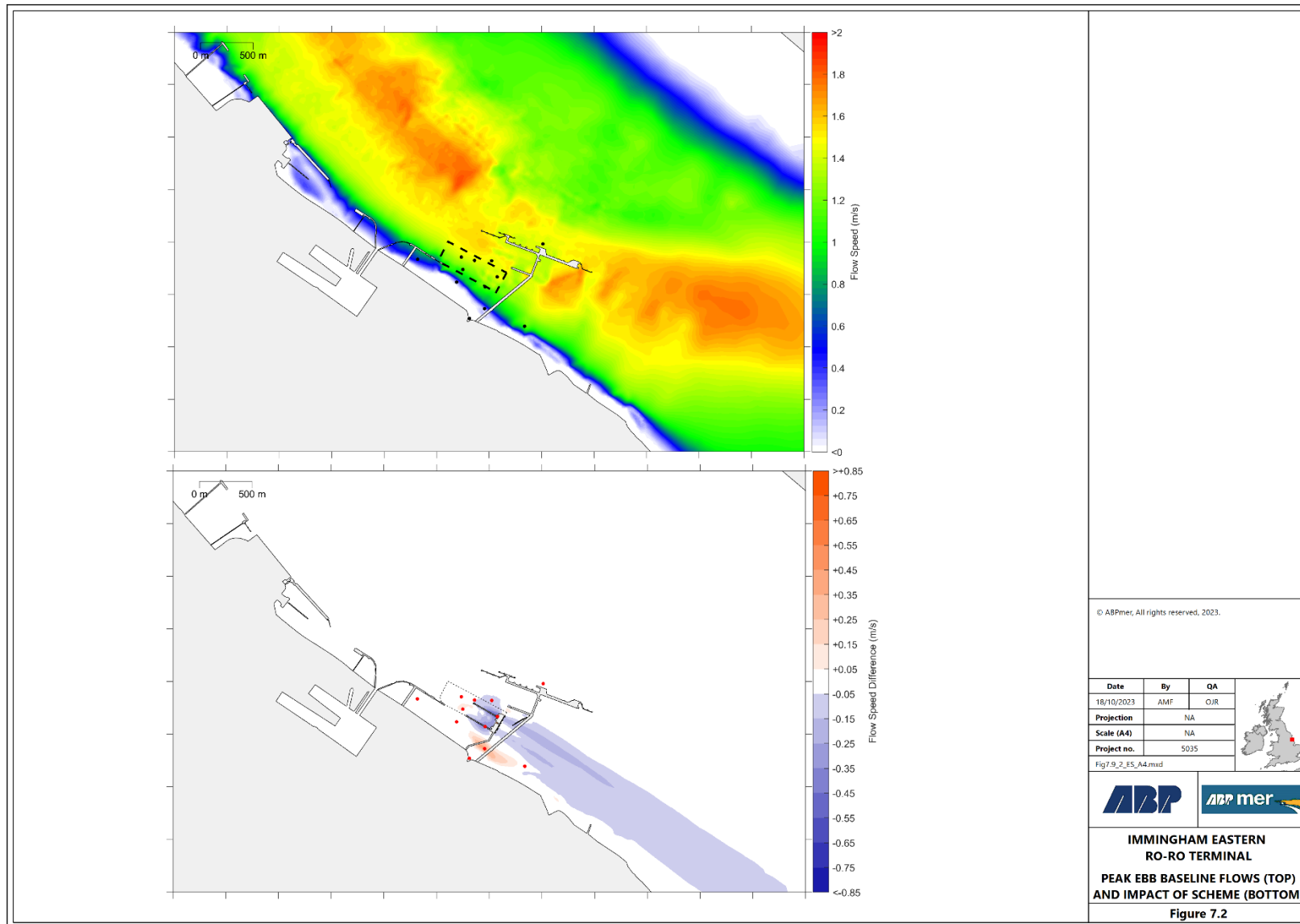


Figure 7.2. Peak ebb baseline flow speed and predicted change

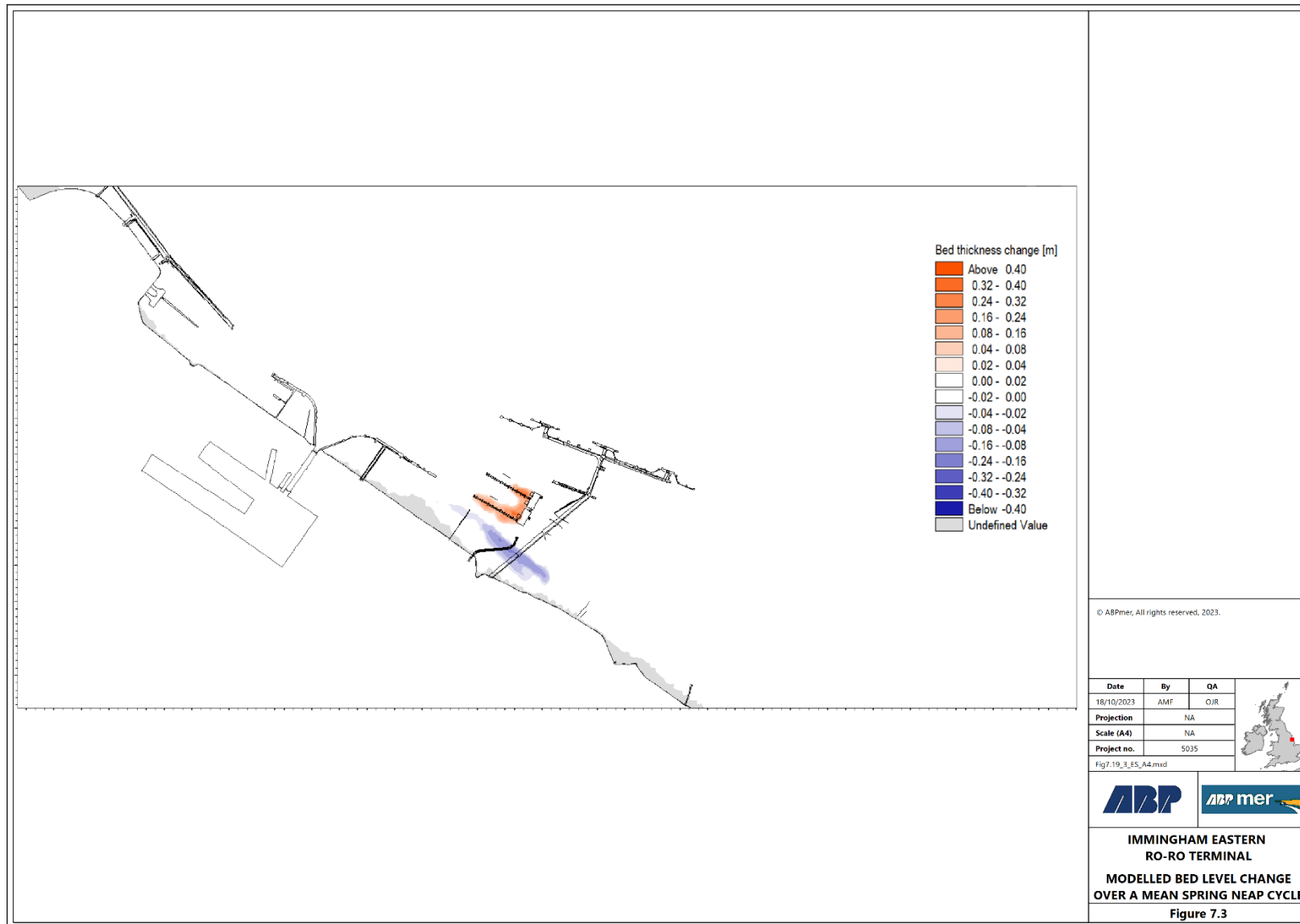


Figure 7.3. Modelled bed level change over a mean spring-neap cycle

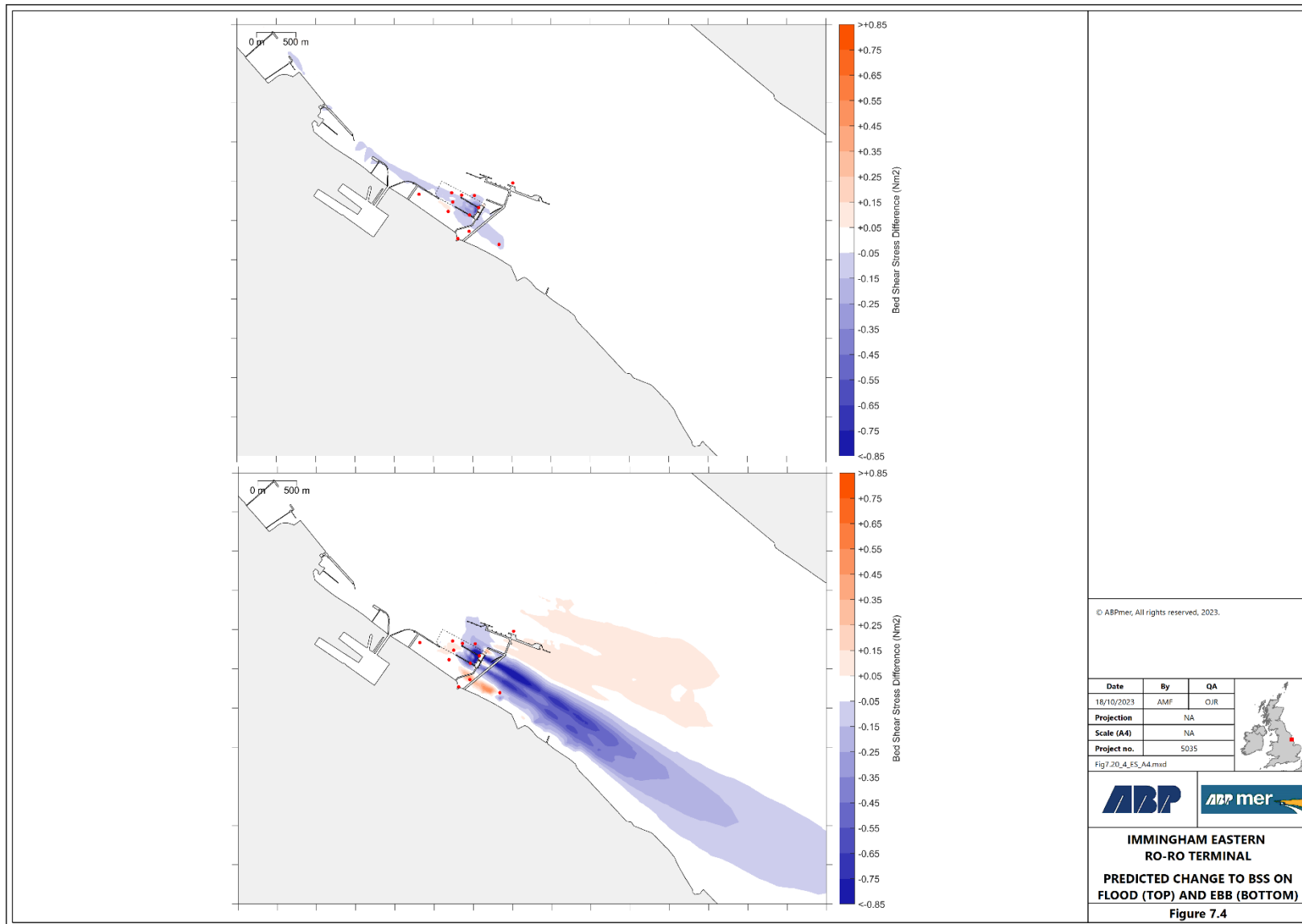


Figure 7.4. Predicted change to BSS on flood and ebb tides

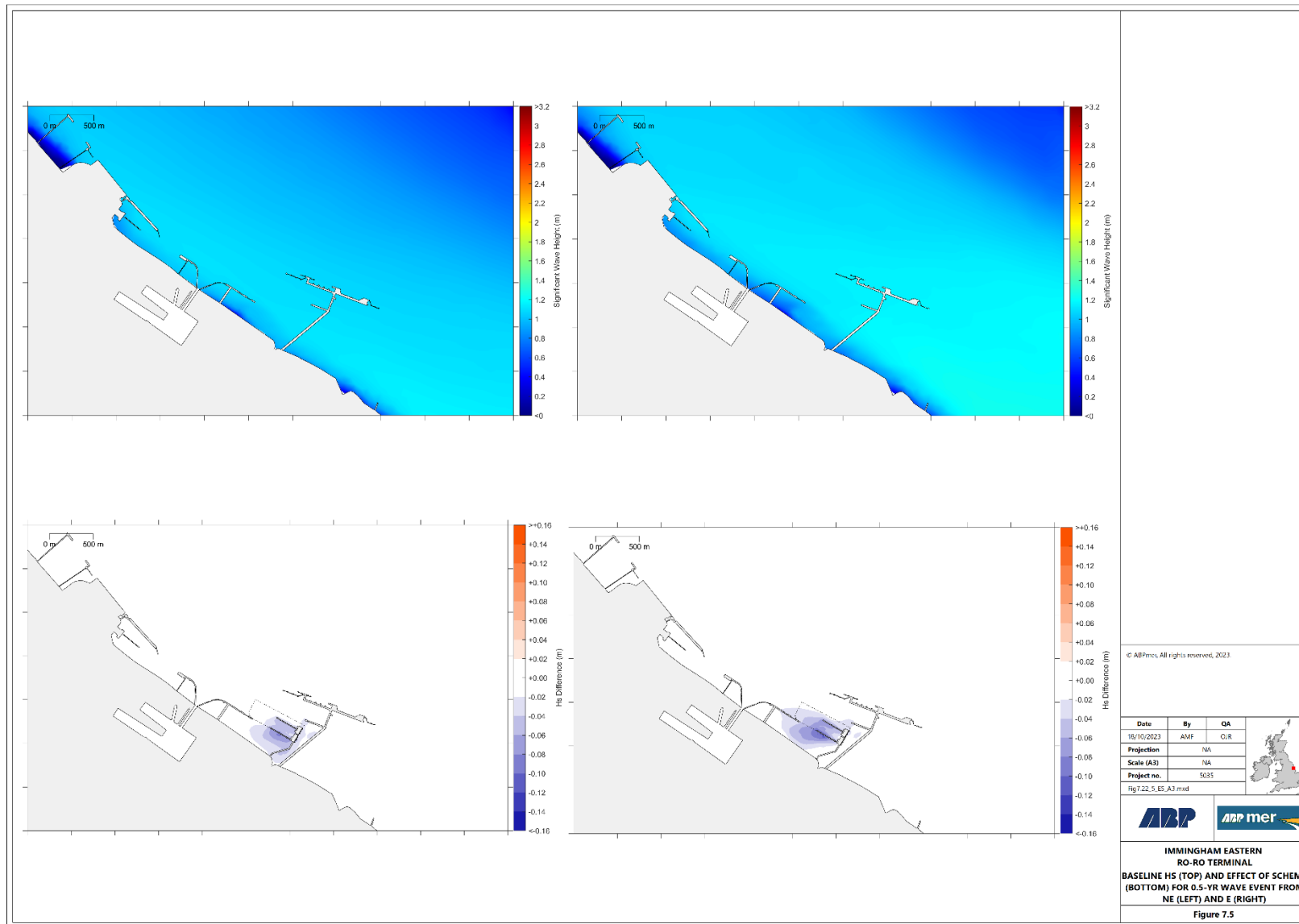


Figure 7.5. Baseline wave height and effect of scheme for 0.5 yr wave event from northeast and east directions

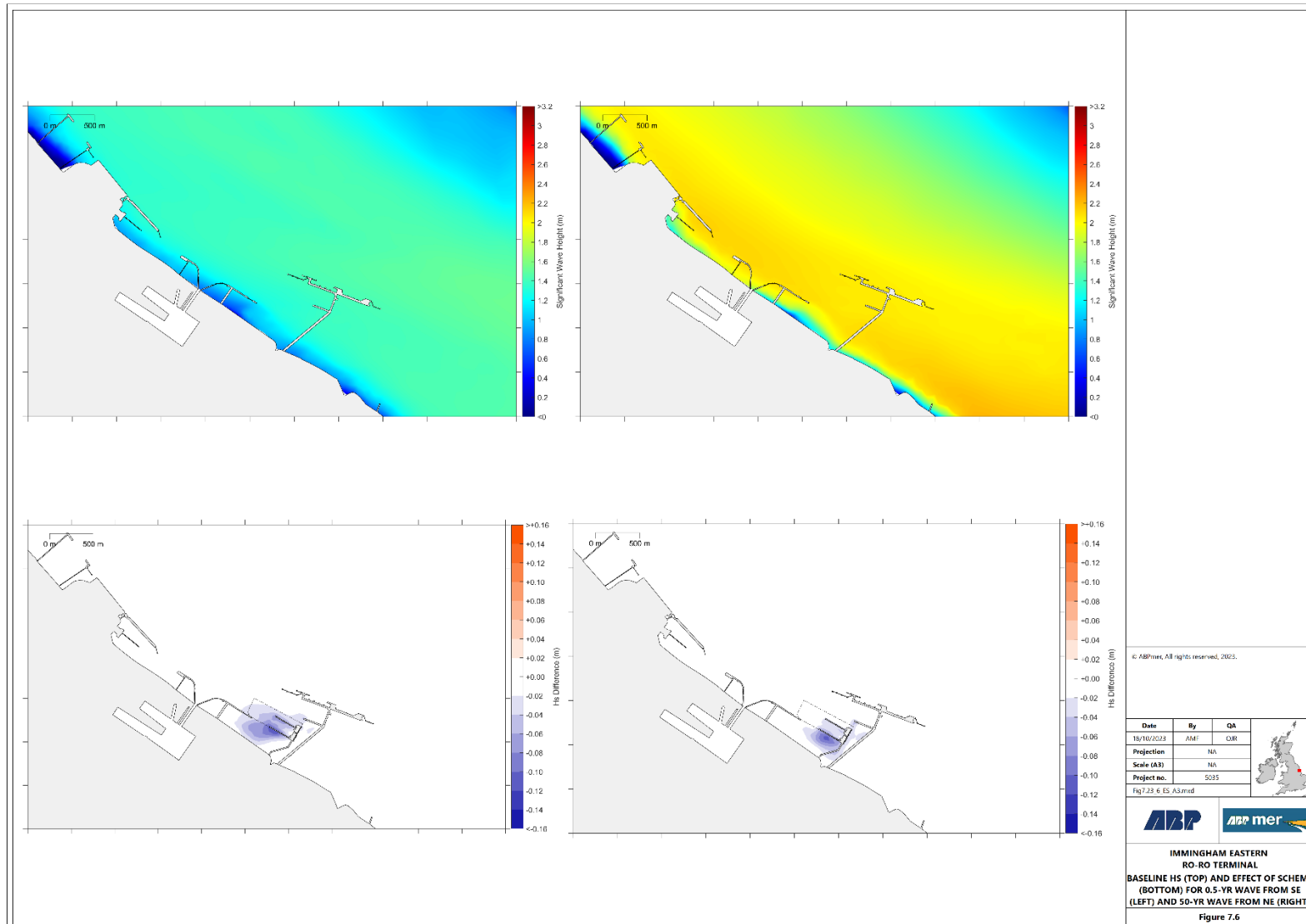


Figure 7.6. Baseline wave height and effect of scheme for 0.5 yr wave event from southeast and 50-yr wave event from northeast directions

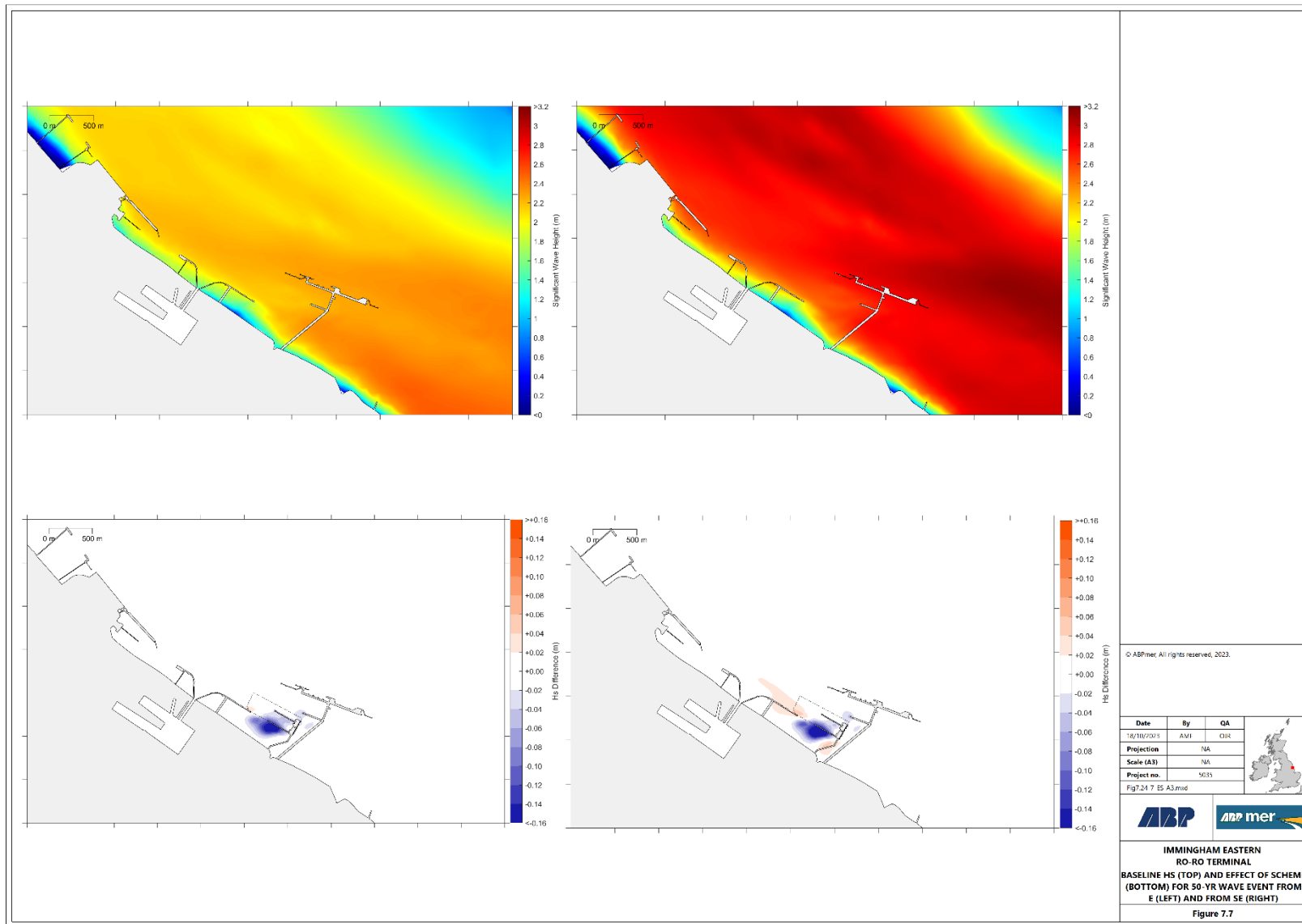


Figure 7.7. Baseline wave height and effect of scheme for 50 yr wave event from east and southeast directions

8 Water and Sediment Quality (Chapter 8)

8.1 Introduction

- 8.1.1 Chapter 8 of the ES [APP-044] provided an assessment of the potential significant effects of the proposed IERRT on water and sediment quality (dissolved oxygen and contaminants) within the marine environment.
- 8.1.2 Baseline conditions were determined through a desk-based review of available information. A project-specific sediment contamination survey was also undertaken.
- 8.1.3 The IERRT and disposal sites are located within the Humber Lower Water Framework Directive (WFD) water body (ID: GB530402609201). The current overall status of this waterbody is 'moderate', with an ecological potential of 'moderate', and a chemical status of 'fail' due to the presence of priority substances and priority hazardous substances exceeding threshold concentrations (environmental quality standards). Environment Agency water quality monitoring data reflect these failures.
- 8.1.4 The sediments from most of the locations sampled within the proposed dredge area were dominated by silts, with a few samples predominantly comprising sand material and/or a low proportion of gravel. Contaminants analysed from sediment samples were generally at low concentrations, and all results were below the established thresholds that would consider the material unsuitable for disposal at sea. In general, concentrations were typically higher in surface samples compared to those obtained at depth.
- 8.1.5 In Chapter 8 of the ES [APP-044], the assessment of the potential changes in water and sediment quality considered a total of six impact pathways over construction and operational phases, including changes in dissolved oxygen and chemical water quality, and the redistribution of sediment-bound contaminants as a result of sediment disturbance and increases in SSCs.

8.2 Consultation

- 8.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. The outcome of the consultation that has been undertaken, along with how it has influenced the water and sediment quality assessment, is presented in Table 8.1 of this chapter of the ESA.

Table 8.1. Summary of consultation relevant to water and sediment quality

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
MMO (CA 32)	Change Application Consultation 17.11.23	Previous comments made by the MMO during the course of the examination relating to concentrations of contaminants in dredge sediment were referenced. No specific comments were raised pertaining to effects to water and sediment quality as a result of the Proposed Changes.	The MMO's comments are noted. The comments raised have been addressed and resolved in other Examination documents where the MMO confirm that no outstanding issues remain related to water and sediment quality and dredge and disposal activities [REP5-044]. This is reflected in the final and agreed Statement of Common Ground (SoCG) between the Applicant and the MMO [REP6-009].

8.3 Updates required to impact assessment

8.3.1 There are no additional impact pathways in relation to water and sediment quality introduced by the Proposed Changes (described in Chapter 2 and Chapter 3 of this ESA). Furthermore, none of the impact pathways assessed in Section 8.8 of Chapter 8 of the ES [APP-044] are affected by the revisions to the IERRT project. This is because the Proposed Changes will not affect the magnitude of change caused by piling, dredging, and disposal activities. The sensitivity and importance of receptors also remains unchanged.

8.4 Updates required to figures

8.4.1 No figures in Volume 2 of the ES relating to Chapter 8 of the ES [APP-064] require updating following the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

8.5 Updates required to appendices

8.5.1 The appendix relating to Chapter 8 of the ES is Appendix 8.1 – Water Framework Directive Compliance Assessment [APP-086].

8.5.2 This appendix does not require updating in light of the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

8.6 Impact assessment summary

- 8.6.1 Table 8.2 below summarises the impact assessment presented in the water and sediment quality chapter (Chapter 8) of the ES [APP-044], and how the Proposed Changes alter the significance of the impacts.

Table 8.2. Water and sediment quality impact assessment summary

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Major beneficial				
Moderate beneficial				
Minor beneficial				
Insignificant / Negligible / Neutral / Low				
Minor adverse / Slight adverse				
Moderate adverse / potentially significant				
Major adverse / Significant / Large adverse				
Water and sediment quality				
<i>Construction phase</i>				
Changes to dissolved oxygen concentrations as a result of increased SSC during piling, capital dredging and disposal activities	Insignificant to minor adverse	N/A	Insignificant to minor adverse	None
Changes to chemical water quality as a result of potential sediment-bound contaminants being released during piling, capital dredging and disposal activities	Insignificant	N/A	Insignificant	None
Redistribution of sediment-bound contaminants during piling, capital dredging and disposal activities	Insignificant	N/A	Insignificant	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
<i>Operational phase</i>				
Changes to dissolved oxygen concentrations as a result of increased SSC during the maintenance dredging and disposal activities	Minor adverse	N/A	Minor adverse	None
Changes to chemical water quality as a result of potential contaminants in the seabed sediment being released during maintenance dredging and disposal activities	Insignificant	N/A	Insignificant	None
Redistribution of sediment-bound contaminants during maintenance dredging and disposal activities	Insignificant	N/A	Insignificant	None

9 Nature Conservation and Marine Ecology (Chapter 9)

9.1 Introduction

- 9.1.1 Chapter 9 of the ES [APP-045] provided an assessment of the potential significant effects of the proposed IERRT on nature conservation and marine ecology, specifically nature conservation designations and protected species, benthic habitats and species, fish, marine mammals and coastal waterbirds.
- 9.1.2 Baseline conditions were determined through a desk-based review of available information, which included data from the Humber Estuary collected and analysed by ABPmer for over 20 years. A project-specific benthic survey was also undertaken to characterise seabed habits and species in the proposed dredge and disposal footprints.
- 9.1.3 The IERRT site falls within the boundaries of the Humber Estuary Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar site. The Humber Estuary Site of Special Scientific Interest (SSSI) also overlaps part of the project site. The Holderness Inshore Marine Conservation Zone (MCZ) is the nearest MCZ to the proposed development, located approximately 20 km away. There are numerous records of protected species in the Humber Estuary including birds, seals, dolphins, fish, eels and marine invertebrates. The site footprint overlaps protected intertidal mudflat habitat.
- 9.1.4 In Chapter 9 of the ES, the assessment considered a total of 20 impact pathways over construction and operational phases, including the direct loss of habitat, direct and indirect changes to habitats and species, changes in water and sediment quality, the potential introduction and spread of non-native species, underwater noise and vibration, airborne noise and visual disturbance. Effects from changes in air quality on nature conservation receptors were considered in Chapter 13 of the ES.

9.2 Consultation

- 9.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. The outcome of the consultation that has been undertaken, along with how it has influenced the marine ecology assessment, is presented in Table 9.1 of this chapter of the ESA.

Table 9.1. Summary of consultation relevant to marine ecology

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
MMO (CA 32)	Change Application Consultation 17.11.23	<p>The MMO does not have any concerns regarding the proposed changes with regards to benthic ecology. The impact of the proposed development on benthic ecology receptors following the proposed changes will be approximately equivalent to what was originally assessed in the ES, and therefore the MMO has no further comments to make on this topic.</p>	<p>The MMO’s comments are noted.</p>
		<p>The MMO does not have any concerns relating to fisheries from the proposed changes to the project. We are content that the significance of impacts arising from direct loss or changes to fish populations, loss of habitat, and changes in water and sediment quality as a result of dredging and dredge disposal will remain broadly the same as those assessed in the ES.</p>	<p>The MMO’s comments are noted.</p>
		<p>Concerning the impacts to fish from underwater noise and vibration during piling, the MMO notes that the number of piles to be installed has changed, with a decrease in the number required for the approach jetty, but an increase in the number of piles required for the dolphins, plus a change in pile diameter is required in some instances. Overall, the MMO considers the changes are not of concern, however, the MMO, in consultation with Cefas fisheries and underwater noise advisors, are in consultation with the Applicant regarding appropriate mitigation measures for underwater noise impacts to fish. A meeting between the MMO, Cefas and the Applicant was held on 7 November 2023 and a separate consultation is expected to be held regarding this shortly.</p>	<p>The MMO’s comments are noted. Discussions between the Applicant and the MMO are ongoing regarding appropriate mitigation measures for underwater noise impacts to fish. However, as noted by the MMO, underwater noise effects on migratory fish and the mitigation measures for underwater noise are not affected by the Proposed Changes.</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
		The MMO has no concerns relating to shellfisheries caused by the proposed changes to the project and therefore has no further comments to make regarding this.	The MMO's comments are noted.
		The MMO does not have any major concerns regarding the proposed changes with regards to underwater noise. Given that the additional piling (if approved) will be undertaken with the original footprint of the project, the MMO believes that the conclusions of the original underwater noise assessment are valid.	The MMO's comments are noted.
		The MMO presumes 180 minutes of impact piling and 20 minutes of vibro-piling each working day is also applicable to the additional piling that is required as a result of the proposed changes, but it would be helpful if this could please be confirmed.	The MMO's presumption is correct.
Natural England (CA 34)	Change Application Consultation 17.11.23	With regard to the Proposed Change 1 (realignment of the approach jetty and related works) and Proposed Change 2 (realignment of the internal link bridge and consequential works), Natural England confirms that these elements will not result in a change to the assessment of impact significance compared to the documents originally submitted into Examination. As regards to Proposed Change 3 (realignment of the UKBF facilities) and Proposed Change 4 (enhanced management controls and options for the potential provision of additional impact protection measures), Natural England has no comment to make.	Natural England's comments are noted. The Applicant's dialogue with Natural England continues regarding matters related to the main application.

9.3 Updates required to impact assessment

9.3.1 There are no additional impact pathways in relation to nature conservation and marine ecology introduced by the Proposed Changes (described in Chapter 2 and Chapter 3 of this ESA). Furthermore, the following pathways assessed in Section 9.8 of Chapter 9 of the ES [APP-045] are not affected by the revisions to the IERRT project:

- Changes to benthic habitats and species as result of the removal of seabed material during capital dredging;
- Changes to benthic habitats and species as a result of sediment deposition during capital dredging and dredge disposal;
- Changes in water and sediment quality during capital dredging and dredge disposal and effects on benthic habitats and species;
- Underwater noise and vibration during piling, capital dredging and dredge disposal and effects on benthic habitats and species;
- Introduction and spread of non-native species during construction;
- Changes to benthic habitats and species as result of seabed removal during maintenance dredging;
- Changes to intertidal habitats and species as a result of the movement of Ro-Ro vessels during operation;
- Non-native species transfer during vessel operation;
- Direct loss or changes to fish populations and habitat as a direct result of capital dredging and dredge disposal;
- Changes in water and sediment quality as a result of capital dredging and dredge disposal and effects on fish;
- Underwater noise disturbance and vibration during piling, capital dredging and dredge disposal and effects on fish;
- Underwater noise disturbance and vibration during piling, capital dredging and dredge disposal and effects on marine mammals;
- Noise and visual disturbance to waterbirds during construction; and
- Disturbance of waterbirds during operation.

9.3.2 The impact pathways in Section 9.8 of Chapter 9 of the ES [APP-045] that have the potential to be affected by Proposed Change 1 (marine infrastructure) and Proposed Change 4 (impact protection measures) are listed below. The following sections provide the updated impact assessment for these pathways in light of the Proposed Changes.

- Direct loss of intertidal habitat as a result of capital dredging and piles;
- Direct loss of subtidal habitat as a result of the piles;
- Indirect loss or change to seabed habitats and species as a result of changes to hydrodynamic and sedimentary processes;
- Direct changes to benthic habitats and species beneath marine infrastructure due to shading;

- Loss or change to coastal waterbird habitat; and
- Direct changes to foraging and roosting habitat as a result of the presence of infrastructure.

Direct loss of intertidal habitat as a result of capital dredging and piles

9.3.3 In Chapter 9 of the ES, it is reported that the IERRT development will result in the direct loss of 0.012 ha of intertidal habitat. This is as a result of:

- Capital dredging, which has the potential to cause a direct loss of 0.006 ha of intertidal habitat which will become subtidal habitat as a result of the deepening; and
- Piling, which will cause a direct loss of 0.006 ha of intertidal mudflat habitat.

9.3.4 The proposed changes to the alignment of the approach jetty, and the number, location and spacing of piles (Proposed Change 1), has the potential to reduce the amount of intertidal habitat loss beneath the piles. However, there will also be additional, albeit temporary, piles installed for the construction of the jetty. Overall, the amount of direct intertidal habitat loss as a result of the piling remains the same as set out in ES (0.006 ha). This is the case even when accounting for the temporary piles in the habitat loss calculations. No changes are proposed to the capital dredging and, therefore, the total amount of direct intertidal habitat loss remains 0.012 ha.

9.3.5 On this basis, the potential effects arising from the direct loss of intertidal are considered to be **insignificant**. This is the same level of significance that was concluded in Chapter 9 of the ES for this impact pathway.

Direct loss of subtidal habitat as a result of the piles

9.3.6 In Chapter 9 of the ES, it is reported that piling in the subtidal area will result in the direct loss of 0.027 ha of seabed habitat.

9.3.7 A small number of additional piles are proposed to be installed for the restraint dolphins and fingers piers as part of Proposed Change 1 (see Chapter 2 of this ESA). Furthermore, additional piles are required for the impact protection measures at the end of the IOT finger pier as part of Proposed Change 4.

9.3.8 In the assessment of habitat loss in Chapter 9 of the ES, a maximum pile diameter of 1,422 mm was accounted for. There is now more certainty in the design of the marine infrastructure such that a portion of the marine piles will have a smaller diameter (noting that the maximum pile diameter for the impact protection measures and restraint dolphins has increased to 1,520 mm as a worst case, as described in Chapter 2 of this ESA).

However, overall, the amount of subtidal habitat loss will increase slightly to 0.032 ha as a result of the Proposed Changes.

- 9.3.9 Nevertheless, the slight increase in direct subtidal habitat loss beneath the piles is still of a magnitude considered to be negligible. Therefore, the effect resulting from direct habitat loss on subtidal benthic habitats and species is assessed as **insignificant**. This is the same level of significance that was concluded in Chapter 9 of the ES for this impact pathway.

Indirect loss or change to seabed habitats and species as a result of changes to hydrodynamic and sedimentary processes

- 9.3.10 In Chapter 9 of the ES, it is reported that there would be an indirect loss in intertidal area measuring approximately 0.01 ha as result of slight increases to current speeds.
- 9.3.11 As described in Chapter 7 of this ESA, the proposed changes to the marine infrastructure will cause a change to the hydrodynamic regime compared with that reported in Chapter 7 of the ES [APP-043]. Consequently, the amount of indirect loss of intertidal habitat will increase to 0.02 ha.
- 9.3.12 As noted in paragraph 9.8.63 of Chapter 9 of the ES, this calculation represents a worst-case assessment of potential elevation changes and has been considered on a precautionary basis. The level of predicted change is at the limit of the accuracy of the modelled data and, in real terms, is likely to be immeasurable against the context of natural variability (as a result of storm events, for example).
- 9.3.13 As noted in paragraph 9.8.66 of Chapter 9 of the ES, the predicted indirect intertidal loss, albeit assessed on a worst-case basis, also consists of a very narrow strip on the lower shore around the sublittoral fringe. This predicted loss would be of a similar scale to that which can occur due to natural background changes in mudflat extent in the local region (e.g., due to seasonal patterns in accretion and erosion or following storm events). It is not considered that this *de minimis* change in mudflat extent will change the overall structure or functioning of the nearby mudflats within the Port of Immingham area or more widely in the Humber Estuary
- 9.3.14 On this basis, the slight increase in indirect intertidal habitat loss is still of a magnitude considered to be negligible. Therefore, the effect resulting from indirect habitat loss on intertidal benthic habitats and species is assessed as **insignificant**. This is the same level of significance that was concluded in Chapter 9 of the ES for this impact pathway.

Direct changes to benthic habitats and species beneath marine infrastructure due to shading

- 9.3.15 The proposed changes to the marine works will not significantly alter the amount of shading that would be caused by the IERRT. The more direct alignment and shorter length of the approach jetty that is proposed (Proposed Change 1) will result in a minor reduction in the amount of shading caused, whilst the additional impact protection measures (Proposed Change 4) will cause a minor increase in the amount of shading. Overall, therefore, the amount of shading caused by the Proposed Changes will be broadly similar to that reported in Chapter 9 of the ES.
- 9.3.16 Overall, the impact is assessed as **insignificant**. This is the same level of significance that was concluded in Chapter 9 of the ES for this impact pathway.

Loss or change to coastal waterbird habitat

- 9.3.17 In Chapter 9 of the ES, it is reported that the IERRT development will result in the loss of 0.022 ha of intertidal habitat due to the following direct and indirect effects:
- Capital dredging, which has the potential to cause a direct loss of 0.006 ha of intertidal habitat which will become subtidal habitat as a result of the deepening;
 - Piling, which will cause a direct loss of 0.006 ha of intertidal mudflat habitat; and
 - Capital dredging and marine infrastructure, which will cause a potential indirect loss of intertidal (0.01 ha) due to erosion caused by changes in currents.
- 9.3.18 The proposed changes to the marine works will increase the amount of indirect intertidal habitat loss to 0.02 ha (as reported above), resulting in a total intertidal habitat loss of 0.032 ha.
- 9.3.19 Nevertheless, the slight increase in intertidal habitat loss is still of a magnitude considered to be negligible. Therefore, the effect resulting from loss or change to coastal waterbird habitat is assessed as **insignificant**. This is the same level of significance that was concluded in Chapter 9 of the ES for this impact pathway.

Direct changes to foraging and roosting habitat as a result of the presence of infrastructure

- 9.3.20 The proposed changes to the approach jetty (Proposed Change 1) includes combining the piled rigid frames such that the spans between the piles are now 25 m (rather 12.5 m as previously assessed). The deck height is now

also proposed to be 1.5 m higher. This will further reduce the enclosed feel of the approach jetty on the mudflat and allow birds feeding near the structure to maintain sightlines. Therefore, Proposed Change 1 reduces the level of impact on waterbird foraging and roosting habitat as a result of the presence of infrastructure.

- 9.3.21 This impact pathway is assessed as **minor**. This is the same level of significance that was concluded in Chapter 9 of the ES for this impact pathway.

9.4 Updates required to figures

- 9.4.1 There is no requirement to update any of the figures in Volume 2 of the ES relating to Chapter 9 of the ES [APP-065] as a result of the Proposed Changes. It should be noted that some figures show the previous scheme outline submitted for the DCO application, however, none of the information presented has changed and has therefore not been updated (see paragraph 1.2.3 of this ESA).

9.5 Updates required to appendices

- 9.5.1 The appendices relating to Chapter 9 of the ES are as follows:
- Appendix 9.1 Benthic Surveys Summary Report [APP-087]; and
 - Appendix 9.2 Underwater Noise Assessment [APP-088].
- 9.5.2 These appendices are not affected by the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA and do not require updating.

9.6 Impact assessment summary

- 9.6.1 Table 9.2 summarises the impact assessment presented in the nature conservation and marine ecology chapter (Chapter 9) of the ES [APP-045], and how the Proposed Changes alter the significance of the impacts.

9.7 Updates required to Habitats Regulations Assessment Report

- 9.7.1 As noted in Section 9.3 of this ESA above, the Proposed Changes to the IERRT project set out in Chapter 2 and Chapter 3 of this ESA do not significantly change the assessment of effects on marine ecological receptors. Whilst there are minor changes to the scale of habitat loss associated with the IERRT project as a result of the Proposed Changes, the conclusions of Chapter 9 of the ES [APP-045] remain the same in that there are no significant effects predicted.

- 9.7.2 In light of the information contained in Section 9.2 of this ESA, the conclusions presented in the Habitats Regulations Assessment Report [APP-115] also remains the same, in that there is not considered to be an Adverse Effect on the Integrity (AEOI) of the Humber Estuary European Marine Sites (EMS) as result of the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

Table 9.2. Nature conservation and marine ecology impact assessment summary

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Major beneficial				
Moderate beneficial				
Minor beneficial				
Insignificant / Negligible / Neutral / Low				
Minor adverse / Slight adverse				
Moderate adverse / potentially significant				
Major adverse / Significant / Large adverse				
Nature conservation and marine ecology				
<i>Construction Phase</i>				
<i>Benthic habitats and species</i>				
Direct loss of intertidal habitat as a result of capital dredging and piles	Insignificant	N/A	Insignificant	None
Direct loss of subtidal habitat as a result of the piles	Insignificant	N/A	Insignificant	None
Changes to benthic habitats and species as result of the removal of seabed material during dredging	Insignificant to minor adverse	N/A	Insignificant to minor adverse	None
Changes to habitats and species as a result of sediment deposition during dredging and dredge disposal	Insignificant	Target disposal loads in the central/ deeper area of the disposal sites to reduce depth reductions	Insignificant	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Indirect loss or change to seabed habitats and species as a result of changes to hydrodynamic and sedimentary processes during capital dredging and dredge disposal	Insignificant	N/A	Insignificant	None
Changes in water and sediment quality during capital dredging and dredge disposal	Insignificant	N/A	Insignificant	None
Underwater noise and vibration during piling, capital dredging and dredge disposal	Insignificant	N/A	Insignificant	None
Introduction and spread of non-native species	Insignificant to minor adverse	Include biosecurity control measures within the Construction Environmental Management Plan (CEMP)	Insignificant to minor adverse	None
<i>Fish and shellfish</i>				
Direct loss or changes to fish populations and habitat as a direct result of dredging and dredge disposal	Insignificant to minor adverse	N/A	Insignificant	None
Changes in water and sediment quality as a result of dredging and dredge disposal	Insignificant	N/A	Insignificant	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Underwater noise disturbance and vibration during piling, capital dredging and dredge disposal	Minor to moderate (migratory fish during piling)	Apply soft start procedures during piling Use vibro piling where possible Seasonal piling restrictions Night time working restriction	Insignificant to minor adverse	None
	Insignificant to minor (other fish species during piling)	Apply soft start procedures during piling Use vibro piling where possible Seasonal piling restrictions Night time working restriction	Insignificant to minor adverse	None
	Insignificant to minor (dredge and dredge disposal)	N/A	Insignificant to minor adverse	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
<i>Marine mammals</i>				
Underwater noise disturbance and vibration during piling, capital dredging and dredge disposal	Minor to moderate adverse (piling)	Apply soft start procedures during piling Use vibro piling where possible Marine Mammal Observer will follow Joint Nature Conservation Committee (JNCC) protocol to minimise the risk of injury to marine mammals during percussive piling	Minor adverse	None
	Insignificant (dredge and dredge disposal)	N/A	Insignificant	None
<i>Coastal waterbirds</i>				
Loss or change to coastal waterbird habitat	Insignificant	N/A	Insignificant	None
Noise and visual disturbance	Inner finger pier and approach jetty: Minor adverse (low sensitivity species)	Winter marine construction restriction for certain aspects of the inner pier and approach jetty works (1 October to 31 March) Noise suppression system for piling on the outer finger pier	Minor adverse	None
	Inner finger pier and approach jetty: Moderate to major adverse (high sensitivity species)			None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
	Outer finger pier: Minor adverse (low sensitivity species)	Acoustic barrier/visual screen on approach jetty from 1 October to 31 March Acoustic barrier/screening on marine construction barges Apply soft start procedures during piling Cold weather construction restriction (all construction activity)		None
	Outer finger pier: Moderate adverse (high sensitivity species)			None
	Capital dredge: Negligible (all species).			None
<i>Operational Phase</i>				
<i>Benthic habitats and species</i>				
Changes to benthic habitats and species as result of seabed removal during maintenance dredging	Insignificant to minor adverse	N/A	Insignificant to minor adverse	None
Direct changes to benthic habitats and species beneath marine infrastructure due to shading	Insignificant	N/A	Insignificant	None
Changes to intertidal habitats and species as a result of the movement of Ro-Ro vessels during operation	Insignificant	N/A	Insignificant	None
Non-native species transfer during vessel operations	Insignificant to minor adverse	N/A	Insignificant to minor adverse	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
<i>Coastal waterbirds</i>				
Direct changes to foraging and roosting habitat as a result of the presence of infrastructure	Minor adverse	N/A	Minor adverse	None
Disturbance of waterbirds during operation	Minor adverse	Screening on the linkspan and approach jetty	Minor adverse	None

10 Commercial and Recreational Navigation (Chapter 10)

10.1 Introduction

- 10.1.1 Chapter 10 of the ES [APP-046] provided an assessment of the potential effects of the proposed IERRT on commercial and recreational navigation.
- 10.1.2 Baseline conditions were determined through a desk-based review of available information, which includes data from the Automatic Identification System (AIS), marine accident/incident data and information from nautical charts.
- 10.1.3 IERRT is located fully within the Port of Immingham Statutory Harbour Authority (SHA) area where ABP is the SHA. In this capacity, ABP is charged with a set of powers and duties which include the management and regulation of the safety of navigation and marine operations in its SHA area. The AIS data show regular use by port service craft (tugs, pilot boats, survey, line handling vessels etc.) and tankers in the vicinity of the proposed IERRT. There are no recreational facilities based at the Port of Immingham, however, there are approximately 1,000 permanent berths in the wider Humber Estuary.
- 10.1.4 In Chapter 10 of the ES, the assessment considered a total of 21 impact pathways over construction and operational phases, including the possibility of contact of works craft with port infrastructure and contact of commercial vessels with marine works, collision of passing vessels with works craft, payload related incidents, collision due to increased commercial vessel movements, collision with passing traffic, contact with the quay, vessel mooring failure. Consideration was also given to seven potential risks to commercial and recreational navigation as a result of the overlapping construction and operation of the IERRT project.

10.2 Consultation

- 10.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. The outcome of the consultation that has been undertaken, along with how it has influenced the commercial and recreational navigation assessment, is presented in Table 10.1 of this chapter of the ESA.

Table 10.1. Summary of consultation relevant to commercial and recreational navigation

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
<p>Associated Petroleum Terminals (APT) (CA 21)</p>	<p>Change Application Consultation 07.11.23</p>	<p>Queried what assessments have been undertaken to address impacts on IOT operations at the IOT Finger Pier brought about by the additional protection barrier both in relation to its construction and operation (noting that the existing finger pier has a roller fender to aid berthing of coastal tankers which will likely be more needed due to amended tidal flow resulting from the blocking effect of the IERRT pontoons).</p>	<p>A review of navigational risks associated with the IERRT project in light of the Proposed Changes is provided in the NRA Addendum at Annex C of this ESA.</p> <p>Proposed Change 4 includes provision for roller fenders to aid berthing of coastal tankers.</p>
		<p>Request confirmation that an assessment of residual navigation risk has been undertaken with proposed measures in place.</p>	<p>An assessment of residual navigational risk including the Proposed Changes is provided in the NRA Addendum at Annex C of this ESA.</p>
		<p>Queries whether assessments have been undertaken in relation to the IERRT construction and construction/operation phases, and whether it is intended that the additional infrastructure will be constructed prior to the IERRT becoming operational.</p>	<p>A review of navigational risks associated with the IERRT project in light of the Proposed Changes is provided in the NRA Addendum at Annex C of this ESA.</p> <p>It remains the case that the possible provision of impact protection measures will only be implemented if subsequently considered to be required by the SHA. The relevant risks are considered to be tolerable and ALARP with the controls that are anticipated without those impact protection measures. They would in any event not be implemented prior to the IERRT becoming operational.</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
APT (CA 23)	Change Application Consultation 13.11.23	The proposed measures appear insufficient to adequately address the risks identified in the IOT operators sNRA.	<p>A review of navigational risks associated with the IERRT project in light of the Proposed Changes is provided in the NRA Addendum at Annex C of this ESA.</p> <p>The outcomes of this assessment remain the same as set out in the original NRA, in that all risks are considered tolerable and ALARP with Embedded and Applied Controls in place.</p>
Svitzer (CA 33)	Change Application Consultation 17.11.23	<p>Reference the construction phase of the project and the terminal itself we have no issues. The movement of barges and other craft associated with the project will be controlled by the VTS team as anywhere else on the river. Effective the 1st of January 2024 SMS will take over control of the East tug barge. Any issues we may have had will no longer apply as we won't be operating from that area.</p> <p>We would like for some of our master's to attend simulation berthing trials if possible before the project is finished so they can get up to speed on what may be required for a berthing/ sailing. They may find that some of our tugs are not suitable due to their size etc.</p>	<p>The comments from Svitzer are noted.</p> <p>The Applicant recognises the importance of the towage operators on the Humber and the fact that early engagement should assist them with responding to any potential upsurges in demand for their services.</p>
DFDS (CA 35)	Change Application Consultation 17.11.23	The impact protection added to the end of the IOT Finger Pier may itself have an impact on navigation as it effectively makes the pier longer, not only on vessels using the IERRT but also the south side of the finger pier, and further	Navigation simulations of the Proposed Changes have been undertaken and are provided at Application Document Reference number 10.3.9. The outcomes of this exercise indicate that tankers and barges arriving or

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
		<p>navigational simulations of such movements should be carried out with the proposed impact protection in place.</p>	<p>departing at IOT finger pier berths, as well as vessels arriving at IERRT, can be done safely with Proposed Change 4 in place (see NRA Addendum).</p>
		<p>With respect to Proposed Change 4, DFDS understand that the Applicant will, in lieu of installing adequate impact protection, require vessels arriving at Berth 1 on the ebb tide to have a mandatory bow tug to protect the IOT Finger Pier in the event of an issue.</p> <p>It is DFDS' opinion that such a measure is not a suitable replacement for, nor as reliable as, physical protection measures. Physical impact protection does not suffer machinery breakdown, lack of availability, towline issues such as parting or fouling of the towline, are not affected by wind nor tide, nor are reliant on any human input.</p>	<p>The comments from DFDS are noted.</p> <p>The risks have been re-assessed in light of Proposed Change 4 in the NRA Addendum at Annex C of this ESA.</p> <p>The outcomes of this assessment remain the same as concluded in the original NRA, in that impact protection measures have been considered as an Applied Control and will only be provided as part of the 'project specific adaptive procedures' if required.</p> <p>The need for physical impact protection will be determined by the SHA and may be introduced in the future. The effect of installing the impact protection measures as now covered by Change 4 have also been assessed.</p>
		<p>The proposal of these enhanced navigation controls appears to be a cost saving measure which is indicative of a lack of proper cost benefit analysis on the part of the Applicant in their NRA production since had they carried out this crucial analysis, they would not have proposed impact protection measures at ISH3</p>	<p>The Applicant does not agree with the assertion made by DFDS that the enhanced navigation controls are a "cost saving measure". The Applicant has clearly explained why Proposed Change 4 differs from that provided at ISH3 in sections 3.20 – 3.42 of the Proposed Change Notification Report [AS-027].</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
		<p>and then decided against that proposal at this late stage.</p>	<p>The Applicant’s position on impact protection remains the same as at ISH3, in that impact protection measures will only be provided as part of the project specific adaptive controls if required by either of the SHAs. The Applicant provided an update at ISH5 on the discussions that had taken place with the IOT Operators since ISH3.</p>
		<p>DFDS would however support enhanced navigational controls in respect of the Immingham Eastern Jetty. Since the establishment of physical impact protection in this area would be impossible to achieve whilst keeping the Eastern Jetty operational, DFDS, as part of our NRA suggested the implementation of enhanced navigational controls requiring the presence of a standby tug (in addition to ordinary towage requirements) to prevent a vessel bound for IERRT Berths 2 or 3 alliding with a vessel berthed at Eastern Jetty.</p>	<p>The comments made by DFDS are noted. The provision of tugs (which would depend on tidal/wind conditions, as directed by the SHA) is already identified as an Applied Control for Risk ID O9 (Ro-Ro arriving/departing Immingham Eastern Ro-Ro terminal Berths 2-3 with a tanker berthed on Eastern Jetty) in the original NRA [APP-089].</p>
		<p>If the Applicant thinks the enhanced management controls are necessary, DFDS suggests the Application should implement this system for the controls already proposed in the NRA, which the Applicant has previously said they cannot do as it interferes with the independence of the Harbour Master.</p>	<p>The Applicant’s NRA concludes that the risks are tolerable and ALARP with the Embedded and Applied Controls in place. While, therefore, the enhanced management controls are not considered necessary, the Applicant is proposing these as an additional measure to further reduce the likelihood and consequence of the risk to the IOT infrastructure in light of the examination submissions received.</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
		<p>DFDS supports the position of IOT Operators that adequate impact protection measures should be required to be installed by the Applicant prior to the start of any construction activities or operation of IERRT, as recommended by DFDS' own NRA [REP2-043]. It is DFDS view that such measures are needed to mitigate the risks which have been clearly identified to the IOT facility. These measures should be designed to protect the IOT trunkway, the IOT finger pier and any vessels berthed on the IOT finger pier.</p> <p>Accordingly, the Impact Protection Measures as proposed in the Proposed Changes are insufficient as they remain conditional on a recommendation by the Statutory Conservancy and Navigation Authority, as detailed in Requirement 18 of the draft DCO. DFDS has already set out in its Relevant Representation (RR-008, paragraphs 3.48 and 7.17) and Written Representation (REP2-040, paragraph 195) why conditional measures are insufficient and remain of this view – the measures should be required to be implemented before the main works are</p>	<p>The proposed implementation is described in Section 3.3 of this ESA. This aligns with current operational practices so as not to interfere with the statutory remit of the Harbour Master.</p> <p>The risks have been reassessed in consideration of Proposed Change 4 the NRA Addendum at Annex C of the ESA.</p> <p>The outcomes of this assessment remain the same as concluded in the original NRA, in that all risks are considered tolerable and ALARP by the SHA with Embedded and Applied Controls in place.</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
		permitted to commence. DFDS, therefore considers the Proposed Changes to offer little reassurance in respect of navigational safety concerns and the potential impact on users of the Port of Immingham and the Humber Estuary.	
Maritime and Coastguard Agency (MCA) (CA 37)	Change Application Consultation 19.11.23	The MCA has noted the four proposed changes to the IERRT project, and that the NRA is to be reviewed in light of these ensuring that the worst-case scenarios for shipping and navigation remains as per original assessment. The MCA welcomes further stakeholder consultation on the impact of the proposed changes. The MCA would expect every attempt to be undertaken by the applicant to resolve any concerns raised by the interested parties, with more detailed justification where consensus cannot be achieved and that the proposals are carried out in accordance with the Port Marine Safety Code (PMSC) and its Guide to Good Practice.	The risks identified in the original NRA have been reviewed in light of the Proposed Changes, taking into account the views of stakeholders on how the risks may have changed.
		The MCA have also confirmed the position of the Statutory Harbour Authority (SHA) - ABP Humber, who have relevant powers under the Harbour Act 1964 (or other) and therefore have jurisdiction. The management of safe navigation and risk within the harbour remains solely with the SHA.	The MCA's comment is noted.
Maritime Bunkering Ltd (CA 41)	Change Application Consultation	Maritime Bunkering Ltd as charterers of the Rix Shipping barges object to the proposed construction of the IERRT as the structure will	With respect to matters relating to navigation safety, navigation simulations of the Proposed Changes have been undertaken and are

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
	17.11.23	<p>limit our opportunities of loading at all berths of the Finger Pier.</p> <p>The structure causes us both safety and commercial concerns and therefore please take this communication as an objection to the application.</p>	<p>provided at Application Document Reference number 10.3.9. The outcomes of this exercise indicate that tankers and barges arriving or departing at IOT finger pier berths can be done safely with Proposed Change 4 in place.</p> <p>Matters relating to socio-economics are dealt with in Chapter 16 of this ESA.</p>
<p>Harbour Master Humber (HMH) (CA 42)</p>	<p>Change Application Consultation 17.11.23</p>	<p>In relation to Proposed Change 1, HMH has the following comments on each section of the change as relates to navigational safety:</p> <p>HMH considers that the proposed realignment of the jetty approach should have no adverse effect on the safety of navigation or the ability of vessels to berth at the proposed IERRT or IOT Finger Pier facilities.</p> <p>HMH considers that the change in number and location of piles should have no adverse effect on the safety of navigation or the ability of vessels to berth at the proposed IERRT or IOT Finger Pier facilities.</p> <p>The effect of the restraint dolphins on the overall infrastructure would need to be considered when assessing the residual risks associated with berthing at IERRT and establishing operating parameters and controls.</p>	<p>The comments from the Harbour Master, Humber noted and have been considered when reviewing how the Proposed Changes may affect the risks identified in the NRA. Proposed Change 1 is not considered to affect navigational risks which is in accordance with the view of the Harbour Master, Humber.</p>
		<p>The Harbour Master, Humber notes that Proposed Change 4 includes an option for the delivery of an additional impact protection barrier at the western end of the IOT finger pier. He is in</p>	<p>The Harbour Master, Humber comments are noted. Navigation simulations of the Proposed Changes have been undertaken and are provided at Application Document Reference</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
		<p>broad agreement with the effect on risks identified but would reiterate the need for simulations to ensure that there is no adverse effect on navigational safety relating to tankers and barges arriving or departing at IOT finger pier Berths 8 and 9. Additional appropriately engineered impact protection measures would be suitable to prevent impact with the finger pier infrastructure, subject to the effect of the change of layout on navigation to and from Berths 8 and 9 being assessed.</p>	<p>number 10.3.9. The outcomes of this exercise indicate that tankers and barges arriving or departing at IOT finger pier berths can be done safely with Proposed Change 4 in place.</p>
		<p>The Harbour Master, Humber is satisfied that the methods of enforcing the operational controls described in paragraph 3.3.4 and 3.3.5 of the ESA through directions and operations manuals would be effective as this is how such requirements are generally promulgated and obeyed by vessel operators. He remains convinced that it would not be appropriate for the use of enhanced controls of this kind (tugs, pilots, speed limits etc.) to be prescribed in the DCO, given that Parliament has already determined where the statutory powers to make these operational decisions should lie.</p>	<p>The Harbour Master, Humber comments are noted.</p>
CLdN	Application Consultation 28.11.23	<p>At this stage CLdN does not intend to comment in detail on the scope of further NRA relating to the change request. The change request relates to navigation issues specific to the locality around the port of Immingham.</p>	<p>CLdN's comments are noted. A review of navigational risks associated with the IERRT project in light of the Proposed Changes is provided in the NRA Addendum at Annex C of this ESA. There is continued dialogue between</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
		<p>Although we note your comments that the impact protection measures will have no impact on navigation, there still appears to be disagreement between ABP and IOT on the scope/design of the works incorporated in the change request and also the process for providing the impact protection measures in future. In addition, DFDS and IOT remain concerned about the NRA conducted to date. CLdN’s position, as set out previously, is that for so long as the local operators (IOT and DFDS) have concerns about navigation impacts in the vicinity of Immingham, CLdN remains concerned about the potential for interruptions to general river traffic – including CLdN / other vessels passing up/downstream to/from Killingholme.</p>	<p>the Applicant, IOT Operators and DFDS regarding navigation.</p>

10.3 Updates required to impact assessment

- 10.3.1 The NRA [APP-089] produced for the IERRT scheme has been reviewed in detail in light of the Proposed Changes. This is set out in the NRA Addendum provided at Annex C to this ESA. A summary of the outcomes of that review are provided in this chapter.
- 10.3.2 There are no new impact pathways or unique risks in relation to commercial and recreational navigation introduced by the Proposed Changes (described in Chapter 2 and Chapter 3 of this ESA). This is because the realignment of the approach jetty and other marine works (Proposed Change 1) do not affect navigation, and the addition of impact protection measures to the end of the IOT finger pier (Proposed Change 4) will be designed to mitigate the risks of allision that have already been identified within the NRA if such further mitigation were to be required.
- 10.3.3 Based on the views of key stakeholders (Table 10.1), Proposed Change 1 is not considered to affect the assessment of navigational risk as already set out in the NRA [APP-089].
- 10.3.4 The impact pathways/risks that have the potential to be affected by Proposed Change 4 associated with the IERRT project are listed below:
- Allision of commercial vessel with marine works (Risk ID C3);
 - Allision of vessel proceeding to/from Immingham Eastern Ro-Ro with tanker moored at IOT Finger Pier (Risk ID O1);
 - Allision of tanker manoeuvring on/off IOT finger pier with IERRT on flood tide (Risk ID O2);
 - Allision of barge manoeuvring on/off IOT finger pier with IERRT on flood tide (Risk ID O3); and
 - Ro-Ro allision with IOT trunk way (Risk ID O4).
- 10.3.5 As noted above, a full review of these risks is provided in the NRA Addendum at Annex C of this ESA, and as such are not repeated here. This review of navigation risks has been undertaken based on the views of key stakeholders, in the same way that the Navigational Risk Assessment (NRA) was produced [APP-089].
- 10.3.6 Overall, there is no change to any of the risk outcomes as a result of the Proposed Changes. As such, all risks remain tolerable in accordance with the tolerability criteria set out by the SHA Duty Holder.

10.4 Updates required to figures

- 10.4.1 No figures in Volume 2 of the ES relating to Chapter 10 of the ES [APP-066] require updating following the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

10.5 Updates required to appendices

10.5.1 The appendices relating to Chapter 10 of the ES are as follows:

- Appendix 10.1 Navigational Risk Assessment [APP-089];
- Appendix 10.2 Navigation Simulation Study [APP-090]; and
- Appendix 10.3 Navigational Simulation – Stakeholder Demonstration [APP-091].

10.5.2 These appendices are not affected by the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA and do not require updating, subject to them being read alongside the NRA Addendum provided at Annex C of this ESA.

11 Coastal Protection, Flood Risk and Drainage (Chapter 11)

11.1 Introduction

- 11.1.1 Chapter 11 of the ES [APP-047] provided an assessment of the potential significant effects of the proposed IERRT on coastal protection, flood defence and drainage receptors, namely people, property, infrastructure, flood defence assets, drainage and sewer systems and waterbodies.
- 11.1.2 Baseline conditions were established based on the collation and review of a wide range of data and information from published material and through consultation with statutory bodies and other stakeholders. The assessment is supported by a Drainage Strategy which outlines how surface water runoff will be managed on site.
- 11.1.3 The IERRT site lies within Flood Zone 3a (high flooding risk) and the wider port has a history of flooding from tidal surges, notably in 1953 and again in 2013, however the IERRT site did not flood during this event. There are tidal flood defences in place along the entire south bank of the Humber Estuary. The sea walls along the length of the operational Port of Immingham consist of concrete sheet piled walls and concrete revetment walls topped with rock filled gabion baskets. Lock gates are used to control water levels within the enclosed dock part of the Port of Immingham. The flood defences provide flood protection to the IERRT site up to and including the 1 in 200-year return flood event. The main residual risks of flooding are associated with a storm surge event (which would overtop the flood defences) and flooding should the flood defences fail.
- 11.1.4 In Chapter 11 of the ES, the assessment considered a total of 16 impact pathways over construction and operational phases, including the exposure to floodwater, changes in tidal regime, floodplain inundation from tidal, river and surface water flood sources, changes to flow regimes and/or water levels, and changes to surface water run-off rates and volumes.

11.2 Consultation

- 11.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. The outcome of the consultation that has been undertaken, along with how it has influenced the coastal protection, flood risk and drainage assessment, is presented in Table 11.1 of this chapter of the ESA.

Table 11.1. Summary of consultation relevant to coastal protection, flood risk and drainage assessment

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
<p>Anglian Water (AW) (CA 20)</p>	<p>Change Application Consultation 07.11.23</p>	<p>Anglian Water have commented:</p> <p>1) In relation to the updated drainage strategy (11.2.2). AW observe that there is no explicit request to connect to the Anglian Water waste water network and as such changes to the drainage of the site would not impact AW.</p> <p>2) In relation to the potential for increased water use on the site and are in response to the scarcity of water resources in the region. AW suggest a Water Resources Assessment be undertaken. The suggested WR Assessment would look at the predicted potable water demand from the development and seek to reduce the water demand from the site - this could be through use of surface water (rainwater falling on the site) for non-potable uses for example. This assessment is requested for both the construction and operation of the site. Following this AW suggest the GGHG assessment in section 19.8 should be updated to account for the carbon emissions that would be associated with the treatment of any water to meet increased demand. They also comment that any increase in water use or new connections for water supply may not be possible from a water resource perspective and that AW have no obligation to meet a demand for this.</p>	<p>1) ABP can confirm that there will be no discharge of waste water to the Anglian Water network from this development.</p> <p>2) Water use is not part of the scope of the water assessment within the ES [APP-047], and not explicitly reviewed in the original ES or this ESA. The proposed new terminal will not represent a significant intensification of water use within the port estate - the general trend has been downward particularly as water is used much less now for the control of fugitive dust emissions from the storage of bulk cargo. ABP benefits from a groundwater abstraction licence and therefore services the vast majority of its freshwater demand via these boreholes and a separate distribution network. A Water Resources Risk Assessment is therefore not considered necessary, as the water use during construction and subsequent operation of the IERRT would fall within the overall general use profile within the wider port estate.</p>

11.3 Updates required to impact assessment

- 11.3.1 There are no additional impact pathways in relation to coastal protection, flood risk and drainage introduced by the Proposed Changes (described in Chapter 2 and Chapter 3 of this ESA). Furthermore, none of the impact pathways assessed in the ES are affected by the revisions to the IERRT project. This is because the Proposed Changes will not affect the magnitude of change caused by the construction and operational activities. The sensitivity and importance of receptors also remains unchanged.
- 11.3.2 The Drainage Strategy has been progressed, with slight amendments, from Royal Institute of British Architects (RIBA) Stage 2 to RIBA Stage 3. However, the fundamental approach of restricting the surface water run-off from the IERRT project to 70% of the existing site run-off (agreed with the North East Lindsey Internal Drainage Board (IDB)) to the Habrough Marsh Drain with attenuation storage provided with an allowance for climate change remains unchanged. The same existing discharge points to the Habrough Marsh Drain will, as before, be retained.
- 11.3.3 The updated drainage design therefore will not affect the assessment of changes to flow regimes and/or water levels or changes to surface water run-off rates and volumes as reported in the ES.

11.4 Updates required to figures

- 11.4.1 No figures in Volume 2 of the ES relating to Chapter 11 ES [APP-067] require updating following the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

11.5 Updates required to appendices

- 11.5.1 The appendix relating to Chapter 11 of the ES is Appendix 11.1 – Flood Risk Assessment [APP-093].
- 11.5.2 This appendix does not require updating in light of the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

11.6 Impact assessment summary

- 11.6.1 Table 11.2 below summarises the impact assessment presented in the coastal protection, flood risk and drainage chapter (Chapter 11) of the ES, and how the Proposed Changes alter the significance of the impacts.

Table 11.2. Coastal protection, flood risk and drainage impact assessment summary

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Major beneficial				
Moderate beneficial				
Minor beneficial				
Insignificant / Negligible / Neutral / Low				
Minor adverse / Slight adverse				
Moderate adverse / potentially significant				
Major adverse / Significant / Large adverse				
Coastal protection, flood defence and drainage				
<i>Construction phase</i>				
Human health (public and visitors): Exposure to floodwater via flooding from predominantly tidal sources e.g., overtopping, such as surge events or breach of defences.	Moderate adverse	Site induction, including evacuation routes, safe refuge, access, and egress. Site will be included in the current Port of Immingham flood response plan and will be registered with the Environment Agency Flood Warnings Direct Service. No visitors or access during periods of inclement weather.	Slight adverse	None
Human health (Construction workers and operatives): Exposure to floodwater via flooding from predominantly tidal sources e.g.,	Moderate adverse	Construction works will be carried out in accordance with the CEMP, including the	Slight adverse	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
overtopping, such as surge events or breach of defences.		Flood Response Plan. Site induction, including evacuation routes, safe refuge, access, and egress. Site will be included in the current Port of Immingham flood response plan and will be registered with the Environment Agency Flood Warnings Direct Service. No work onsite during a flood warning period.		
Flood defences (on-site along the IERRT project site frontage): Changes in tidal regime e.g., wave heights, water levels, erosion/ deposition due to dredging/ construction activities.	Neutral	No mitigation measures are proposed beyond the ongoing inspection and maintenance programme undertaken by the Environment Agency	Neutral	None
Flood defences (off-site around wider Port of Immingham frontage): Changes in tidal regime e.g., wave heights, water levels, erosion/deposition due to dredging/ construction activities.	Neutral	No mitigation measures are proposed beyond the ongoing inspection and maintenance programme	Neutral	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
		undertaken by the Environment Agency.		
Existing development (on-site and wider Port of Immingham): Floodplain inundation from tidal flooding, overland flow from fluvial/surface water sources.	Neutral	Flood resilience and resistant measures embedded in design. Overland flow paths maintained and temporary drainage to control surface water discharge.	Neutral	None
Existing development (off-site (neighbouring sites)): Floodplain inundation from tidal flooding, impedance of overland flow routes, from fluvial/surface water sources.	Neutral	Overland flow paths maintained and temporary drainage to control surface water discharge.	Neutral	None
Surface waterbodies (Habrough Marsh Drain): Changes in flow regime/water level due to surface water discharge.	Slight adverse	Temporary drainage facilities (swales etc) provided during the construction phase to control discharge of surface water run-off.	Neutral	None
Drainage infrastructure: Increased rate and volume of surface water runoff due to impermeable surfacing/ compaction.	Slight adverse	Temporary drainage facilities (swales etc) provided during the construction phase to control discharge of surface water run-off.	Neutral	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
<i>Operational phase</i>				
Human health (public and visitors to the site): Exposure to floodwater via flooding from predominantly tidal sources e.g., overtopping or breach of defences.	Moderate adverse	Site induction, including evacuation routes, safe refuge, access, and egress. Site registered with the Environment Agency Flood Warnings Direct Service.	Slight adverse	None
Human health (site operatives and future workforce): Exposure to floodwater via flooding from predominantly tidal sources e.g., overtopping or breach of defences.	Moderate adverse	Flood Response Plan. Site induction, including evacuation routes, safe refuge, access, and egress. Site registered with the Environment Agency Flood Warnings Direct Service. No work onsite during a flood warning period.	Slight adverse	None
Flood defences (On-site around the site frontage): Changes in tidal regime e.g., wave heights, water levels, erosion/deposition due to dredging/ construction activities.	Slight adverse	No mitigation measures are required beyond the continuation of the current inspection and maintenance regime undertaken by the Environment Agency.	Slight adverse	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Flood defences (off-site around wider Port of Immingham frontage): Changes in tidal regime e.g., wave heights, water levels, erosion/deposition due to dredging and offshore development.	Slight adverse	No mitigation measures are required beyond the continuation of the current inspection and maintenance regime undertaken by ABP and the Environment Agency.	Slight adverse	None
Existing development (on-site and wider Port of Immingham): Floodplain inundation from tidal flooding, overland flow from fluvial/surface water sources.	Slight adverse	No additional mitigation is required beyond the flood resilience and resistant measures embedded in design. Drainage infrastructure designed in line with the Drainage Strategy includes attenuation storage to manage climate change over the operation of the development.	Slight adverse	None
Existing development (off-site (neighbouring sites)): Floodplain inundation from tidal flooding, new overland flow routes, flooding from fluvial/surface water sources.	Neutral	Drainage infrastructure designed in line with the Drainage Strategy includes attenuation storage to manage climate change over	Neutral	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
		the operation of the development.		
Surface waterbodies (Habrough Marsh Drain): Changes in flow regime/water level due to increases in surface water discharge.	Moderate adverse	Drainage infrastructure designed in line with the Drainage Strategy includes attenuation storage to manage climate change over the operation of the development and provides betterment over the current baseline drainage.	Slight beneficial	None
Drainage infrastructure: Increased rate and volume of surface water runoff from impermeable surfaces.	Moderate adverse	Drainage infrastructure designed in line with the Drainage Strategy including attenuation storage to manage climate change over the operation of the development	Moderate beneficial	None

12 Ground Conditions, Including Land Quality (Chapter 12)

12.1 Introduction

- 12.1.1 Chapter 12 of the ES [APP-048] provided an assessment of the potential significant effects of the proposed IERRT on geology, soils and contaminated land. The receptors considered in this assessment were human health, an ecological system or organism within such a system, geology, property in the form of buildings and services, and controlled waters (surface water courses and groundwater).
- 12.1.2 Baseline conditions were determined through a desk-based review of available information, supplemented by a walkover. In addition, a Ground Investigation (GI) was carried out in May 2022 following a previous GI undertaken in 2020 which has also been used to inform the assessment. A further confirmatory GI has also been undertaken which includes provision for ongoing monitoring works as is normal for a project such as the IERRT.
- 12.1.3 The majority of the site is artificial made ground. The bedrock geology is predominantly Flamborough Chalk Formation (also a Principal Aquifer) overlain by Devensian (Glacial) Till. Superficial deposits across the site mainly comprise tidal flat deposits (clays and silts) with the estuary banks being characterised by beach and tidal flat deposits (clay, silt and sand). There are historical landfills located on the site which contain inert, industrial, commercial and household waste. There are three unnamed surface watercourses to the east of the site boundary and a further 37 unnamed surface watercourses within 250 m radius of the site.
- 12.1.4 In Chapter 12 of the ES, the assessment considered a total of eight impact pathways on different receptors over construction and operational phases, including the direct contact with contamination, the inhalation of dust and/or soil derived vapours, the migration and accumulation of ground gas, the lateral and vertical migration of contamination through groundwater and surface run-off.

12.2 Consultation

- 12.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. However, no specific comments were raised in relation to ground conditions, including land quality.

12.3 Updates required to impact assessment

12.3.1 There are no additional impact pathways in relation to ground condition, including land quality introduced by the Proposed Changes (described in Chapter 2 and Chapter 3 of this ESA). Furthermore, none of the impact pathways assessed in the ES are affected by the revisions to the IERRT project. This is because the changes are within the order limits of the assessment undertaken within the ES.

12.4 Updates required to figures

12.4.1 No figures in Volume 2 of the ES relating to Chapter 12 of the ES [APP-068] require updating following the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

12.5 Updates required to appendices

12.5.1 The appendices relating to Chapter 12 of the ES are as follows:

- Appendix 12.1 Phase 1 Desk Study [APP-094 to APP-097];
- Appendix 12.2 Factual Report [APP-098];
- Appendix 12.3 Phase 2 Ground Investigation Report [APP-099];
and
- Appendix 12.4 Outline Remediation Strategy [APP-100].

12.5.2 These appendices are not affected by the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA and do not require updating.

12.6 Impact assessment summary

12.6.1 Table 12.1 below summarises the impact assessment presented in the ground conditions, including land quality chapter (Chapter 12) of the ES, and how the Proposed Changes alter the significance of the impacts.

Table 12.1. Ground conditions, including land quality impact assessment summary

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Major beneficial				
Moderate beneficial				
Minor beneficial				
Insignificant / Negligible / Neutral / Low				
Minor adverse / Slight adverse				
Moderate adverse / potentially significant				
Major adverse / Significant / Large adverse				
Ground conditions, including land quality				
<i>Construction phase</i>				
Human Health-Contamination (onsite workers, site visitors): Direct contact with contamination (e.g., in soils)	Moderate adverse (significant)	Construction works will be carried out in accordance with the CEMP and environmental good practice on site.	Slight adverse (not significant)	None
Human Health-Contamination (off-site workers, site visitors): Inhalation of dust and/or soil derived vapours	Moderate adverse (significant)	Construction works will be carried out in accordance with the CEMP and environmental good practice on site.	Slight adverse (not significant)	None
Human Health -Ground Gas (onsite workers, site visitors): Migration and accumulation of ground gas	Moderate/ large adverse (significant)	Entry into excavations or any other enclosed space on a construction site will comply with confined space legislation and be assessed prior to entry.	Slight adverse (not significant)	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Property (temporary buildings erected on site during construction): Migration and accumulation of ground gas (onsite workers, site visitors)	Moderate/ large adverse (significant)	Ground gas protection measures will be implemented into design and build of temporary structures.	Neutral/ slight adverse (not significant)	None
Geology: Lateral and vertical migration (including as a result of piling) of contamination through leachate, groundwater or surface run off	Neutral/ slight adverse (not significant)	Construction works will be carried out in accordance with the CEMP. Location specific Piling Risk Assessments and environmental good practice on site.	Neutral (not significant)	None
Soils: Lateral and vertical migration (including as a result of piling) of contamination through leachate, groundwater or surface run off	Neutral/ slight adverse (not significant)	A Ground Investigation (GI) has been undertaken in May 2022 to confirm baseline conditions. A confirmatory GI – to inform the detailed design - is being undertaken and will be completed. The findings of the confirmatory GI will be assessed and detailed in an interpretative report. In the event that any geo-environmental risks are identified following receipt of the final factual report, which will include the results of the final round of monitoring, as well as the	Neutral (not significant)	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
		<p>conclusion of the assessment then in accordance with guidance in LCRM (Environment Agency, 2021), appropriate mitigation measures as necessary will be incorporated in the final remediation strategy for the project, the outline for which is provided as Appendix 12.4.</p> <p>All earthworks operations will be undertaken in accordance with BS 6031:2009 'Code of Practice for Earthworks' (BSI, 2009), BS 16907-1 to 7:2018 Earthworks and Highways England (HE) guidelines including Design Manual for Roads and Bridges (DMRB) Series 600 'Earthworks' (BSI, 2018). Development will actively work towards achieving an earthworks balance.</p>		

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
<p>Groundwater (Bedrock Contamination): Lateral and vertical migration (including as a result of piling) of contamination through leachate, groundwater or surface run off</p>	<p>Moderate/ large adverse (significant)</p>	<p>A GI has been undertaken in May 2022 to confirm baseline conditions and a risk assessment has been undertaken based on the GI data. A confirmatory GI – to inform the detailed design – is being undertaken and will be completed soon after submission of the Development Consent Order (DCO) application. The findings of the confirmatory GI will be assessed and detailed in an interpretative report. In the event that any geo-environmental risks are identified following receipt of the final factual report, which will include the results of the final round of monitoring, as well as the conclusion of the assessment then in accordance with respective guidance, appropriate mitigation measures as necessary will be</p>	<p>Neutral/ slight adverse (not significant)</p>	<p>None</p>

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
		<p>incorporated in the final remediation strategy for the project, the outline for which is provided as Appendix 12.4.</p> <p>Construction works will be carried out in accordance with the CEMP.</p> <p>Piling works will be planned in accordance with best practice guidance. Piling operations will be subject to foundation works risk assessment and any potential to cause pollution to the aquifer will be covered by measures to be detailed in piling method statements.</p>		
<p>Groundwater (Superficial Contamination): Lateral and vertical migration (including as a result of piling) of contamination through leachate, groundwater or surface run off</p>	<p>Slight adverse (not significant)</p>	<p>A GI has been undertaken in May 2022 to confirm baseline conditions. A confirmatory GI – to inform the detailed design – is being undertaken and will be completed soon after submission of the DCO application. The findings of</p>	<p>Neutral/ slight adverse (not significant)</p>	<p>None</p>

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
		<p>the confirmatory GI will be assessed and detailed in an interpretative report.</p> <p>Piling works will be assessed in accordance with best practice guidance. Piling operations will be subject to foundation works risk assessment and any potential to cause pollution to the aquifer will be covered by measures to be detailed in piling method statements.</p> <p>Construction works will be carried out in accordance with the CEMP.</p>		
<p>Surface Water-Contamination (Humber Estuary): Lateral and vertical migration of contamination through leachate, groundwater or surface run off</p>	<p>Moderate adverse (significant)</p>	<p>Specific guidance relating to the control of water pollution from construction sites is discussed within Chapter 8 Water and Sediment Quality of this ES.</p>	<p>Neutral/ slight adverse (not significant)</p>	<p>None</p>
<p>Surface Water-Contamination (North Beck Drain Catchment and associated Habrough Marsh Drain): Lateral and vertical</p>	<p>Moderate/ large adverse (significant)</p>	<p>Specific guidance relating to the control of water pollution from construction sites is discussed within</p>	<p>Neutral/ slight adverse (not significant)</p>	<p>None</p>

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
migration (including as a result of piling) of contamination through leachate, groundwater or surface run off		Chapter 8 Water and Sediment Quality of this ES.		
<i>Operational phase</i>				
Human Health-Contamination (future on-site workers): Direct contact with contamination and inhalation of dust and/ or soil derived vapours	Slight adverse (not significant)	Maintenance workers will be required to adopt safe working practices under relevant health and safety legislation. Therefore, the significant effects are unlikely to arise.	Neutral/ slight adverse (not significant)	None
Human Health-Contamination (future site visitors, off-site workers): Direct contact with contamination and inhalation of dust and/ or soil derived vapours	Slight adverse (not significant)	No mitigation measures are required as operation of the development is not likely to cause significant effect on offsite receptors with regards to geology and soils.	Neutral/ slight adverse (not significant)	None
Property (building and services): Direct contact with contamination in soil, leachate and groundwater	Moderate/ large adverse (significant)	Buildings and services risks will be mitigated by using pipe material appropriate for any aggressive ground conditions.	Neutral/ slight adverse (not significant)	None
Property (building and services): Migration of ground gas	Moderate/ large adverse (significant)	Ground gas protection measures appropriate to the site conditions will be implemented into design and build of structures.	Neutral/ slight adverse (not significant)	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Soils (Contamination): Lateral and vertical migration of contamination through leachate, groundwater or surface run-off	Neutral/ slight adverse (not significant)	The IERRT project will be operated in accordance with existing environmental legislation, regulations and good practice.	Neutral/ slight adverse (not significant)	None
Groundwater (Superficial Contamination): Lateral and vertical migration of contamination through groundwater and surface run-off	Neutral/ slight adverse (not significant)	The IERRT project will be operated in accordance with existing environmental legislation, regulations and good practice.	Neutral/ slight adverse (not significant)	None
Groundwater (Bedrock Contamination): Lateral and vertical migration of contamination through groundwater and surface run-off	Slight adverse (not significant)	The IERRT project will be operated in accordance with existing environmental legislation, regulations and good practice.	Slight adverse (not significant)	None
Controlled Waters (Contamination): Lateral and vertical migration of contamination through groundwater and surface run-off	Slight adverse (not significant)	The IERRT project will have a managed surface drainage system and operated in accordance with existing environmental legislation, regulations and good practice.	Slight adverse (not significant)	None

13 Air Quality (Chapter 13)

13.1 Introduction

- 13.1.1 Chapter 13: Air Quality [APP-049] of the ES provided an assessment of the potential significant effects of the proposed IERRT on local air quality. The assessment considered potential impacts on human health and nature conservation receptors.
- 13.1.2 Baseline conditions were determined through a desk-based review of available information and a project-specific air quality survey which was undertaken to characterise baseline nitrogen dioxide (NO₂) concentrations.
- 13.1.3 In Chapter 13 of the ES, the assessment considered four impact pathways which were categorised as either onsite or offsite emissions sources. During construction onsite emission sources included construction dust, site plant and vessel emissions and during the operational phase onsite emissions comprised vessel, land-tug and road traffic emissions. Offsite emission sources in both construction and operational phases included road traffic emissions on the local and Strategic Road Network.

13.2 Consultation

- 13.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. However, no specific comments were raised in relation to air quality.

13.3 Updates required to impact assessment

- 13.3.1 There are no additional impact pathways in relation to air quality introduced by the Proposed Changes (described in Chapter 2 and Chapter 3 of this ESA). Furthermore, the following pathways assessed in Section 13.8 of the ES [APP-049] are not affected by the revisions to the IERRT project:
- Onsite emissions sources during the construction phase;
 - Offsite emission sources during the construction phase; and
 - Offsite emissions during the operational phase.
- 13.3.2 This is because, whilst the Proposed Changes slightly alter the location of some elements of the construction works, including the alignment of the jetty and overbridge, they do not alter these elements to the extent that it would affect the assessment of onsite construction phase emissions as reported in the ES, nor do they alter the Order Limits. It is assumed that the Proposed Changes will not affect the number of construction traffic movements required to facilitate the construction of the IERRT project, nor will the

revisions alter the number or route of operational traffic movements on public roads beyond the Port of Immingham.

- 13.3.3 The impact pathway assessed in Section 13.8 of Chapter 13 of the ES [APP-049] that has the potential to be affected by Proposed Change 1 and Proposed Change 2 is '*onsite emission sources during the operational phase*'. This is because the revisions will alter the alignment of the onsite roads used by operational traffic and land-tugs as they load onto and off the docked vessels.
- 13.3.4 The following sections provide the updated impact assessment for this pathway in light of the Proposed Changes.
- 13.3.5 In addition to the Proposed Changes, there have also been changes to some of the secondary baseline data referred to in Chapter 13 of the ES – notably the background pollutant concentration and deposition rate data provided by the Air Pollution Information System (APIS, 2023). These updates have been accounted for in the updated impact assessment set out in the following sections.

Updated Baseline

- 13.3.6 In May 2023, the APIS online resource updated the background pollution data it provides, including background concentration data for oxides of nitrogen (NO_x) and ammonia (NH₃), and deposition rate data for nutrient nitrogen. The data for these pollutants published by APIS provide the basis for the interpretation of baseline conditions at the nature conservation sensitive receptors considered in the air quality assessment.
- 13.3.7 Updated background pollutant concentration and deposition rate data made available by APIS is provided in Table 13.1 for the sensitive receptors potentially affected by the Proposed Changes. No update is provided for receptors that are not potentially affected by the Proposed Changes. All impacts at receptors remote from the proposed development were negligible and the effect of the change in the APIS background pollutant data will not change or alter that, nor the conclusions reported in the ES for those locations.
- 13.3.8 Table 13.1 shows that there is no exceedance of the annual mean air quality standard for NO_x at any of the modelled locations. Whilst the table does show an exceedance of lower range of the annual mean air quality standard (the Critical Level) for NH₃, the upper range isn't exceeded. It is confirmed that the upper range of the Critical Level (3 µg/m³) for this pollutant is more appropriate for the habitats considered in this assessment, due to the absence of lichens and bryophytes. The lower range of the air quality standard for nitrogen deposition is exceeded at the nearest Local Wildlife Site (LWS), Site of Importance for Nature Conservation (SINC) and the

nearest sections of Priority Habitat (PH). Nitrogen deposition rates at the nearest saltmarsh habitats within the Special Area of Conservation are below the lower range of the air quality standard (the Critical Load) that was appropriate at the time of the assessment reported in the ES, although they would exceed the lower range of the updated Critical Load range recently published by APIS for non-pioneering saltmarsh habitats.

Table 13.1. Updated Background Pollutant Data

Receptor ID	Location	NO _x Conc. (µg/m ³) ¹	NH ₃ Conc. (µg/m ³) ¹	Nitrogen Deposition Rate (kgN/ha/yr) ¹
Humber Estuary SAC (NE Lincolnshire estuary shore and East Riding of Yorkshire estuary shore)				
SAC1	518489, 417847	19.0	1.6	16.4
SAC2	523789, 413171	19.0	1.5	15.2
SAC3	521951, 419696	15.6	1.6	15.4
SAC4	523237, 418505	16.1	1.5	15.3
SAC5	524349, 417648	16.3	1.6	15.3
Local Wildlife Site (Homestead Park, Immingham)				
LWS1	518051, 415615	17.8	1.6	34.2
Site of Importance for Nature Conservation (Adjacent to Manby Road Immingham)				
SINC1	518286, 415761	17.8	1.6	20.4
Priority Habitats (Within and adjacent to the Port of Immingham)				
PH1	521269, 415512	19.3	1.5	26.1
PH2	520742, 414998	21.7	1.5	26.1
PH3	519956, 415190	25.1	1.5	15.9
PH4	516446, 417896	14.8	1.6	27.9
Air Quality Standard		30²	1 – 3³	10 – 20^{4,5} 20 – 30⁶
Notes:				
1 Bold values denote and exceedance of the relevant air quality standard.				
2 Annual mean NO _x air quality objective value.				
3 Annual mean NH ₃ Environmental Assessment Level set out in Environment Agency guidance. Only 1 µg/m ³ for habitats where bryophytes are present.				
4 Critical Load for nitrogen deposition at broadleaved deciduous woodland habitat.				
5 Critical Load for nitrogen deposition at acid grassland habitat.				
6 Critical Load for nitrogen deposition at coastal saltmarsh habitat, although it is also noted that the recent update of APIS suggested non-pioneering saltmarsh could have a Critical Load for nitrogen deposition of 10-20 kgN/ha/yr.				

Onsite emission sources during the operational phase

13.3.9 Updated results that account for the Proposed Changes and the change in APIS-sourced background pollutant data are provided in Table 13.2 for NO_x, Table 13.3 for NH₃ and Table 13.4 for nitrogen deposition.

Table 13.2. Updated annual mean NO_x statistics from onsite sources (nature conservation receptors)

Receptor ID	Future Baseline Concentration (µg/m ³) ^{1,2,3}	Operational Concentration (µg/m ³) ^{1,2,3}	Change in Concentration (µg/m ³) ^{1,2,3,4}
Humber Estuary SAC/ SPA (NE Lincolnshire estuary shore and East Riding of Yorkshire estuary shore)			
SAC1	19.0 (63%)	19.1 (64%)	0.1 (<1%)
SAC2	19.0 (63%)	19.1 (64%)	0.1 (<1%)
SAC3	15.6 (52%)	16.1 (54%)	0.5 (1.7%)
SAC4	16.1 (54%)	16.6 (55%)	0.5 (1.8%)
SAC5	16.3 (54%)	16.7 (56%)	0.4 (1.2%)
Local Wildlife Site (Homestead Park, Immingham)			
LWS1	17.8 (59%)	18.0 (60%)	0.2 (0.7%)
Site of Importance for Nature Conservation (Adjacent to Manby Road Immingham)			
SINC1	17.8 (59%)	18.1 (60%)	0.3 (0.9%)
Priority Habitats (Within and adjacent to the Port of Immingham)			
PH1	19.3 (64%)	20.4 (68%)	1.1 (3.7%)
PH2	21.7 (72%)	22.7 (76%)	1.0 (3.4%)
PH3	25.1 (87%)	27.9 (93%)	2.8 (9.3%)
PH4	14.8 (49%)	14.9 (50%)	0.1 (0.3%)
Air Quality Standard	30		
Notes:			
1	Values in parenthesis represent the concentration as a percentage of the air quality standard.		
2	Bold values denote an exceedance of the air quality standard (30 µg/m ³ air quality objective value).		
3	Future baseline 1 only. These receptors are too distant from the modelled road network to be affected by the contribution of in-combination traffic flows.		
4	Bold values denote an impact of more than 1% of the air quality standard.		

Table 13.3. Updated annual mean NH₃ statistics from onsite sources (nature conservation receptors)

Receptor ID	Future Baseline Concentration (µg/m ³) ^{1,2,3}	Operational Concentration (µg/m ³) ^{1,2,3}	Change in Concentration (µg/m ³) ^{1,2,3,4}
Humber Estuary SAC/ SPA (NE Lincolnshire estuary shore and East Riding of Yorkshire estuary shore)			
SAC1	1.6 (160%)	1.6 (160%)	<0.1 (0.1%)
SAC2	1.5 (150%)	1.5 (150%)	<0.1 (<0.1%)
SAC3	1.6 (160%)	1.6 (160%)	<0.1 (0.2%)
SAC4	1.5 (150%)	1.5 (150%)	<0.1 (0.2%)
SAC5	1.6 (160%)	1.6 (160%)	<0.1 (0.1%)
Local Wildlife Site (Homestead Park, Immingham)			
LWS1	1.6 (160%)	1.6 (160%)	<0.1 (0.2%)
Site of Importance for Nature Conservation (Adjacent to Manby Road Immingham)			
SINC1	1.6 (160%)	1.6 (160%)	<0.1 (0.3%)
Priority Habitats (Within and adjacent to the Port of Immingham)			
PH1	1.5 (150%)	1.5 (150%)	<0.1 (1.4%)
PH2	1.5 (150%)	1.5 (150%)	<0.1 (1.8%)
PH3	1.5 (150%)	1.6 (160%)	0.1 (9.4%)
PH4	1.6 (160%)	1.6 (160%)	<0.1 (0.1%)
Air Quality Standard	1 – 3		
Notes:			
1	Values in parenthesis represent the concentration as a percentage of the air quality standard.		
2	Bold values denote an exceedance of the air quality standard (1 – 3 µg/m ³ Environmental Assessment Level and only 1 µg/m ³ for habitats where bryophytes are present).		
3	Future baseline 1 only. These receptors are too distant from the modelled road network to be affected by the contribution of in-combination traffic flows.		
4	Bold values denote an impact of more than 1% of the air quality standard.		

Table 13.4. Updated nitrogen deposition rate statistics from onsite sources (nature conservation receptors)

Receptor ID	Future Baseline Deposition Rate (kgN/ha/yr) ^{1,2,3}	Operational Deposition Rate (kgN/ha/yr) ^{1,2,3}	Change in Deposition Rate (kgN/ha/yr) ^{1,2,3,4}
Humber Estuary SAC/ SPA (NEst Lincolnshire estuary shore and East Riding of Yorkshire estuary shore)			
SAC1	16.4 (82%)	16.4 (82%)	<0.1 (0.1%)
SAC2	15.2 (76%)	15.2 (76%)	<0.1 (<0.1%)
SAC3	15.4 (77%)	15.5 (77%)	0.1 (0.3%)
SAC4	15.3 (77%)	15.4 (77%)	0.1 (0.3%)
SAC5	15.3 (77%)	15.3 (77%)	<0.1 (0.2%)
Local Wildlife Site (Homestead Park, Immingham)			
LWS1	26.7 (267%)	26.7 (267%)	<0.1 (0.3%)
Site of Importance for Nature Conservation (Adjacent to Manby Road Immingham)			
SINC1	16.0 (160%)	16.0 (160%)	<0.1 (0.4%)
Priority Habitats (Within and adjacent to the Port of Immingham)			
PH1	26.1 (261%)	26.3 (263%)	0.2 (1.7%)
PH2	26.1 (261%)	26.3 (263%)	0.2 (1.8%)
PH3	15.9 (159%)	16.6 (166%)	0.7 (7.0%)
PH4	27.9 (279%)	27.9 (279%)	<0.1 (0.1%)
Air Quality Standard	10 – 20^{5,6} 20 – 30⁷		
Notes:			
1	Values in parenthesis represent the concentration as a percentage of the air quality standard.		
2	Bold values denote an exceedance of the air quality standard (the relevant habitat-specific Critical Load).		
3	Future baseline 1 only. These receptors are too distant from the modelled road network to be affected by the contribution of in-combination traffic flows.		
4	Bold values denote an impact of more than 1% of the air quality standard.		
5	Broadleaved deciduous woodland.		
6	Acid grassland.		
7	Coastal saltmarsh (noting that the recent update of APIS suggested non-pioneering saltmarsh could have a Critical Load for nitrogen deposition of 10 – 20 kgN/ha/yr.).		

- 13.3.10 Table 13.2 shows that there is no exceedance of the annual mean air quality standard for NO_x at any of the receptors considered in both future baseline and operational scenarios. Table 13.2 also shows that impacts within the SAC account for less than 1% of the air quality standard at locations on the southern shore of the estuary (SAC1 and SAC2). An impact that accounts for less than 1% of the air quality standard is screened as insignificant and the effect of that impact is not significant. Impacts within the SAC do account for more than 1% of the air quality standard at locations on the northern shore of the estuary (SAC3, SAC4 and SAC5). However, an impact of more than 1% of the air quality standard is still screened as insignificant for locations where operational concentrations are below 70% of the air quality standard. The SAC habitats on the northern shore of the SAC experience operational NO_x concentrations of less than 70% of the air quality standard and as such, the impact there is screened as insignificant, and the effect of that impact is not significant. Annual mean NO_x impacts account for less than 1% of the air quality standard at the LWS and SINC considered in the assessment. Annual mean NO_x impacts accounting for more than 1% of the air quality standard are predicted at some Priority Habitat locations. However, these habitats are excluded from the assessment of significance in the absence of local or national designation and an absence of guidance to support such an assessment.
- 13.3.11 Table 13.3 shows that the lower range of the air quality standard for NH₃ is exceeded at all locations considered in both future baseline and future operational scenarios. This is predominantly due to elevated background conditions. It should be noted that the lower range applies only to habitats where bryophytes are present. None of the locations considered exceed the upper range of the air quality standard in either future baseline or future operational scenarios. Impacts at the habitats considered in the SAC, the LWS and the SINC, account for less than 1% of the air quality standard. As such, they are screened as insignificant, and the effect of that impact is not significant. Three of the four Priority Habitats sites considered in the assessment do experience an impact of more than 1% of the air quality standard, due to their proximity to IERRT project sources. However, these habitats are excluded from the assessment of significance in the absence of local or national designation and an absence of guidance to support such an assessment.
- 13.3.12 Table 13.4 shows that there is not an exceedance of the air quality standard (the Critical Load) for nitrogen deposition at the Saltmarsh habitat within the SAC in either future baseline or operational scenarios, assuming that the lower range of that standard is 20 kgN/ha/yr, which was appropriate at the time of the ES assessment. If the lower range for that saltmarsh habitat was assumed to be 10 kgN/hr/yr, as now reported in APIS for non-pioneering saltmarsh habitat since the submission of the ES, then there would be an exceedance of the Critical Load at all SAC locations considered in both

future baseline and operational scenarios. The nitrogen deposition impacts at the habitats considered within the SAC account for less than 1% of the lower Critical Load range, assuming both 20 kgN/ha/yr and 10 kgN/ha/yr. An impact that accounts for less than 1% of the air quality standard is screened as insignificant and the effect of that impact is not significant. Table 13.4 also shows that the relevant air quality standard for nitrogen deposition is exceeded in both future baseline and operational scenarios at the LWS, the SINC and Priority Habitats considered in the assessment. At the LWS and SINC, the impact accounts for less than 1% of the air quality standard and is screened as insignificant. The impact is more than 1% of the relevant standard at some Priority Habitat locations. However, these habitats are excluded from the assessment of significance in the absence of local or national designation and an absence of guidance to support such an assessment.

13.4 Updates required to figures

- 13.4.1 Figure 13.1(b) and Figure 13.3 (a) in Volume 2 of the ES relating to Chapter 13 of the ES [APP-069] require updating following the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA. These updated figures are provided at the end of this chapter and are referred to as Figure 13.1 and Figure 13.2, respectively.

13.5 Updates required to appendices

- 13.5.1 The appendix relating to Chapter 13 of the ES is Appendix 13.1 – Construction Dust Assessment Methodology [APP-101].
- 13.5.2 This appendix does not require updating in light of the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

13.6 Impact assessment summary

- 13.6.1 Table 13.5 below summarises the impact assessment presented in the air quality chapter (Chapter 13) of the ES, and how the Proposed Changes alter the significance of the impacts.

Table 13.5. Air quality impact assessment summary

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Major beneficial				
Moderate beneficial				
Minor beneficial				
Insignificant / Negligible / Neutral / Low				
Minor adverse / Slight adverse				
Moderate adverse / potentially significant				
Major adverse / Significant / Large adverse				
Air quality				
<i>Construction phase</i>				
Human health and amenity sensitive receptors: Onsite emissions sources (marine vessels, site plant and construction dust)	Potentially significant due to effect of unmitigated dust impacts	Standard practice dust mitigation as recommended by the Institute of Air Quality Management (IAQM)	Insignificant	None
Human health and amenity sensitive receptors: Offsite emissions sources (road traffic movement emissions on local roads and Strategic Road Network (SRN))	Insignificant	Standard trip and emissions reduction measures typically set out within a Construction Travel Plan and/or CEMP	Negligible	None
Nature conservation receptors: Onsite emissions sources (marine vessels, site plant and construction dust)	Potentially significant due to effect of unmitigated dust impacts	Standard practice dust mitigation as recommended by the IAQM	Negligible	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Nature conservation receptors: Offsite emissions sources (road traffic movement emissions on local roads and SRN)	Insignificant	Standard trip and emissions reduction measures typically set out within a Construction Travel Plan and/or CEMP	Negligible	None
<i>Operational phase</i>				
Human health and amenity sensitive receptors: Onsite emissions sources (marine vessels, land-tugs and Heavy Goods Vehicle (HGV) movement emissions)	Insignificant	Marine Vessels: <ul style="list-style-type: none"> - Compliance with appropriate emission standards - Sulphur dioxide (SO₂) scrubbers on main engine emissions Land-tugs: <ul style="list-style-type: none"> - Prohibit the unnecessary idling of engines - Selective Catalytic Reduction - Onsite speed limits HGVs: <ul style="list-style-type: none"> - Operational travel plan - Onsite speed limits - Prohibit the unnecessary idling of engines 	Insignificant	None
Human health and amenity sensitive receptors: Offsite emissions sources (road traffic movement emissions on local roads and SRN)	Insignificant	<ul style="list-style-type: none"> - Indirect evolution of the vehicle fleet with introduction of modernised vehicles and better emissions technology 	Insignificant	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Nature conservation receptors: Onsite emissions sources (marine vessels, land-tugs and HGV movement emissions)	Insignificant	Marine Vessels: - Compliance with appropriate emission standards - SO ₂ scrubbers on main engine emissions Land-tugs: - Prohibit the unnecessary idling of engines - Selective Catalytic Reduction - Onsite speed limits HGVs: - Operational travel plan - Onsite speed limits - Prohibit the unnecessary idling of engines	Insignificant	None
Nature conservation receptors: Offsite emissions sources (road traffic movement emissions on local roads and SRN)	Insignificant	Indirect evolution of the vehicle fleet with introduction of modernised vehicles and better emissions technology	Insignificant	None

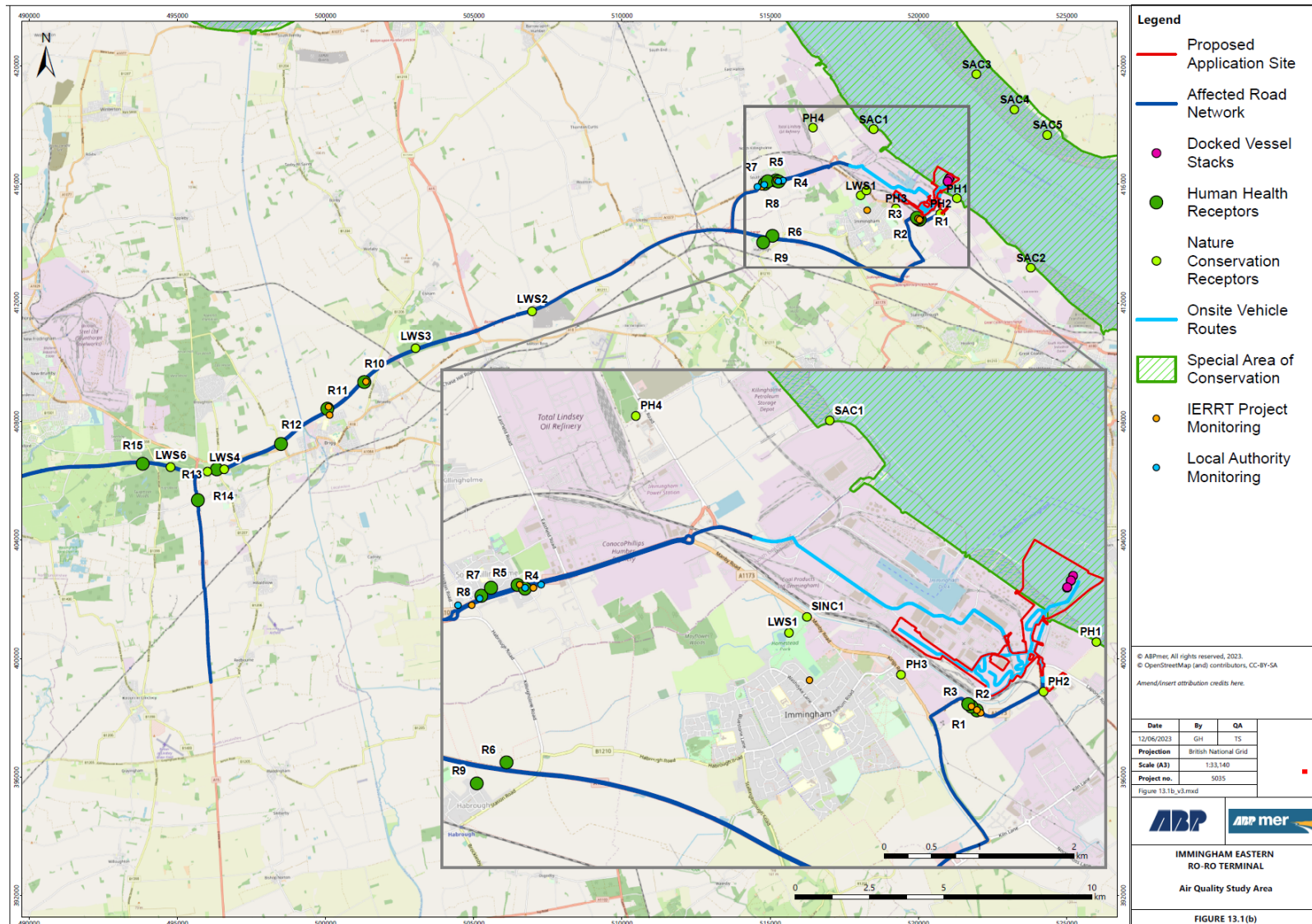


Figure 13.1. Air quality study area

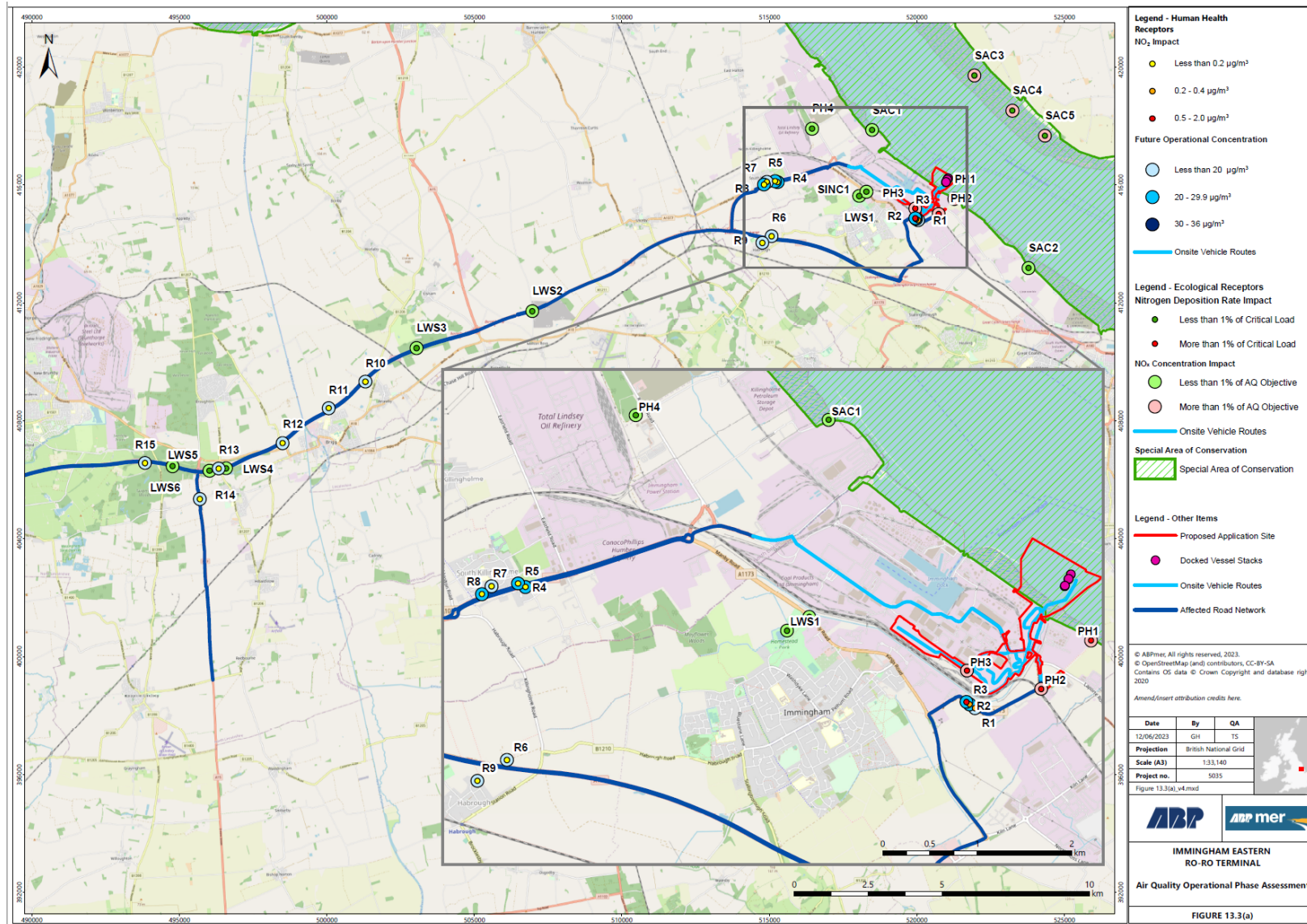


Figure 13.2. Air quality operational phase assessment

14 Noise and Vibration (Chapter 14)

14.1 Introduction

- 14.1.1 Chapter 14: Noise and Vibration [APP-050] provided an assessment of the potential significant effects of the proposed IERRT on Noise Sensitive Receptors (NSRs), including residential and non-residential receptors during construction and operation.
- 14.1.2 Baseline conditions were determined by sound surveys to characterise the sound climate at the nearest NSRs on Kings Road, Queens Road and along the A160 near South Killingholme. Sound surveys were also undertaken at locations within the Port of Immingham representative of non-residential NSRs and ecological receptors along the Humber Estuary. These surveys have been supplemented by a desk-based review of available baseline information.
- 14.1.3 The existing baseline sound climate at the Port of Immingham is dominated by port operations, together with noise from the industrial / commercial premises on the north side of the A1173 and Immingham Lorry Park, as well as road traffic noise on the A1173 and surrounding local roads.
- 14.1.4 In Chapter 14: Noise and Vibration [APP-050], the assessment considered five impact pathways over the construction and operational phases, including potential noise and vibration impacts associated with construction activities on site, potential noise impacts associated with traffic movements during construction and operation, and potential noise impacts associated with vessel movements, other site activities and mechanical plant during operation.

14.2 Consultation

- 14.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. However, no specific comments were raised in relation to airborne noise and vibration.

14.3 Updates required to impact assessment

- 14.3.1 There are no additional impact pathways in relation to noise and vibration introduced by the Proposed Changes (described in Chapter 2 and Chapter 3 of this ESA). Furthermore, the following pathways assessed in Section 14.8 of the ES [APP-050] are not affected by the revisions to the IERRT project:
- Potential noise impacts associated with traffic movements on local highways during construction; and

- Potential noise impacts associated with traffic movements on local highways during operation.
- 14.3.2 The Proposed Changes will not materially alter the number of anticipated construction traffic movements required to facilitate the construction of the IERRT project, nor will the revisions alter the number or route of operational traffic movements on public roads beyond the Port of Immingham.
- 14.3.3 The impact pathways assessed in Section 14.8 of the ES [APP-050] that have the potential to be affected by the Proposed Changes to the IERRT project are listed below. The following sections provide the updated impact assessment for these pathways in light of the Proposed Changes.
- Potential noise impacts associated with construction activities onsite;
 - Potential vibration impacts on existing infrastructure associated with construction activities onsite; and
 - Potential noise impacts associated with vessel movements, other site activities and mechanical plant during operation.
- 14.3.4 The revisions will alter the alignment of the jetty and the onsite roads (including the overbridge) used by operational traffic and land tugs. The operational noise model has been updated with the revised IERRT project layout.
- 14.3.5 In addition to the three non-residential NSRs, namely, (People Asset Management Ltd (PAM) building (a port occupational health services building), Nippon Gases UK Limited Office, and PK Construction (Lincs) Limited Office Building), the potential effects of the construction and operation of the proposed development on the relocated Malcolm West office building has been considered in this addendum.
- 14.3.6 It is assumed the relocated Malcolm West building will be built at an early stage of the construction programme. The construction vibration effects on the Exolum pipeline have also been considered in this addendum.

Potential noise impacts associated with the construction activities on site

- 14.3.7 The relocated Malcolm West Office building is adjacent to the existing PK Construction Office building, as shown in Figure 14.1 below. The current ambient noise levels at monitoring location M4 (as reported in Chapter 14: Noise and Vibration [APP-050]) is also representative of the relocated located Malcolm West Office building. The Malcolm West Office building has been assigned as being medium sensitivity based upon Table 14.11 in Chapter 14: Noise and Vibration [APP-050]. To avoid a significant adverse effect on occupants of the Malcolm West Office building, a construction noise of 75 dB $L_{Aeq,12\text{ hr}}$ would apply. This is the same limit as for the PK

Construction Office and the Nippon Gas building as detailed in paragraph 14.8.14 of Chapter 14: Noise and Vibration [APP-050].

- 14.3.8 The main construction activities which have the potential to affect NSRs remain the same as reported in Chapter 14: Noise and Vibration [APP-050]. Due to the changes of the design and construction of the overbridge the proposed construction plant has been reviewed and updated as detailed in Annex A of this ESA (which is an update to Appendix 14.2 – Construction Noise Levels and Assumptions in Volume 3 of the ES [APP-103]). Where possible the piling for the overbridge construction will be sheet hydraulic jacking, but percussive sheet piling may be required to pile to refusal. As a worst-case scenario both methods of piling have been included in the assessment.
- 14.3.9 The construction noise predictions have been updated with the closest distance between the NSR and construction activity based on the revised plans. The updated worst-case predicted construction noise levels at the residential NSRs are summarised in Table 14.1, together with the corresponding magnitude of impact descriptor.

Table 14.1. Predicted construction noise levels - residential NSRs

Activity	Predicted Construction Noise Level $L_{Aeq,T}$ dB			
	NSRs on Queens Road	Magnitude of Impact	NSRs on Kings Road	Magnitude of Impact
Marine works	49	Negligible	47	Negligible
Site clearance and demolition	64	Negligible	62	Negligible
Drainage works	59	Negligible	57	Negligible
Piling, installation and construction of buildings	50	Negligible	45	Negligible
Laying roads and hard standing	52	Negligible	50	Negligible
Bridge works	36	Negligible	31	Negligible
Cumulative- worst case all daytime activities	65	Negligible	63	Negligible
All values are in A-weighted dB re 20 μ Pa, free-field				

- 14.3.10 The worst-case predicted construction noise levels at the on-site non-residential NSRs are summarised in Table 14.2, together with the difference between the Total Noise and the 65 dB $L_{Aeq,12\text{ hr}}$ lower cut-off level, and the corresponding magnitude of impact descriptor from Table 14.4 in Chapter 14: Noise and Vibration [APP-050].

Table 14.2. Predicted construction noise levels – on-site non-residential NSRs

Activity	Predicted Construction Noise + Existing Ambient Noise Level $L_{Aeq,T}$ dB (Total Noise)							
	PAM building	Difference compared with 65 dB $L_{Aeq,12\text{ hr}}$ lower cut-off level	PK Construction office building	Difference compared with 65 dB $L_{Aeq,12\text{ hr}}$ lower cut-off level	Nippon Gas office building	Difference compared with 65 dB $L_{Aeq,12\text{ hr}}$ lower cut-off level	Relocated Malcolm West Office building	Difference compared with 65 dB $L_{Aeq,12\text{ hr}}$ lower cut-off level
Marine works	64	-1 (Negligible)	64	-1 (Negligible)	60	-5 (Negligible)	65	0 (Low)
Site clearance and demolition	69	4 (Low)	78	13 (High)	67	2 (Low)	79	14 (High)
Drainage works	68	3 (Low)	76	11 (High)	74	9 (Medium)	76	11 (High)
Piling, installation, and construction of buildings	63	-2 (Negligible)	73	8 (Medium)	66	1 (Low)	70	5 (Medium)
Laying roads and hard standing	67	2 (Low)	67	2 (Low)	66	1 (Low)	67	2 (Low)
Bridge works	68	3 (Low)	69	4 (Low)	48	-17 (Negligible)	67	2 (Low)
Cumulative- worst case all daytime activities	75	10 (High)	82	17 (High)	76	11 (High)	81	16 (High)
All values are in A-weighted dB re 20 μ Pa, free-field								

14.3.11 At the residential NSRs on Kings Road and Queens Road in Immingham, for all scenarios, the predicted noise levels from construction activities are below the daytime construction noise level described in paragraph 14.8.14 of Chapter 14: Noise and Vibration [APP-050]. The magnitude of impact has been identified as likely to be negligible and therefore considered not significant for Queens Road and Kings Road residential NSRs, as the predicted worst-case when all daytime construction activities are assumed to be occurring at the same time (which is unlikely for long extended periods, or at all, in practice). The evening and night-time marine works will also result in a negligible magnitude of impact and therefore considered not significant. Based on the sensitivity of the NSRs (high) as shown in Table 14.11 in Chapter 14: Noise and Vibration [APP-050], the likely construction noise effects (based on Table 14.12 in Chapter 14: Noise and Vibration [APP-050]) on nearby residential NSRs are minor adverse and considered not significant. This is the same level of significance that was concluded in ES Chapter 14: Noise and Vibration [APP-050] for this impact pathway.

PAM Building

14.3.12 For the PAM building, based on the assumption there will be temporary acoustic screening during the construction works, the total noise level (pre-existing ambient noise level + predicted construction noise level) as shown in Table 14.2 is less than 5 dB above the daytime lower cut off value of 65 dB $L_{Aeq,T}$ apart from during the cumulative worst-case if all activities were undertaken at the same time. However, this is unlikely to occur in practice, and even if it did this would not be for long extended periods. Therefore, based on the sensitivity of the PAM building (high) as shown in Table 14.11 in Chapter 14: Noise and Vibration [APP-050] and using professional judgement in respect of the likelihood and potential duration of the cumulative worst-case scenario, the likely construction noise effects (based on Table 14.12 in Chapter 14: Noise and Vibration [APP-050]) are considered to be minor adverse and therefore considered to be **not significant** during construction works.

14.3.13 In addition, the main NSRs (i.e., the staff and visitors) will, however, be located inside the PAM building. It is understood that external windows and doors to sensitive rooms facing the construction works can be kept closed and alternative means of cooling/ ventilation can be utilised. Based upon thermal double glazing providing typically 33 dB(A) attenuation, the internal design criterion for private offices, small treatment rooms, interview rooms, consulting rooms (as detailed in paragraph 14.3.8 in Chapter 14: Noise and Vibration [APP-050]) is likely to be met during the construction works. On this basis, the classification of effects at PAM building would reduce further to minor adverse or less and therefore considered **not significant**. This is the same level of significance that was concluded in ES Chapter 14: Noise and Vibration [APP-050] for this impact pathway.

PK Construction Office building

14.3.14 For the PK Construction Office building the total noise level as shown in Table 14.2 exceeds the daytime lower cut off value of 65 dB by more than

10 dB during site clearance and demolition, drainage, and the cumulative of all activities, and therefore the magnitude of impact has been identified as high. Based on the sensitivity of these office buildings (medium as a likely worst-case) as shown in Table 14.11 in Chapter 14: Noise and Vibration [APP-050], the likely construction noise effects (based on Table 14.12 in Chapter 14: Noise and Vibration [APP-050]) for this high magnitude of impact construction activities are considered to be moderate adverse and therefore **significant**, which is the same level of significance as stated in ES Chapter 14: Noise and Vibration [APP-050].

- 14.3.15 The main NSRs within the PK Construction Office building (i.e., the office staff) will, however, be located inside the office building. It is understood that external windows and doors to sensitive rooms facing the construction works can be kept closed and alternative means of cooling/ ventilation can be utilised. Based upon thermal double glazing providing typically 33 dB(A) attenuation, the internal design criterion for open plan offices (as detailed in paragraph 14.3.48 in Chapter 14: Noise and Vibration [APP-050]) is likely to be met during the construction works. On this basis, the classification of effects at PK Construction Office building reduces to minor adverse or less thus **not significant** during different phases of the works. This is the same level of significance that was concluded in ES Chapter 14: Noise and Vibration [APP-050] for this impact pathway.

Nippon Gas Office building

- 14.3.16 For the Nippon Gas Office building, the total noise level as shown in Table 14.2 is less than 10 dB above the daytime lower cut off value of 65 dB $L_{Aeq,T}$ apart from during the cumulative worst-case scenario if all activities were undertaken at the same time (which as explained above, is unlikely for long extended periods, or at all, in practice). The magnitude of impact has been identified as high for the cumulative scenario. Based on the sensitivity of the office building (medium as a likely worst-case) as shown in Table 14.11 in Chapter 14: Noise and Vibration [APP-050], the likely construction noise effects (based on Table 14.12 in Chapter 14: Noise and Vibration [APP-050]) are considered moderate adverse and therefore **significant** for the worst-case cumulative scenario which is the same level of significance as stated in ES Chapter 14: Noise and Vibration [APP-050]. Whilst the effects during all other activities are predicted to be **minor adverse or less** and **not significant** which is the same level of significance as stated in ES Chapter 14: Noise and Vibration [APP-050]. Again, however, the main NSRs (i.e., the office staff) will be located inside the office building, and on the basis that external windows and doors to sensitive rooms facing the construction works are kept closed and alternative means of cooling/ ventilation is utilised, the internal design criterion for open plan offices (as detailed in paragraph 14.3.48 in Chapter 14: Noise and Vibration [APP-050]) is likely to be met during the construction works. On this basis the classification of effects at the Nippon Gas Office building reduces to minor adverse or less and therefore **not significant**. This is the same level of

significance that was concluded in ES Chapter 14: Noise and Vibration [APP-050] for this impact pathway.

Relocated Malcolm West Office building

- 14.3.17 For the relocated Malcolm West Office building the total noise level as shown in Table 14.2 exceeds the daytime lower cut off value of 65 dB by more than 10 dB during site clearance and demolition, drainage, and the cumulative of all activities, and therefore the magnitude of impact has been identified as high. Based on the sensitivity of these office buildings (medium as a likely worst-case) as shown in Table 14.11 in Chapter 14: Noise and Vibration [APP-050], the likely construction noise effects (based on Table 14.12 in Chapter 14: Noise and Vibration [APP-050]) for this high magnitude of impact construction activities are considered to be moderate adverse and therefore **significant**. This is an additional NSR that has been included in this ESA.
- 14.3.18 The main NSRs (i.e., the office staff) will, however, be located inside the office building. It is understood that external windows and doors to sensitive rooms facing the construction works can be kept closed and alternative means of cooling/ ventilation can be utilised. Based upon thermal double glazing providing typically 33 dB(A) attenuation, the internal design criterion for open plan offices (as detailed in paragraph 14.3.48 in Chapter 14: Noise and Vibration [APP-050]) is likely to be met during the construction works. On this basis, the classification of effects at relocated Malcolm West Office building reduces to minor adverse or less and therefore **not significant** during different phases of the works.
- 14.3.19 Additionally, the mitigation proposed in Section 14.9 of Chapter 14: Noise and Vibration [APP-050] and contained within the Construction Environmental Management Plan (CEMP) [APP-111] will help to minimise the construction noise levels further and reduce them below those assessed and reported above.

Construction vibration

- 14.3.20 As detailed in Chapter 3 of this ESA piling will be required for the marine works (vessel impact protection, approach jetty, linkspan and pontoons and finger piers) and landside works (IERRT project buildings and bridge construction).
- 14.3.21 For the marine works, the piling will be vibro-piling to refusal and then percussive piling techniques to reach the final level.
- 14.3.22 For the landside works, rotary piling is proposed for the new building foundations. For the overbridge vibratory jack sheet piling will be used where possible and if necessary percussive impact piling used to pile to refusal. Vibratory jack sheet piling method results in minimal vibration impacts.

- 14.3.23 The vibration predictions as detailed in Section 14.8 of Chapter 14: Noise and Vibration [APP-050] have been updated as the bridge piling works (Proposed Change 2) will be closer to the PAM building than previously assessed and also to predict the potential vibration impact on Exolum pipeline near the approach jetty (Proposed Change 1). The closest slope distance from the Exolum pipeline to the piling area for the IERRT jetty is approximately 19 m. The closest distance from the PAM building to the bridge piling is approximately 12 m. The distance of the closest pile to the IOT finger pier is approximately 5 m as a result of Proposed Change 4. The closest pile to the IOT jetty (main trunk way) is approximately 8 m, which is the same as reported in Chapter 14: Noise and Vibration [APP-050].
- 14.3.24 Table 14.7 in Chapter 14: Noise and Vibration [APP-050] sets out the magnitude of impact for construction vibration building damage for continuous vibration (for vibratory piling). Percussive impact piling is classed as transient vibration as it is discreet individual events. BS 7385-2 (BSI, 1993) states that the probability of building damage tends to be zero for transient vibration levels less than 12.5 mm/s PPV. For continuous vibration, such as from vibratory rollers, the threshold is around half this value. Therefore, Table 14.7 in Chapter 14: Noise and Vibration [APP-050] has been updated to include magnitude of impact for construction vibration building damage for both transient and continuous vibration and is shown in Table 14.3.
- 14.3.25 These values for construction vibration building damage have been applied to the relevant structures within the Port and surrounding area, including existing jetties and pipelines.
- 14.3.26 The resultant predicted PPV for percussive and vibratory piling are shown in Table 14.4, together with the resultant magnitude of impact based upon Table 14.7 in Chapter 14: Noise and Vibration [APP-050]. The existing jetties and pipelines are considered to be reinforced structures. The PAM building is considered to be a light framed structure. As the type and size of the piling rigs are not yet confirmed, a range of Pile Hammer Energy (J) have been assessed for the percussive piling works.

Table 14.3. Magnitude of impact – construction vibration building damage

Magnitude of Impact	Damage Risk	Continuous Vibration Level PPV mm/s		Transient Vibration Level PPV mm/s	
		Unreinforced or light framed structures	Reinforced or framed structures	Unreinforced or light framed structures	Reinforced or framed structures
High	Major	≥30	≥100	≥60	≥200
Medium	Minor	15 to <30	50 to <100	30 to <60	100 to <200
Low	Cosmetic	6 to <15	25 to <50	12 to <30	50 to <100
Negligible	Negligible	<6	<25	<12	<50

Table 14.4. Resultant PPV for percussive and vibratory piling

Receptor	Percussive Piling (47100 J)		Percussive Piling (300000 J)		Percussive Piling (63500 J)		Vibratory Piling	
	Predicted ppv Levels mm/s	Magnitude of Impact based on Transient	Predicted ppv Levels mm/s	Magnitude of Impact based on Transient	Predicted ppv Levels mm/s	Magnitude of Impact based on Transient	Predicted ppv Levels mm/s	Magnitude of Impact based on continuous
IOT Finger Pier (impact protection)	21.2	Negligible	53.5	Low	24.6	Negligible	32.5	Low
IOT Jetty Main Trunk way (impact protection)	18.8	Negligible	47.5	Negligible	21.9	Negligible	17.8	Negligible
IOT Jetty (proposed IERRT Jetty)	5.4	Negligible	13.5	Negligible	6.2	Negligible	2.4	Negligible
PAM Building – Bridge works	25.7	Low	65	High	29.9	Low	10.5	Low
PAM building – IERRT Building construction	n/a	n/a	n/a	n/a	n/a	n/a	0.6	Negligible
Exolum Pipeline	14.2	Negligible	35.8	Negligible	16.4	Negligible	8.6	Negligible

- 14.3.27 This initial vibration assessment for the IOT pipeline (finger pier and main trunk way) shows the predicted PPV levels for percussive piling using a piling rig with either 47100 J, or 63500 J hammer energy are likely to result in a negligible magnitude of impact (based on Table 14.3) for building damage, which results in a **negligible adverse** effect and therefore **not significant**. Different piling rigs may be used during construction, but the pile hammer energy associated with the CG300 rig (300000 J) is considered a worst case for marine piling, the initial vibration assessment for the IOT finger pier using 300000 J hammer energy is likely result in a low magnitude of impact at the closest pile which results in a **minor adverse** effect and therefore **not significant**. The impact on the IOT finger pier was not previously assessed in the ES Chapter 14 Noise and Vibration [APP 050] as the distance to the nearest pile was greater than the nearest pile to the IOT main trunk way.
- 14.3.28 This initial vibration assessment for the IOT Exolum pipeline shows the predicted PPV levels for percussive piling using a piling rig with either 47100 J, 300000 J or 63500 J hammer energy are likely to result in a negligible magnitude of impact (based on Table 14.3) for building damage, which results in a **negligible adverse** effect and therefore **not significant**.
- 14.3.29 For the landside piling operations, provided the pile hammer energy does not exceed 63500 J, for percussive piling near the PAM building, would result on a low magnitude of impact (based on Table 14.3) for building damage, which would result in a **minor adverse** effect and therefore **not significant**. This the same level of significance as reported in ES Chapter 14 Noise and Vibration [APP 050].
- 14.3.30 The predicted PPV levels for vibratory piling are likely to result in a negligible magnitude of impact (based on Table 14.3), resulting in a **negligible adverse** effect for the IOT Jetty main trunk way and Exolum pipeline, thus **not significant** and a low magnitude of impact (based on Table 14.3) for building damage, resulting in a minor adverse effect **not significant** for the PAM building and IOT finger pier. The ES Chapter 14 Noise and Vibration [APP 050] reported a negligible adverse effect for the PAM building and therefore is not a significant change.
- 14.3.31 The predicted PPV levels for both percussive and vibratory piling in close proximity to the PAM building for construction of the overbridge would result in significant annoyance to the occupants on the PAM building. However, given the timeframes for piling installation (approximately 2 to 3 days) it is proposed that the piling operation is undertaken where possible when the PAM building is not occupied, within the construction working hours or with prior notification of the piling works occurring. Good communication with the occupants of the PAM building will help to reduce the level of disruption, especially explaining about the limited duration of the piling works and that the level of vibration will be below the level for structural building damage. Where possible, alternative (low vibration and noise) piling techniques such as sheet hydraulic jacking will be used.

Operational noise – on-site activities

14.3.32 The operational noise model has been updated with the proposed design changes including the revised alignment of the approach jetty and the overbridge and routing for HGVs and land tugs around the southern compound. The noise from unloading and loading the vessels, with the associated on-site HGV and land tug movements, are likely to be one of the loudest activities from the operation of the proposed development and therefore operational noise levels have been predicted for the following scenario during arrival of up to three vessels. The scenario includes three ships arriving into dock, mooring up, vessel doors opening, vessel unloading (either accompanied HGVs or by land tugs), HGV and land tugs movements on port roads and over the proposed bridge (travelling to the southern compound), a reach stacker operating in the Northern compound and HGV trailers with refrigerated units parked in the trailer parks.

14.3.33 As the IERRT project will be operational 24 hours a day, the operational noise levels have been predicted over a 1-hour period and have been combined with the quietest hourly ambient noise level during the day and night-time periods. The change in noise level between the daytime and night-time combined noise levels and the existing quietest ambient noise levels for the daytime and night-time is reported in Table 14.5 below, along with the magnitude of impact based on Table 14.8 in Chapter 14: Noise and Vibration [APP-050] in ES Chapter 14.

Table 14.5. Operational noise – on-site activities

NSR	Predicted Noise Level, dB	Ambient Noise Level, dB	Combined Noise Level, dB	Level Difference, dB	Magnitude of Impact
Queens Road (day)	46.3	61.0	61.1	0.1	Low
Queens Road (night)	46.3	53.8	54.5	0.7	Low
Kings Road (day)	38.4	61.9	61.9	0.0	Negligible/ No change
Kings Road (night)	38.4	55.7	55.8	0.1	Low
PAM Building*	66.5	59.2	67.2	8.0	High
PK Construction Office*	65.7	59.2	66.6	7.4	High
Nippon Gas Office*	58.5	53.1	59.6	6.5	High
Relocation Malcolm West Office*	65.3	59.2	66.3	7.1	High
* Day-time assessment only as these NSRs are not occupied during the evening and night-time periods.					

- 14.3.34 Based on the results presented in Table 14.5, it is predicted that there would be a very slight increase in noise levels at residential NSRs on Queens Road due to the on-site operations. Based on Table 14.8 in Chapter 14: Noise and Vibration [APP-050], the magnitude of impact is low for NSRs on Queens Road during the day and night-time periods. This will result in a minor adverse effect (**not significant**) during both the day and night assessment periods. This is the same level of significance that was concluded in ES Chapter 14: Noise and Vibration [APP-050] for this impact pathway.
- 14.3.35 There would be no change in the noise levels at residential NSRs on Kings Road during the on-site daytime operations and a very slight increase in noise levels during the night-time period. This would result in a negligible/ no change effect (**not significant**) during the day and minor adverse effect (**not significant**) during the night at residential NSRs on Kings Road. This is the same level of significance that was concluded in ES Chapter 14: Noise and Vibration [APP-050] for this impact pathway.
- 14.3.36 For the on-site NSRs, which are located in the vicinity the IERRT project landside activities, Table 14.5 shows that there would be an increase in noise levels. Based on Table 14.8 in Chapter 14: Noise and Vibration [APP-050] the magnitude of impact is high for the PAM building, Nippon Gas Office building, PK Construction Office building and the relocated Malcolm West Office building. As shown in Table 14.11 of the Chapter 14: Noise and Vibration [APP-050], the sensitivity for the PAM building (health use) is high, and the Nippon Gas, PK construction and relocated Malcolm West offices are medium. This will result in a **major adverse** effect (significant) at the PAM building, a **moderate adverse** effect (significant) at the Nippon Gas Office, PK Construction Office and relocated Malcolm West Office buildings. This is the same level of significance that was reported in ES Chapter 14: Noise and Vibration [APP-050] for the PAM building and Nippon Gas. At the PK Construction Office building the level of significance has increased to **moderate adverse** from minor adverse as reported in ES chapter 14: Noise and Vibration [APP-050] due to Proposed Change 2.
- 14.3.37 However, NSRs at these buildings – i.e., the employees and other users – will be located inside. On the basis that all external windows and doors facing the IERRT project are kept closed and alternative means of ventilation is used, and based upon thermal double glazing providing typically 33 dB(A) attenuation, the internal design criterion of open plan offices and consulting rooms (as detailed in paragraph 14.3.48 of Chapter 14: Noise and Vibration [APP-050]) is likely to be met during the operation of the IERRT project. Therefore, on this basis and using professional judgement, the classification of effects at the PAM building and the Nippon Gas, PK Construction and relocated Malcolm West offices buildings would be expected to reduce to minor adverse or less and therefore considered **not significant**. This is the same level of significance that was concluded in ES Chapter 14: Noise and Vibration [APP-050] for this impact pathway.

Mitigation measures

14.3.38 A maximum pile hammer energy has been set for percussive piling works near the PAM building as an additional mitigation measure. The mitigation measures reported in Section 14.9 of Chapter 14: Noise and Vibration [APP-050] remain unchanged.

14.4 Updates required to figures

14.4.1 Figure 14.1 in Volume 2 of the ES relating to Chapter 14: Noise and Vibration [APP-070] of the ES has been updated to include the relocated Malcolm West Office Building. This is provided at the end of this chapter and is referred to as Figure 14.1.

14.5 Updates required to appendices

14.5.1 The appendices relating to Chapter 14: Noise and Vibration [APP-050] of the ES are as follows:

- Appendix 14.1 Sound Monitoring Survey [APP-102];
- Appendix 14.2 Construction Noise Levels and Assumptions [APP-103]; and
- Appendix 14.3 Operational Noise Levels and Assumptions [APP-104].

14.5.2 Appendix 14.1 [APP-102] and Appendix 14.3 [APP-104] are not affected by the changes set out in Chapter 2 and Chapter 3 of this ESA and do not require updating. Appendix 14.2 [APP-103] has been updated to include the revised plant for the construction and piling methods for the overbridge. This is provided in Annex D of this ESA.

14.6 Impact assessment summary

14.6.1 Table 14.6 below summarises the impact assessment presented in the Chapter 14 Noise and Vibration chapter [APP-050] of the ES, and how the Proposed Changes alter the significance of the impacts.

Table 14.6. Noise and vibration impact assessment summary

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Major beneficial				
Moderate beneficial				
Minor beneficial				
Insignificant / Negligible / Neutral / Low				
Minor adverse / Slight adverse				
Moderate adverse / potentially significant				
Major adverse / Significant / Large adverse				
Airborne noise and vibration				
<i>Construction phase</i>				
Residential Noise Sensitive Receptors (NSRs) on Queens Road and Kings Road: Construction noise	Negligible adverse (not significant)	Standard construction mitigation as set out in the CEMP. Section 61 application for construction works outside the standard construction hours.	Negligible adverse (not significant)	None
Residential NSRs on Queens Road and Kings Road: Construction traffic	Minor adverse (not significant)	Construction traffic management plan included in the CEMP.	Minor adverse (not significant)	None
The People Asset Management Ltd (PAM) building, (adjacent to the IERRT project site): Construction noise	Minor adverse (not significant)	Embedded mitigation includes the screening and crusher plant being located a minimum of 250 m away from NSRs and temporary acoustic screening around	Minor adverse (not significant)	None

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

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
<p>PK Construction Office and Nippon Gas Office buildings (on-site NSRs): Construction noise</p> <p>*Additional NSR in addendum-relocated Malcolm West Office Building</p>	<p>Up to moderate adverse (significant) external to the office building</p>	<p>Embedded mitigation includes the screening and crusher plant being located a minimum of 250 m away from NSRs. This measure has been included within the assessment in Section 14.8 of Chapter 14.</p> <p>In addition, measures will include standard construction mitigation as set out in Section 14.9 of Chapter 14 (and to be included in the CEMP), and also include the ability for the external windows and doors facing the construction works to remain closed and alternative means of cooling/ ventilation used.</p>	<p>Minor adverse or less (not significant).</p>	<p>None</p>

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
<p>IOT Jetty (Finger Pier and Main Trunk Way) and PAM Building: Construction vibration. *Additional Sensitive Receptor in Addendum – Relocated Exolum Pipeline</p>	<p>Minor adverse or less (not significant)</p>	<p>Pre-construction condition surveys on nearby buildings and structures to be undertaken. Liaison protocol with local businesses/ occupiers to be established.</p> <p>Verification of the construction vibration predictions once the piling methods and piling rig are known to confirm that there are no significant effects expected.</p> <p>Monitoring to verify the thresholds are not exceeded.</p> <p>Limit on the pile hammer energy for piling operations near the PAM building.</p>	<p>Minor adverse or less (not significant)</p>	<p>None (subject to limit on the pile hammer energy for piling operations near PAM building)</p>

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
<i>Operational phase</i>				
Residential NSRs on Queens Road: On-site activities	Minor adverse (not significant)	Standard best practice for operational activities.	Minor adverse or less (not significant)	None
Residential NSRs on Kings Road: On-site activities	Minor / negligible / no change (not significant)	Standard best practice for operational activities.	Minor/ negligible adverse (not significant)	None
PAM Building: On-site activities	Up to major adverse (significant)	Standard best practice for operational activities, together with keeping all PAM building external windows and doors facing the IERRT closed.	Minor adverse or less (not significant)	None
PK Construction Office building: On-site activities	Minor adverse (not significant) Moderate adverse (significant) in addendum	Standard best practice for operational activities, together with keeping all PK Construction Office external windows and doors facing the IERRT closed.	Minor adverse or less (not significant)	None
Nippon Gas Office building: On-site activities	Moderate adverse (significant)	Standard best practice for operational activities, together with keeping all Nippon Gas Office external windows	Minor adverse or less (not significant)	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
		and doors facing the IERRT closed.		
Relocated Malcolm West Office Building:-On-site activities (new NSR in addendum)	Moderate adverse (significant)	Standard best practice for operational activities, together with keeping all relocated Malcolm West Office external windows and doors facing the IERRT closed.	Minor adverse or less (not significant)	New NSR
Residential NSRs on Queens Road: Road traffic noise	Up to moderate/major adverse (significant)	Offer noise insulation to affected residential NSRs	Minor adverse or less (not significant).	None

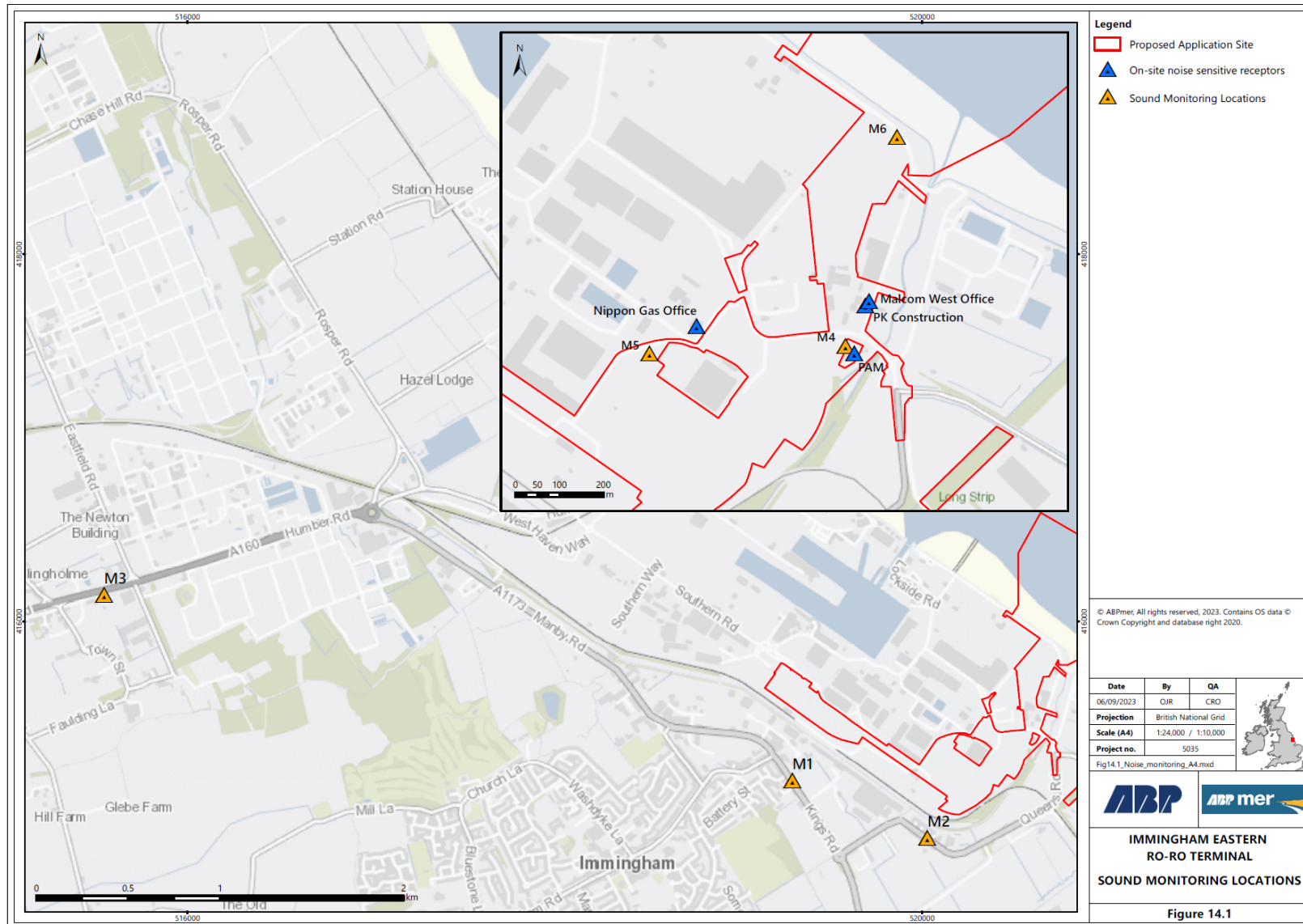


Figure 14.1. Sound monitoring locations

15 Cultural Heritage and Marine Archaeology (Chapter 15)

15.1 Introduction

- 15.1.1 Chapter 15 of the ES [APP-051] provided an assessment of the potential significant effects of the proposed IERRT on cultural heritage and marine archaeology. The assessment considers potential impacts on seabed prehistory (e.g., palaeolithic artefacts), seabed features (e.g., shipwrecks), intertidal heritage receptors and on the historic setting of the Port of Immingham.
- 15.1.2 The historic environment baseline was defined through a desk-based review of available information and project-specific surveys. A geophysical survey was carried out to characterise features of archaeological potential and was supported by analysis of sediment logs from vibrocores. An intertidal walkover survey and a setting assessment were also completed.
- 15.1.3 Twenty-five palaeogeographic (historical seabed) features of archaeological potential have been identified within the study area. There are two known wreck sites and 102 seabed features which have possible archaeological potential within the study area. The intertidal walkover identified four sites including remnants of mooring dolphins associated with the 20th century port.
- 15.1.4 In Chapter 15 of the ES, the assessment considered three impact pathways from the construction phase in detail. These addressed the potential for direct impacts on known and potential heritage receptors from construction activities and from dredging, and the potential for indirect impacts to heritage receptors due to altered sediment or hydrological processes. Maintenance dredging takes place in areas where impacts have already occurred for the capital dredge during the construction phase and therefore there are unlikely to be further impacts on heritage receptors either directly or indirectly during operation.

15.2 Consultation

- 15.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. However, no specific comments were raised in relation to cultural heritage and marine archaeology.

15.3 Updates required to impact assessment

15.3.1 There are no additional impact pathways in relation to cultural heritage and marine archaeology introduced by the Proposed Changes (described in Chapter 2 and Chapter 3 of this ESA). Furthermore, none of the impact pathways assessed in Section 15.8 of Chapter 15 of the ES [APP-051] are affected by the revisions to the IERRT project. This is because the changes do not affect the magnitude of impact or sensitivity of resources.

15.4 Updates required to figures

15.4.1 No figures in Volume 2 of the ES relating to Chapter 15 of the ES [APP-071] require updating following Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

15.5 Updates required to appendices

15.5.1 The appendices relating to Chapter 15 of the ES are as follows:

- Appendix 15.1 Marine Archaeology Technical Report [APP-105];
- Appendix 15.2 Historic Environment Settings Assessment [APP-106]; and
- Appendix 15.3 Draft Written Scheme of Investigation [APP-107].

15.5.2 These appendices are not affected by the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA and do not require updating.

15.6 Impact assessment summary

15.6.1 Table 15.1 summarises the impact assessment presented in the cultural heritage and marine archaeology chapter (Chapter 15) of the ES, and how the Proposed Changes alter the significance of the impacts.

Table 15.1. Cultural heritage and marine archaeology impact assessment summary

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Major beneficial				
Moderate beneficial				
Minor beneficial				
Insignificant / Negligible / Neutral / Low				
Minor adverse / Slight adverse				
Moderate adverse / potentially significant				
Major adverse / Significant / Large adverse				
Cultural heritage and marine archaeology				
<i>Construction phase</i>				
Direct impacts on known and potential marine heritage receptors from construction activities	Major adverse	Offsetting by means of geoarchaeological assessment of geotechnical surveys.	Major positive (as long as data are retained, analysed, and reported on by a qualified geo-archaeologist)	None
Direct impacts on known and potential marine heritage receptors from dredging	Major adverse	Avoidance via implementation of Archaeological Exclusion Zones (AEZs) were deemed appropriate; WSI (Written Scheme of Investigation) and any supporting activity-specific	Negligible	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
		Method Statements) and reduction via a Protocols for Archaeological Discoveries (PAD).		
Indirect impacts to marine heritage receptors due to altered sediment or hydrological processes	Negligible	No mitigation is necessary as a result of negligible adverse significance of impact.	Negligible	None
<i>Operational phase</i>				
Direct impacts on known and potential marine heritage receptors from maintenance dredging	Negligible	No mitigation is necessary as a result of negligible adverse significance of impact.	Negligible	None
Indirect effects such as changes in local scouring and sedimentation patterns	Negligible	No mitigation is necessary as a result of negligible adverse significance of impact.	Negligible	None
Impacts to setting of cultural heritage receptors.	Negligible	No mitigation is necessary as a result of negligible adverse significance of impact.	Negligible	None

16 Socio-economic (Chapter 16)

16.1 Introduction

- 16.1.1 Chapter 16 of the ES [APP-052] provided an assessment of the potential significant effects of the proposed IERRT on employment, local businesses, and the local population. The assessment considered receptors that will potentially be affected by employment generation.
- 16.1.2 Baseline conditions were determined through a desk-based review of available information which presents information on the local population and labour market, employment sectors, economic activity and inactivity, and workforce occupations.
- 16.1.3 In Chapter 16 of the ES, the assessment considered a total of nine impact pathways including the changes to employment and impacts on the local economy (the Gross Value Added per construction worker), impacts on local services and infrastructure, impacts on existing businesses and activities, and changing influx of works during construction and operation. In addition, the potential impact on temporary accommodation during construction was also assessed.

16.2 Consultation

- 16.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. The outcome of the consultation that has been undertaken, along with how it has influenced the socio-economic assessment, is presented in Table 16.1 of this chapter of the ESA.

Table 16.1. Summary of consultation relevant to socio-economic assessment

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
Maritime Bunkering Ltd (CA 41)	Change Application Consultation 17.11.23	Maritime Bunkering Ltd as charterers of the Rix Shipping barges object to the proposed construction of the IERRT as the structure will limit our opportunities of loading at all berths of the Finger Pier. The structure causes us both safety and commercial concerns and therefore please take this communication as objection to the application.	Chapter 16 of the ES [APP-052] on socio-economics provides an assessment of effects on businesses due to IERRT. It is recognised that Rix currently uses Berths 8 and 9 of the IOT Finger Pier. Navigation simulations of the Proposed Changes have been undertaken and are provided at Application Document Reference number 10.3.9. The outcomes of this exercise indicate that tankers and barges arriving or departing at IOT finger pier berths, as well as vessels arriving at IERRT, can be done safely with Proposed Change 4 in place (see NRA Addendum at Annex C of this ESA). On this basis, the Proposed Changes do not introduce new commercial effects relating to the ability of Rix to use the IOT finger pier berths. Therefore, the assessment provided in Chapter 16 still applies, concluding that there would be no impact on the ability of Rix to operate the berths they need access to during construction and operation of IERRT.
Svitzer (CA 33)	Change Application Consultation 17.11.23	In the long term if the project goes ahead, if any constraints are placed on vessels due to arrive and depart berths in the area and a Stena ship is arriving/ departing at the same time we need to be mindful of tug ordering times. We can't be in a position that our tugs must wait prolonged periods as this causes issues with crew's hours and our ability to serve other customers. As the ferries operate to a schedule it should be relatively easy to devise a process for the occasions there is a clash.	The applicant notes the importance of clear and early communication when it comes to tug ordering times. As Svitzer note, the IERRT will service Ro-Ro vessels which operate to a schedule. This will assist with ensuring that tug allocations and vessel arrival and departure slots can be equitably managed.

16.3 Updates required to impact assessment

- 16.3.1 There are no additional impact pathways in relation to socio-economics introduced by the Proposed Changes (described in Chapter 2 and Chapter 3 of this ESA).
- 16.3.2 The impact pathway assessed in Section 16.8 of Chapter 16 of the ES [APP-052] that has the potential to be affected by the Proposed Changes is listed below. The following paragraphs provide the updated impact assessment for this pathway in light of Proposed Changes:
- Effects on existing businesses during the construction and operational phases.
- 16.3.3 The preferred masterplan contains a slight change in building footprint for UK Border Force relative to the previous masterplan as a result of Proposed Change 3. With regard to impacts to the operation of the business, there will likely be no effect due to the expectation that UKBF would plan to ensure continuous presence for customs and security purposes throughout construction and operation of the IERRT project. Therefore, no changes to the significance of effect are expected.
- 16.3.4 With regard to employment for the business, there could potentially be a slight increase in UKBF jobs as the volumes through the port could increase as a result of the IERRT project, however this is not expected to cause a significant change, and therefore the conclusions reported within the original ES remain unchanged.
- 16.3.5 With regards to the PAM building during construction, installation of the piling and associated construction works in the immediate area of the PAM Building for the approach bridge would be approximately 2 to 3 days as a result of Proposed Change 2. Piling will be where possible undertaken when the PAM building is not occupied within the construction working hours and with prior notification of construction works occurring. Good communication with the occupants of the PAM building will help to reduce the level of disruption, especially explaining about the limited duration of the piling works, and any possible intermittent access constraints. With these measures in place, the limited disruption to the PAM building is considered not significant.
- 16.3.6 Regarding the minor alterations associated with the Drurys buildings as described at paragraph 2.3.42 of Chapter 2 of the ESA, due to size and scale of the relocation exercise, it has been concluded that this minor alteration would not result in a significant adverse effect on the Drury's ability to operate. Figure 3.1 of this ESA shows the location of the additional buildings that will be demolished including their dimensions as a result of the minor alterations, and the Building Schedule at Appendix 2.3 to the ES has been updated to

note the ancillary buildings which are to be constructed (provided at Annex B of this ESA).

16.3.7 Proposed Change 4 as detailed within Chapter 2 and Chapter 3 of this addendum would be timed to avoid works to the IOT infrastructure as previously detailed in paragraph 16.8.64 to 16.8.70 within Chapter 16: Socio economics [APP-052] of the ES for the Project.

16.4 Updates required to figures

16.4.1 There are no figures relating to Chapter 16 of the ES.

16.5 Updates required to appendices

16.5.1 There are no appendices relating to Chapter 16 of the ES.

16.6 Impact assessment summary

16.6.1 Table 16.2 summarises the impact assessment presented in the socio-economic chapter (Chapter 16) of the ES, and how the Proposed Changes alter the significance of the impacts.

Table 16.2. Socio-economic impact assessment summary

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Major beneficial				
Moderate beneficial				
Minor beneficial				
Insignificant / Negligible / Neutral / Low				
Minor adverse / Slight adverse				
Moderate adverse / potentially significant				
Major adverse / Significant / Large adverse				
Socio-economic				
<i>Construction phase</i>				
Employment	Moderate beneficial (significant)	N/A	Moderate beneficial (significant)	None
Gross Value Added (GVA)	Moderate beneficial (significant)	N/A	Moderate beneficial (significant)	None
Impact on local services and infrastructure	Negligible (not significant)	N/A	Negligible (non-significant)	None
Temporary accommodation	Negligible (not significant)	N/A	Negligible (non-significant)	None
Effects on existing businesses and activities	Negligible (not significant)	N/A	Negligible (non-significant)	None
<i>Operational Phase</i>				
Employment	Moderate beneficial (significant)	N/A	Moderate beneficial (significant)	None
GVA	Minor beneficial (not significant)	N/A	Minor beneficial (not significant)	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Impact on local services and infrastructure	Negligible (not significant)	N/A	Negligible (not significant)	None
Effects on existing businesses and activities	Negligible (not significant)	N/A	Negligible (not significant)	None

17 Traffic and Transport (Chapter 17)

17.1 Introduction

- 17.1.1 Chapter 17 of the ES [APP-053] provided an assessment of the potential significant effects of the proposed IERRT on terrestrial traffic and transportation. The assessment considered users of the public highway in the vicinity of the site (pedestrians, cyclists and public transport users), private car and van drivers, and existing freight traffic users of the port and surrounding areas.
- 17.1.2 Baseline conditions were informed by traffic count surveys carried out on the local road network at various locations. Traffic flow data from the Department for Transport (DfT) and Personal Injury Accident data from North East Lincolnshire Council were also collated.
- 17.1.3 In Chapter 17 of the ES, the assessment considered a total of 12 impact pathways including impacts associated with potential severance, driver delay, pedestrian delay and amenity, accidents and safety, hazardous or abnormal loads, and fear and intimidation during construction and operational phases.

17.2 Consultation

- 17.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. The outcome of the consultation that has been undertaken, along with how it has influenced the traffic and transport assessment, is presented in Table 17.1 of this chapter of the ESA.

Table 17.1. Summary of consultation relevant to the traffic and transport assessment

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
Grimsby, Cleethorpes and District Civic Society (CA 12& CA 14)	Change Application Consultation 30.10.23	Concern was raised regarding the level of additional road traffic the proposal will produce. Rail Freight is recognised to be more environmentally friendly than Road haulage, so it would be beneficial to the well-being of the area to use the rail facilities more. The Road network is already congested, with numerous road closures due to accidents involving in many cases, Heavy Goods vehicles. Rail should be considered as a prime mover of container traffic and other bulk goods.	The Civic Society's comments are noted, however they are not specifically related to the Proposed Changes to the IERRT project. Nevertheless, the applicant will contact the Civic Society to explain the North Sea Ro-Ro traffic logistics model and how road connectivity is an intrinsic element of this logistics chain.
National Highways (CA 31)	Change Application Consultation 16.11.23	National Highways has identified that the proposed changes dated the 20th October 2023 are non-material to the impact on the SRN.	National Highways comments are noted.

17.3 Updates required to impact assessment

17.3.1 There are no additional impact pathways in relation to traffic and transport introduced by the Proposed Changes (described in Chapter 2 and Chapter 3 of this ESA). Furthermore, none of the impact pathways assessed in Section 17.8 of Chapter 17 the ES [APP-053] are affected by the revisions to the IERRT project. This is because the changes relate solely to either marine elements of the scheme, or internal changes to the terminal itself. None of these changes affect the capacity of the terminal as assessed in Chapter 17 of the ES.

17.4 Updates required to figures

17.4.1 No figures in Volume 2 of the ES relating to Chapter 17 of the ES require updating following the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

17.5 Updates required to appendices

17.5.1 The appendices relating to Chapter 17 of the ES are as follows:

- Appendix 17.1 Transport Assessment [APP-108]; and
- Appendix 17.2 Travel Plan [APP-109].

17.5.2 These appendices are not affected by the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA and do not require updating.

17.6 Impact assessment summary

17.6.1 Table 17.2 summarises the impact assessment presented in the traffic and transport chapter (Chapter 17) of the ES [APP-053], and how the Proposed Changes alter the significance of the impacts.

Table 17.2. Traffic and transport impact assessment summary

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Major beneficial				
Moderate beneficial				
Minor beneficial				
Insignificant / Negligible / Neutral / Low				
Minor adverse / Slight adverse				
Moderate adverse / potentially significant				
Major adverse / Significant / Large adverse				
Traffic and transport				
<i>Construction phase</i>				
Severance during construction – pedestrians	Insignificant	N/A	Insignificant	None
Driver delay during construction – road users	Insignificant	N/A	Insignificant	None
Pedestrian delay and amenity during construction – pedestrians	Insignificant	N/A	Insignificant	None
Accidents and safety during construction – road users	Insignificant	N/A	Insignificant	None
Hazardous or abnormal loads during construction – road users and pedestrians	Insignificant	N/A	Insignificant	None
Fear and intimidation during construction – pedestrians	Insignificant	N/A	Insignificant	None
<i>Operational phase</i>				
Severance during operation – pedestrians	Insignificant / minor	N/A	Insignificant/ minor	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Driver delay during operation – road users	Insignificant / minor	N/A	Insignificant/ minor	None
Pedestrian delay and amenity during operation – pedestrians	Insignificant / minor	N/A	Insignificant/ minor	None
Accidents and safety during operation – road users	Insignificant	N/A	Insignificant	None
Hazardous or abnormal loads during operation – road users and pedestrians	Insignificant	N/A	Insignificant	None
Fear and intimidation during operation – pedestrians	Insignificant / minor	N/A	Insignificant/ minor	None

18 Land Use Planning (Chapter 18)

18.1 Introduction

- 18.1.1 Chapter 18 of the ES [APP-054] provided an assessment of the potential significant risks of the IERRT on land use planning and human health. Specifically, it considered the potential for workers and users of the IERRT to be exposed to unacceptable levels of risk from potential major accidents at the existing major hazard sites, pipelines, and explosives sites in the vicinity.
- 18.1.2 A desk-based review identified a number of current major hazard sites, pipelines and explosives sites where major accidents could impact on the area of the proposed development. The risks from each hazard were assessed based on an approach adopted by the Health and Safety Executive (HSE) for land use planning, with some additional quantitative risk analysis to provide a better understanding of the risks.

18.2 Consultation

- 18.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. The outcome of the consultation that has been undertaken, along with how it has influenced the land use planning assessment, is presented in Table 18.1 of this chapter of the ESA.

Table 18.1. Summary of consultation relevant to the land use planning assessment

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered in this Chapter
Ministry of Defence (MOD) (CA 13)	Change Application Consultation 02.11.23	The MOD Safeguarding Team's assessment of this amendment remains as our previous submission, for offshore no objection. The onshore element has been assessed as a Site Outside Safeguarding Area (SOSA) and our response remains as our previous correspondence.	The MOD's comments are noted.

18.3 Updates required to impact assessment

- 18.3.1 There are no additional impact pathways in relation to land use planning introduced by the Proposed Changes (described in Chapter 2 and Chapter 3 of this ESA). Furthermore, none of the impact pathways assessed in Chapter 18 the ES [APP-054] are affected by the revisions to the IERRT project. This is because the changes do not change the Order Limits of the proposed development. Furthermore, the operational areas will not be changed to an extent that would affect whether the existing major hazard sites in the vicinity of IERRT would pose an unacceptable risk to people using and working at the IERRT.
- 18.3.2 The terminal layout still follows general principles established in the original application so as to comply with HSE's Land Use Planning guidance. The passenger waiting area is still within a Middle Zone area and the maximum number of passengers - which does not include lorry drivers accompanying their load - will not exceed 100 at any one time and, in any case, 100 per day. Similarly, the use of the northern trailer park will be for cargo placement only – as it is now – because it partly sits within a Development Proximity Zone (DPZ).

18.4 Updates required to figures

- 18.4.1 No figures in Volume 2 of the ES relating to Chapter 18 of the ES [APP-073] require updating following the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

18.5 Updates required to appendices

- 18.5.1 There are no appendices relating to Chapter 18 of the ES. Therefore, no appendices require updating in light of the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

18.6 Impact assessment summary

- 18.6.1 Table 18.2 summarises the impact assessment presented in the land use planning chapter (Chapter 18) of the ES, and how the Proposed Changes alter the significance of the impacts.

Table 18.2. Land use planning impact assessment summary

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Major beneficial				
Moderate beneficial				
Minor beneficial				
Insignificant / Negligible / Neutral / Low				
Minor adverse / Slight adverse				
Moderate adverse / potentially significant				
Major adverse / Significant / Large adverse				
Land use planning				
Major accidents at major hazard sites, pipelines, and explosives sites in the vicinity of proposed development	Not significant	Maximum number of members of the public who may be present in the waiting area of the Terminal will not exceed 100 at any one time	Not significant	None

19 Climate Change (Chapter 19)

19.1 Introduction

- 19.1.1 Chapter 19 of the ES [APP-055] provided an assessment of the potentially significant effects of the proposed development in relation to climate change. Consideration of climate change effects is divided into three aspects; Impact of the IERRT project on climate (greenhouse gas (GHG) emissions); Climate Change Resilience (CCR) review of the proposed development to climate change; and in-combination climate change impacts (ICCI).
- 19.1.2 A desk-based review identified the relevant receptors and considered the relevance to the GHG impact assessment, CCR review and ICCI assessments. The baseline for GHG emissions was defined as a 'business as usual' scenario where the IERRT project does not go ahead. For CCR the baseline is derived from historical climate data obtained from the Met Office recorded by the closest meteorological station to the IERRT project for the period 1981-2010.
- 19.1.3 In line with guidance all GHG emissions are classified as being significant because all emissions contribute to climate change. To contextualise the significance level, the GHG emissions from construction and operation were compared to the UK Carbon Budgets in Chapter 19 of the ES.
- 19.1.4 In Chapter 19 of the ES, a review of the potential impacts to the CCR receptors assessed nine impact pathways including inaccessibility to the site, health and safety risks, unsuitable site conditions, damage to construction materials, plant equipment, assets, and infrastructure, and increased operational cooling requirements.

19.2 Consultation

- 19.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. However, no specific comments were raised in relation to climate change.

19.3 Updates required to impact assessment

- 19.3.1 There are no additional or different impact pathways in relation to CCR introduced by the Proposed Changes (described in Chapter 2 and Chapter 3 of this ESA).

19.3.2 Furthermore, the following pathways assessed in Section 19.8 of Chapter 19 of the ES [APP-055] relating to the GHG emissions assessment are not affected by the revisions to the IERRT project:

- Greenhouse gas emissions: Demolition;
- Greenhouse gas emissions: Land clearance;
- Greenhouse gas emissions: Enabling works;
- Greenhouse gas emissions: Fuel use/ energy consumption;
- Greenhouse gas emissions: Water consumption and wastewater treatment;
- Greenhouse gas emissions: Freight and vessel transport;
- Greenhouse gas emissions: Fuel use/ energy consumption;
- Greenhouse gas emissions: Water consumption and wastewater treatment;
- Greenhouse gas emissions: Transportation of workers;
- Greenhouse gas emissions: Waste emissions related to waste production during operational phase; and
- Climate Change Resilience Assessment which has qualitatively reviewed the IERRT project's resilience (including the proposed design mitigation measures) to climate change.

19.3.3 The impact pathway that has the potential to be affected by the Proposed Changes is the cumulative GHG impact assessment. The following sections provide the updated impact assessment for this pathway in light of the Proposed Changes which specifically relate to construction materials, waste, and transport.

Cumulative GHG impact assessment

19.3.4 The GHG Assessment has taken a project lifecycle approach to identify GHG emissions hotspots (i.e., emissions sources likely to generate the largest amount of GHG emissions) and correspondingly enable the identification of priority areas for mitigation.

19.3.5 Changes to the GHG assessment as a result of the Proposed Changes include:

- Construction Materials: emissions increased from 69,835 to 90,770 tCO₂e due to the addition of a new construction element included within the design;
- Waste: emissions increased from 153 to 183 tCO₂e to align reporting of construction waste to those listed within Appendix 1 of the CEMP Construction materials and waste management assessment [APP-111]. These changes are as a result of the changes in material waste percentages, as well as the additional materials required to accommodate the design changes. End of life waste has been scoped out of the assessment in line with project waste reporting; and

- Transport: emissions increased from 462 tCO₂e to 28,937 tCO₂e to account for the transport of the additional materials include within the design. This includes the transport of the steel pontoons which have a total single trip distance of 353 km.

19.3.6 The emissions associated with the Proposed Changes account for <2% of the total emissions during the project lifecycle which is considered negligible. Therefore, the Proposed Changes do not change the findings or conclusions of Chapter 19 of the ES.

19.4 Updates required to figures

19.4.1 There are no figures relating to Chapter 19 of the ES. Therefore, no figures require updating in light of the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

19.5 Updates required to appendices

19.5.1 There are no appendices relating to Chapter 19 of the ES. Therefore, no appendices require updating in light of the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

19.6 Impact assessment summary

19.6.1 Table 19.1 summarises the impact assessment presented in the climate change chapter (Chapter 19) of the ES, and how the Proposed Changes alter the significance of the impacts.

Table 19.1. Climate change impact assessment summary

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Major beneficial				
Moderate beneficial				
Minor beneficial				
Insignificant / Negligible / Neutral / Low				
Minor adverse / Slight adverse				
Moderate adverse / potentially significant				
Major adverse / Significant / Large adverse				
Climate change				
<i>Construction phase</i>				
Greenhouse gas emissions: Demolition	Low	Not applicable	Minor adverse (not significant)	None
Greenhouse gas emissions: Land clearance	Low	Not applicable	Minor adverse (not significant)	None
Greenhouse gas emissions: Enabling works	Low	Not applicable	Minor adverse (not significant)	None
Greenhouse gas emissions: Products	Low	Not applicable	Minor adverse (not significant)	None
Greenhouse gas emissions: Transport of products	Low	Not applicable	Minor adverse (not significant)	None
Greenhouse gas emissions: Fuel use/ energy consumption	Low	Not applicable	Minor adverse (not significant)	None
Greenhouse gas emissions: Water consumption and wastewater treatment	Low	Not applicable	Minor adverse (not significant)	None
Greenhouse gas emissions: Transportation of workers	Low	Not applicable	Minor adverse (not significant)	None

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Greenhouse gas emissions: Freight and vessel transport	Low	Not applicable	Minor adverse (not significant)	None
Greenhouse gas emissions: Waste	Low	Not applicable	Minor adverse (not significant)	None
Climate change resilience	Not significant	Climate adaption measures which are integrated into design	Not significant	None
<i>Operational Phase</i>				
Greenhouse gas emissions: Fuel use/ energy consumption	Low	Not applicable	Minor adverse (not significant)	None
Greenhouse gas emissions: Water consumption and wastewater treatment	Low	Not applicable	Minor adverse (not significant)	None
Greenhouse gas emissions: Transportation of workers	Low	Not applicable	Minor adverse (not significant)	None
Greenhouse gas emissions: Freight and vessel transport	Low	Not applicable	Minor adverse (not significant)	None
Greenhouse gas emissions: Waste – emissions related to waste production during the operational phase	Low	Not applicable	Minor adverse (not significant)	None
Climate change resilience	Not significant	Climate adaption measures which are integrated into design	Not significant	None

20 Cumulative and In-combination Effects (Chapter 20)

20.1 Introduction

20.1.1 Chapter 20 of the ES [APP-056] presented the approach and the assessment of the cumulative and in-combination effects of the proposed development.

20.2 Consultation

20.2.1 Feedback received in response to the non-statutory consultation and the publication of the Proposed Changes Notification has been taken into account to inform this ESA. However, no specific comments were raised in relation to cumulative and in-combination effects.

20.3 Updates required to impact assessment

20.3.1 There are no changes to the proposed development Order Limits as a result of the Proposed Changes. As a result, there are no changes to the other developments identified on the long list or short list that could interact with the IERRT project, as presented in Chapter 20 of the ES [APP-056] and Figure 20.1 [APP-074].

20.3.2 There are no new or different significant effects for any other environmental topics as a result of the Proposed Changes (as noted in this ESA). There are therefore no changes to the intra-project effects or inter-project effects presented in Chapter 20 of the ES [APP-056].

20.4 Updates required to figures

20.4.1 No figures in Volume 2 of the ES relating to Chapter 20 of the ES [APP-074] require updating following the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

20.5 Updates required to appendices

20.5.1 There are no appendices relating to Chapter 20 of the ES. Therefore, no appendices require updating in light of the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

21 Summary

- 21.1.1 In summary, there will be no new likely significant adverse effects as a result of the Proposed Changes to the IERRT project.
- 21.1.2 The Proposed Changes will also not change the level of significance of effects from each impact pathway reported in the ES.

References

APIS. (2023). Air Pollution Information System. [Online] Available at: [REDACTED] (accessed October 2023).

British Standards Institute. (2018). BS 16907:2018-1 to BS 16907:2018-7. Earthworks. Part 1 to Part 7.

British Standards Institute. (2014a). BS 5228-1:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites. Part 1: Noise.

British Standards Institute. (2014b). BS 5228-2:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites. Part 2: Vibration.

British Standards Institute. (2009). BS 6031:2009 Code of Practice for Earthworks.

British Standards Institute. (1993). BS 7385-2 – Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration.

Environment Agency. (2021). Land Contamination Risk Management (LCRM). [Online] Available at: <https://www.gov.uk/government/publications/land-contamination-riskmanagement-lcrm#full-publication-update-history> (accessed June 2022).

Abbreviations/Acronyms

Acronym	Definition
ABP	Associated British Ports
AEOI	Adverse Effect on the Integrity
AEZs	Archaeological Exclusion Zones
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
APIS	Air Pollution Information System
APT	Associated Petroleum Terminals
AW	Anglian Water
BS	British Standard
BSI	British Standards Institution
BSS	Bed Shear Stress
CCR	Climate Change Resilience
CD	Chart Datum
CEMP	Construction Environmental Management Plan
CFA	Continuous Flight Auger
dB	Decibel
DCO	Development Consent Order
DfT	Department for Transport
DPZ	Development Proximity Zone
EIA	Environmental Impact Assessment
EMS	Estuary European Marine Sites
ES	Environmental Statement
ESA	Environmental Statement Addendum
ExA	Examining Authority
GHG	Greenhouse Gas
GI	Ground Investigation
GVA	Gross Value Added
HE	Highways England
HES	Humber Estuary Services
HGV	Heavy Goods Vehicle
HMH	Harbour Master Humber
HRA	Habitats Regulations Assessment
HSE	Health and Safety Executive
HST	Humber Sea Terminal
IAQM	Institute of Air Quality Management
ICCI	In-combination Climate Change Impacts
ID	Identity
IDB	Internal Drainage Board
IERRT	Immingham Eastern Ro-Ro Terminal
IGT	Immingham Gas Terminal
IOH	Immingham Outer Harbour
IOT	Immingham Oil Terminal
ISH3	Issue Specific Hearing 3
JNCC	Joint Nature Conservation Committee
LCRM	Land Contamination Risk Management
LiDAR	Light Detection and Ranging

Acronym	Definition
LWS	Local Wildlife Site
MCA	Maritime and Coastguard Agency
MCZ	Marine Conservation Zone
MLWS	Mean Low Water Springs
MOD	Ministry of Defence
MMO	Marine Management Organisation
NH ₃	Ammonia
NO ₂	Nitrogen Dioxide
NO _x	Oxides of Nitrogen
NPPF	National Planning Policy Framework
NPSfP	National Policy Statement for Ports
NRA	Navigational Risk Assessment
NSR	Noise Sensitive Receptors
PAD	Protocols for Archaeological Discoveries
PAM	People Asset Management Ltd
PEC	Pilotage Exemption Certificate
PH	Priority Habitats
PINS	Planning Inspectorate
PMSC	Port Marine Safety Code
PPV	Peak Particle Velocity
RIBA	Royal Institute of British Architects
Ro-Ro	Roll-on/roll-off
SAC	Special Area of Conservation
SHA	Statutory Harbour Authority
SINC	Site of Importance for Nature Conservation
SO ₂	Sulphur Dioxide
SoCG	Statement of Common Ground
SOSA	Site Outside Safeguarding Area
SPA	Special Protection Area
SRN	Strategic Road Network
SSC	Suspended Sediment Concentration
SSSI	Site of Special Scientific Interest
tCO _{2e}	tonnes of Carbon Dioxide equivalent
UK	United Kingdom
UKBF	UK Border Force
VTS	Vessel Traffic Services
WFD	Water Framework Directive
WSI	Written Scheme of Investigation

Cardinal points/directions are used unless otherwise stated.
SI units are used unless otherwise stated.

Annex A: Concept Lighting Design Stage Summary Report

PROJECT IERRT LANDSIDE CONCEPT LIGHTING DESIGN STAGE SUMMARY REPORT

Project no. 4021009

Prepared for:
Associated British Ports

Document No:	4021009-SIL-ZZ-02-RP-E-00008
Status	S5
Classification	Public



Table of contents

1.	Introduction.....	2
1.1	Background.....	2
1.2	Scope of Works.....	2
2.	Concept Design	3
2.1	Electrical Services	3
2.2	Design Standards.....	3
2.3	Lighting Design Criteria	3
2.4	Environmental Criteria	5
2.5	Below Ground Services and Electrical Distribution	5
2.6	Protective Earthing and Protective Equipotential Bonding.....	6
2.7	Testing and Commissioning	6
2.8	Assumptions and Exclusions.....	6
3.	Network Rail Glare, Light Pollution and Column / Mast Collapse Assessment	8
3.1	Upward Light Ratio (ULR).....	8
3.2	Limitation of the effects on transport systems	9
3.3	Lighting Column and Mast Collapse.....	9
APPENDIX	A.1	
Appendix A:	Lighting Lux Plot Calculation	A.2

1. Introduction

1.1 Background

A DCO application for the proposed scheme was accepted for examination by the Planning Inspectorate on 6 March 2023. The proposed scheme is currently in examination which started on 25 July 2023 and is due to close on 25 January 2024. This report has been produced to update the proposed Landside structure lighting plan.

This report provides details of the concept level lighting design undertaken and the assumptions made in undertaking the design.

1.2 Scope of Works

The project objective is to further develop the proposed landside concept lighting design to meet the design parameters detailed within this document.

2. Concept Design

2.1 Electrical Services

2.2 Design Standards

The project design has been prepared in line with the following standards and regulations:

- CIBSE Publications
- BS 7671 Requirements for Electrical Installations
- The CIBSE Lighting Guide. LG06: The Exterior Environment
- The Docks Regulations and Guidance 1988: 'Regulation 6 – Lighting'
- HSG38 – HSE – Lighting at Work
- GN01-ILP Guidance Note 1 – the reduction of obtrusive light – 2021 v2
- The Building Regulations
- Energy Conservation Act

All components and systems within the scope of this Section of the works must comply with all statutory Acts of Parliament and any relevant British or European standards.

Materials, components and systems not manufactured in the UK or Europe shall be of a standard which ensures its compliance with all relevant British and European standards. Any such material, component or system which is utilised shall be affixed with the CE or new UKCA mark to indicate that certain European Directives or UK requirements, relevant to that product have been complied with.

Prior to works commencing on site, confirmation will be required of the above by direct measurement at the incoming supply point and for inclusion of these values in the design documents as part of the project. It is anticipated that this would be carried out as part of the investigations at detailed design stage.

Existing columns or electrical distribution switchgear in poor condition will be replaced and redundant cabling and associated markings on distribution boards will be removed from site as required.

All work shall be carried out by an approved NICEIC and / or ECA Electrical Contractor

2.3 Lighting Design Criteria

The concept design proposal is that a high mast system of lighting will be utilised to provide ambient and working illumination, having regard to environmental impact and minimising energy consumption by use of a dimming regime to further reduce lighting levels at pre-determined times. All lighting will be LED type and use a light source that emits zero UV light and reduced blue white output, rather than other commonly used light sources, to further mitigate environmental disruption.

The lighting scheme will be operated by photocells that turn the lighting on at dusk and switches them off again at dawn. There will also be a requirement for a lighting control system to switch the lighting between general and operation mode. It is recommended that luminaires with reduced energy consumption characteristics will be supplied.

Site lighting will use light types and methods to provide adequate colour rendition without degrading security protection visibility or creating safety concerns. The light source will have a warm white appearance of approximately 4000 K or greater, but further dialogue is required to consider the colour temperature of any existing lighting distribution.

Lighting levels, uniformity, colour rendering and temperature shall be as follows:

- Lux levels: 20 lux average 5 lux minimum
- Uniformity: 0.25
- Colour Rendering: Ra 20 (note: a higher level will be achieved with LED lighting)
- Colour Temperature: 4000K minimum

Required lux levels are currently specified from the Health and Safety Guidance Note 38 – Lighting at Work 1997, complying with the requirements for a Lorry Park (document extract below):

Activity	Typical locations/ types of work	Average illuminance (lux) 1x	Minimum measured illuminance (lux) 1x
Movement of people, machines and vehicles ^(a)	Lorry park, corridors, circulation routes	20	5

This therefore defining 20 lux average with 5 lux minimum (i.e. 0.25 Uniformity). The extract below from the more recent BS EN 14264 pt 2 concurs with these specified levels.

Table 5.14 — Shipyards and docks

Ref. no.	Type of area, task or activity	\bar{E}_m lx	U_o –	R_{GL} –	R_a –	Specific requirements
5.14.1	General lighting of shipyard area, storage areas for prefabricated goods.	20	0,25	55	40	
5.14.2	Short-term handling of large units	20	0,25	55	20	

All lighting columns will adopt a loop in / loop out termination method comprising a Tofco type cut-out that will be suitable to terminate SWA 3-core cable (up to 25 mm²). The cut-outs will also be suitable for use with BS 88 type fuses. A maintenance, refurbishment and replacement regime of systems and components will be provided to meet the required design life.

The present lighting scheme mode of operation and control will be investigated to consider parallel mode of operation.

Variable lighting levels may be adopted following discussion at detailed design stage.

2.4 Environmental Criteria

The existing installation at the Port of Immingham consists of the following:

- Supply Voltage: 230 V & 400 V
- Phase: SP&N; 3 Wire & TP&N; 4 Wire + CPC
- Supply Frequency (f): 50 Hz
- Ambient Temp: -5 °C to 35 °C
- Humidity: Normal
- Presence of Water: High with high saline levels
- Impact: Moderate
- Ventilation: Natural
- Fire Risk: Normal

2.5 Below Ground Services and Electrical Distribution

All distribution boards and panels will be SP&N / TP&N and any surface mounted or underground / buried cable will be Cu/XLPE/SWA/LSF type multicore cables with a minimum cross-sectional area of 16 mm². Cabling supplying lighting circuits will be single-phase and consideration shall be given to colour coding for ease of identification.

All additional duct work that is required will be installed at the appropriate depth, unless there is already sufficient spare ducting capacity. Note that all control cables must be run in a separate duct from power cables.

The following ducting will be used:

- 150 mm diameter for all LV electrical service and lighting cables;

Cable duct buried under carriageways finished concrete will consist of ducts having a minimum cover of 750 mm and will be protected by concrete surround or similar as directed and agreed with the Client's Engineer. The ducts will typically be twin-walled high-density polypropylene with smooth bore of 150 mm in internal diameter to BS EN 50086-2-4, marked accordingly and terminate in an underground draw-in chamber.

When buried in land / soft soil, service ducts will typically be twin-walled high-density polypropylene with smooth bore of 150 mm in internal diameter to BS EN 50086-2-4. A minimum cover of 450 mm will be provided.

Consideration should be given to a new dedicated electrical distribution board fed from the existing primary distribution supply. Allowance must be made for co-ordination with the current

provider to establish the supply arrangement and capacity details before work commences. Distribution will typically comprise a 400V distribution panel complete with moulded case circuit breakers to feed any / all sub distribution boards as required by the prospective demand.

Service voltage will be 400/230 Volt at 50 Hz and all equipment housings and enclosures will be constructed from materials that are resistant to the effects of weather (outdoor marine applications).

Generally, the concept will include but will not be limited to:

- Replacement of external luminaires and existing columns.
- Identification and removal of redundant equipment and cabling.
- Supply and installation of all electrical cabling associated with the new lighting scheme.
- Supply and installation of the new equipment associated with the lighting control system.
- Inspection, testing and commissioning of the complete installation.
- The complete electrical installation will include all cables, glands, fixings, terminations, numbers, supports, tray work, bracketry, cable installation, labelling, junction boxes, local isolators and all equipment necessary to complete the installation in accordance with the specification.

2.6 Protective Earthing and Protective Equipotential Bonding

The installation will form an equipotential zone in the site to provide fault protection by bonding all extraneous and exposed conductive parts to the main earth terminal in accordance with BS 7430 and BS 7671. Where appropriate, it will be linked to the existing network to ensure the earth potential is common across the full installation.

All high masts will come complete with lightning protection rod on top of the mast.

2.7 Testing and Commissioning

Testing and commissioning of the electrical installation work will be in accordance with the relevant British Standards and on completion of the installation, commissioning of all items of plant and equipment will be carried out to demonstrate the complete installation is operating correctly and in accordance with any project Specification or site standards. As a minimum, testing will be carried as per the relevant applicable British standards and specifications in accordance with BS 7671.

2.8 Assumptions and Exclusions

There is specific guidance in BS 7671 which relates to electrical installations near water. Further review of this will be required during detailed design stage.

Further discussion will be required with regard to site standards relating to preferred power distribution equipment and lighting manufacturers to minimize the need for additional training or spares.

3. Network Rail Glare, Light Pollution and Column / Mast Collapse Assessment

The whole lighting design will be undertaken in accordance with the recommendations given in the GN01-ILP Guidance Note 1 – the reduction of obtrusive light, document.

This document sets out targets and limits for the reduction of obtrusive light, be that excessive glare, spill light away from the area being lit and upward light which would contribute to ‘sky glow’.

In order to set the target levels, a suitable environmental zone needs to be selected based upon the location and use of the site in question. Table 2 below, extracted from the GN01-ILP document demonstrates the environmental zone options.

Table 2: Environmental zones

Zone	Surrounding	Lighting environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres of suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity

For this, site the environmental zone has been assessed to be E3.

3.1 Upward Light Ratio (ULR)

Table 6 below, extracted from the GN01-ILP document, demonstrates maximum values of upward light; for zone E3 this is 5%.

Table 6 (CIE 150 table 5): Maximum values of upward light ratio (ULR) of luminaires

Light technical parameter	Environmental zones				
	E0	E1	E2	E3	E4
Upward light ratio (ULR) / %	0	0	2.5	5	15

Referring to the lux plot calculation in Appendix A, the calculated ULR is 0.4%, therefore passing by a significant margin.

3.2 Limitation of the effects on transport systems

Guidance from GN01-ILP will be followed to assess potential glare to vehicle drivers from road lighting.

This uses Maximum values of Threshold Increment and viewing direction in the path of travel. Threshold Increment (TI) is the measure of disability glare expressed as the percentage increase in contrast required between an object and its background for it to be seen equally well with a source of glare present. Note: Higher values of TI correspond to greater disability glare, the reduction in visibility caused by intense light sources in the field of view.

Table 5 below, extracted from the GN01-ILP document demonstrates the maximum values of threshold increment and viewing direction.

Table 5 (CIE 150; table 4): Maximum values of Threshold Increment and viewing direction in the path of travel

Light technical parameter	Road classification ¹			
	No road lighting	M6 / M5	M4 / M3	M2 / M1
Veiling luminance ² (L_v)	0.037 cd/m ²	0.23 cd/m ²	0.40 cd/m ²	0.84 cd/m ²
Threshold Increment	15% based on adaption luminance of 0.1 cd/m ²	15% based on adaption luminance of 1.0 cd/m ²	15% based on adaption luminance of 2.0 cd/m ²	15% based on adaption luminance of 5 cd/m ²

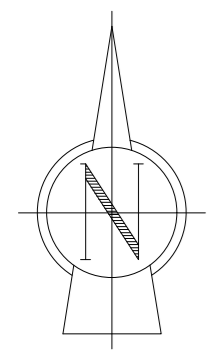
Within the calculation, simulated viewing points have been placed along the rail tracks at a 3m spacing at a height of 1.5m above ground level. The extract below of the calculation demonstrates a 'pass' in all simulations.

3.3 Lighting Column and Mast Collapse

The lighting has been designed so that in the event of a lighting column or mast collapse the infrastructure will not fall within 4m of a Network Rail-owned track. This design requirement shall be adhered to throughout the subsequent design phase.

APPENDIX

Appendix A: Lighting Lux Plot Calculation (4021009-SIL-ZZ-02-DR-E-63010-P02)



- FLOODLIGHTING EQUIPMENT:**
- 30m masts each carrying the following Challenger 1**
- M1..... 3 x AL6202_10752SI (H)
 - 2 x AL6201_10752SI (T)
- M2..... 5 x AL6202_10752SI (H)
- M3..... 4 x AL6202_10752SI (H)
- 2 x AL6201_10752SI (T)
- M4..... 5 x AL6202_10752SI (H)
- 1 x AL6201_10752SI (T)
- M5..... 3 x AL6202_10752SI (H)
- M7..... 4 x AL6202_10752SI (H)
- M8..... 1 x AL6202_10752SI (H)
- 2 x AL6302_05752SI (K)
- M9..... 2 x AL6202_10752SI (H)
- 2 x AL6302_05752SI (K)
- M10..... 3 x AL6302_05752SI (G)
- M18..... 2 x AL6302_05752SI (G)
- 1 x AL6302_05752SI (K)
- M19-M23..... 2 x AL6302_05752SI (G)
- 2 x AL6302_05752SI (K)
- M24..... 1 x AL6302_05752SI (G)
- 1 x AL6302_05752SI (K)
- M25..... 2 x AL6302_05752SI (G)
- M26, M27..... 4 x AL6302_05752SI (G)
- 47 x 8m masts each carrying the following S-Lums**
- A..... 1 x AL1002_55W_4K
 - Single
 - Bracket Projection 0.5M
 - Bracket: +0° / Spigot: +0° / Lantern +0°
- 3 x 8m masts each carrying the following S-Lums**
- A1..... 1 x AL1002_55W_4K
 - Single
 - Bracket Projection 0.5M
 - Bracket: +0° / Spigot: +0° / Lantern +10°
- 25 x 8m masts each carrying the following S-Lums**
- B..... 1 x AL1002_55W_4K
 - Single
 - Bracket Projection 0.5M
 - Bracket: +0° / Spigot: +0° / Lantern +0°
- 6 x 8m masts each carrying the following S-Lums**
- D..... 1 x AL1009_55W_4K
 - Single
 - Bracket Projection 0.5M
 - Bracket: +0° / Spigot: +0° / Lantern +0°
 - Custom Mounted
- 19 x 8m masts each carrying the following S-Lums**
- L..... 1 x AL1003_135W_4K
 - Single
 - Bracket Projection 0.5M
 - Bracket: +0° / Spigot: +0° / Lantern +10°
- 4 x 8m masts each carrying the following S-Lums**
- M..... 1 x AL1002_55W_4K
 - Twin
 - Back to Back
 - Bracket Projection 0.5M
 - Bracket: +0° / Spigot: +0° / Lantern +0°
- 14 x 6m Building mounted S-Lums**
- N..... 1 x AL1003_55W_4K
 - Single
 - Lantern +0°
- 7 x 8m masts each carrying the following S-Lums**
- Q..... 1 x AL1002_55W_4K
 - Bracket Projection 0.5M
 - Bracket: +0° / Spigot: +0° / Lantern +0°
 - 1 x AL1003_55W_4K
 - Bracket Projection 0.5M
 - Bracket: +0° / Spigot: +0° / Lantern +15°
- 8 x 8m masts each carrying the following S-Lums**
- R..... 2 x AL1003_55W_4K
 - Twin
 - Back to Back
 - Bracket Projection 0.5M
 - Bracket: +0° / Spigot: +0° / Lantern +0°
- 1 x 6m masts each carrying the following S-Lums**
- S..... 1 x AL1003_55W_4K
 - Single
 - Bracket Projection 0.5M
 - Bracket: +0° / Spigot: +0° / Lantern +0°

- HORIZONTAL ILLUMINANCE LEVELS - SPECIFIED**
- Average Horizontal Illuminance (E_{av}): 20 Lux
 - Minimum Horizontal Illuminance (E_{min}): 5 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.25
- HORIZONTAL ILLUMINANCE LEVELS - CALCULATED**
- Bridge**
- Average Horizontal Illuminance (E_{av}): 21 Lux
 - Minimum Horizontal Illuminance (E_{min}): 7 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.32
- Central Trailer Park**
- Average Horizontal Illuminance (E_{av}): 23 Lux
 - Minimum Horizontal Illuminance (E_{min}): 8 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.26
- Central Trailer Park Staff Parking**
- Average Horizontal Illuminance (E_{av}): 20 Lux
 - Minimum Horizontal Illuminance (E_{min}): 5 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.25
- Marshall Yard - Road**
- Average Horizontal Illuminance (E_{av}): 25 Lux
 - Minimum Horizontal Illuminance (E_{min}): 7 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.28
- Marshall Yard - Main Area**
- Average Horizontal Illuminance (E_{av}): 24 Lux
 - Minimum Horizontal Illuminance (E_{min}): 8 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.33
- North Trailer Park**
- Average Horizontal Illuminance (E_{av}): 20 Lux
 - Minimum Horizontal Illuminance (E_{min}): 6 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.30
- North Trailer Park Road 2**
- Average Horizontal Illuminance (E_{av}): 22 Lux
 - Minimum Horizontal Illuminance (E_{min}): 6 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.27
- South Trailer Park**
- Average Horizontal Illuminance (E_{av}): 25 Lux
 - Minimum Horizontal Illuminance (E_{min}): 7 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.28
- South Trailer Park Road 1**
- Average Horizontal Illuminance (E_{av}): 24 Lux
 - Minimum Horizontal Illuminance (E_{min}): 7 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.29
- South Trailer Park Road 2**
- Average Horizontal Illuminance (E_{av}): 19 Lux
 - Minimum Horizontal Illuminance (E_{min}): 8 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.27
- Western Trailer Park Area**
- Average Horizontal Illuminance (E_{av}): 20 Lux
 - Minimum Horizontal Illuminance (E_{min}): 8 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.25
- Robinson Road**
- Average Horizontal Illuminance (E_{av}): 20 Lux
 - Minimum Horizontal Illuminance (E_{min}): 9 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.45
- Area 01**
- Average Horizontal Illuminance (E_{av}): 20 Lux
 - Minimum Horizontal Illuminance (E_{min}): 9 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.30
- Area 02**
- Average Horizontal Illuminance (E_{av}): 22 Lux
 - Minimum Horizontal Illuminance (E_{min}): 8 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.37
- Area 03**
- Average Horizontal Illuminance (E_{av}): 28 Lux
 - Minimum Horizontal Illuminance (E_{min}): 11 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.39
- New Area**
- Average Horizontal Illuminance (E_{av}): 21 Lux
 - Minimum Horizontal Illuminance (E_{min}): 7 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.33
- New Car Park**
- Average Horizontal Illuminance (E_{av}): 21 Lux
 - Minimum Horizontal Illuminance (E_{min}): 8 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.37
- New Road**
- Average Horizontal Illuminance (E_{av}): 28 Lux
 - Minimum Horizontal Illuminance (E_{min}): 9 Lux
 - Uniformity Ratio (E_{av} / E_{min}): 0.32

OBSTRUCTIVE LIGHT COMPLIANCE REPORT

CIE 150:2017, 63-Medium Glare Index, Pre-Curlew

Filename: L5407593_9_ABP_Humber Project Sugar

04/09/2023 07:36:28

Threshold Increment (TI)

Maximum Allowable Value: 15 %

Calculations Tested (32):

Calculation Label	Adaptation	Test Results
Threshold Increment_East_Track 1	10	PASS
Threshold Increment_East_Track 2	10	PASS
Threshold Increment_West_Track 1	10	PASS
Threshold Increment_West_Track 2	10	PASS
Threshold Increment_East_Track 3	10	PASS
Threshold Increment_East_Track 4	10	PASS
Threshold Increment_East_Track 5	10	PASS
Threshold Increment_East_Track 6	10	PASS
Threshold Increment_East_Track 7	10	PASS
Threshold Increment_West_Track 8	10	PASS
Threshold Increment_West_Track 9	10	PASS
Threshold Increment_East_Track 9	10	PASS
Threshold Increment_East_Track 10	10	PASS
Threshold Increment_West_Track 10	10	PASS
Threshold Increment_East_Track 11	10	PASS
Threshold Increment_West_Track 11	10	PASS
Threshold Increment_East_Track 12	10	PASS
Threshold Increment_West_Track 12	10	PASS
Threshold Increment_East_Track 13	10	PASS
Threshold Increment_West_Track 13	10	PASS
Threshold Increment_East_Track 14	10	PASS
Threshold Increment_East_Track 15	10	PASS
Threshold Increment_East_Track 16	10	PASS
Threshold Increment_West_Track 16	10	PASS
Threshold Increment_East_Track 17	10	PASS
Threshold Increment_West_Track 17	10	PASS
Threshold Increment_East_Track 18	10	PASS
Threshold Increment_East_Track 19	10	PASS
Threshold Increment_West_Track 19	10	PASS
Threshold Increment_West_Track 20	10	PASS
Threshold Increment_East_Track 20	10	PASS
Threshold Increment_West_Track 21	10	PASS
Threshold Increment_East_Track 22	10	PASS
Threshold Increment_West_Track 22	10	PASS
Threshold Increment_East_Track 23	10	PASS
Threshold Increment_West_Track 23	10	PASS
Threshold Increment_East_Track 24	10	PASS
Threshold Increment_East_Track 25	10	PASS
Threshold Increment_East_Track 26	10	PASS
Threshold Increment_West_Track 26	10	PASS
Threshold Increment_East_Track 27	10	PASS
Threshold Increment_West_Track 27	10	PASS
Threshold Increment_East_Track 28	10	PASS
Threshold Increment_East_Track 29	10	PASS
Threshold Increment_West_Track 29	10	PASS
Threshold Increment_West_Track 30	10	PASS

Upward Light Ratio (ULR)

Maximum Allowable Value: 0.0 %

Calculated ULR: 0.4 %

Test Results: **PASS**

Note: The limits, including the height and depth of the Works, shown in the drawing are not to be taken as limiting the obligations of the contractor under Contract.

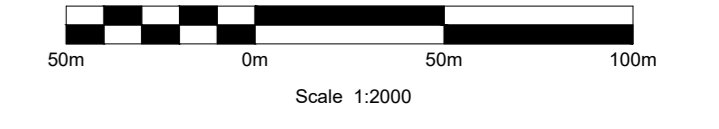
SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION:

IN ADDITION TO THE HAZARDS OR RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, THE FOLLOWING SIGNIFICANT HAZARDOUS RISKS SHOULD BE NOTED. FURTHER DETAILS ARE INCLUDED IN THE CDM DESIGN RISK MANAGEMENT REGISTER.

CONSTRUCTION:

MAINTENANCE, CLEANING AND OPERATION:

DECOMMISSIONING OR DEMOLITION:



Rev	Drawn	Check	Rev'd	Appr'd	Date	Description

Designed by: **SIL** Date: **22/09/23**

Status: **SS** Suitable for Client Review and Acceptance

RIBA Stage: **NA** Classification: **Public**

Client: **ABP**



Project: **PROJECT SUGAR**

Design Services: **DESIGN SERVICES**

Drawing title: **EXTERNAL LIGHTING LUX PLOT**



IERRT

Marine Concept Lighting Design Stage Summary Report

P02

19th September 2023

Associated British Ports



Project IERRT

Project No: B2429400
Document Title: Marine Concept Lighting Design Stage Summary Report
Document No.: B2429400/P02
Revision: P02
Date: 19th September 2023
Client Name: ABP
Project Manager: Claire Nicolson
Author: Brian Manson
File Name: B2429400-E001-ABP Lighting Summary_Report_P02.docx

Jacobs Engineering Group Inc.

95 Bothwell
Street Glasgow
G2 7HX
United Kingdom
T +44.141.243.8000
www.jacobs.com

© Copyright 2019 Jacobs Engineering Group Inc. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright.

Limitation: This document has been prepared on behalf of, and for the exclusive use of Jacobs' client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this document by any third party.

Document History and Status

Revision	Date	Description	By	Review	Approved
P01	Nov 22	Client Review	VY	RH	GP
P02	Sep 23	Final	VY	MG	DR

Contents

- 1. Introduction 1-1**
 - 1.1 Background 1-1
 - 1.2 Scope 1-1
- 2. Concept Design 2-2**
 - 2.1 Electrical Services 2-2
 - 2.1.1 Design Parameters 2-2
 - 2.1.2 Concept Design 2-3
 - 2.1.3 Testing & Commissioning 2-4
 - 2.1.4 Assumptions and Exclusions 2-5

Appendix(es)

Appendix A Concept Lighting Layout

1. Introduction

1.1 Background

Jacobs have been commissioned to undertake a concept lighting design study to look at the potential provision of lighting for new roll on, roll off (ro-ro) berths at the Port of Immingham that includes a landside terminal area for a combination of container units, HGV and trailer units. This report details the Marine lighting elements of the project only.

This report provides details of the concept level lighting design undertaken and the assumptions made in undertaking the design.

A DCO application for the proposed scheme was accepted for examination by the Planning Inspectorate on the 6th of March 2023. The proposed scheme is currently in examination which started on 25 July 2023 and is due to close on 25 January 2024.

1.2 Scope

Review of existing external lighting strategy and prepare a new lighting concept design for the marine. Information review: undertake review of information available through Jacobs records, ABP records and other publicly available information sources and identify gaps in the information.

2. Concept Design

2.1 Electrical Services

2.1.1 Design Parameters

The existing installation at the Port of Immingham consists of the following:

- Supply Voltage: 230 V & 400 V
- Phase: SP&N; 3 Wire & TP&N; 4 Wire + CPC • Supply Frequency (f): 50 Hz
- Ambient Temp: -5° C to 35° C
- Humidity: Normal • Presence of Water: High with high saline levels
- Impact: Moderate • Ventilation: Natural
- Fire Risk: Normal

Prior to works commencing on site, confirmation will be required of the above by direct measurement at the incoming supply point and for inclusion of these values in the design documents as part of the project. It is anticipated that this would be carried out as part of the investigations at detailed design stage.

It is assumed that if any existing columns or electrical distribution switchgear are in poor condition they will be replaced and redundant cabling and associated markings on distribution boards will be removed from site as required.

It is expected and will be specified that the work shall be carried out by an approved NICEIC and / or ECA Electrical Contractor.

The concept project design will include technical references consulted in preparation of this document to include, but not limited to:

- The Building Regulations, 1972
- Energy Conservation Act, 1981
- CIBSE Publications
- BS 7671 IET Wiring Regulations
- CE Directive on Machinery 89/392 EEG-98/37
- Low Voltage Directive EEG-72/23 EEG-93/68
- EEG and EMC Directive 89/336 – 93/68 EEG
- The CIBSE Lighting Guide: 'The Outdoor Environment'
- The Docks Regulations and Guidance 1988: 'Regulation 6 – Lighting'
- HSG38 – HSE – Lighting at work
- BS EN 12464-2 Light and lighting. Lighting of workplaces – Outdoor work places
- COP 25 – Docks Regulations and Guidance 1988 + A:

All components and systems within the scope of this Section of the works must comply with all statutory acts of Parliament and any relevant British or European standards.

Materials, components and systems not manufactured in the UK or Europe shall be of a standard which ensures its compliance with all relevant British and European standards. Any such material, component or system which is utilized shall be affixed with the CE or new UKCA mark to indicate that certain European Directives or UK requirements, relevant to that product have been complied with.

2.1.2 Concept Design

All distribution boards and panels will be SP&N/TP&N and any surface mounted or underground / buried cable will be Cu/XLPE/SWA/LSZH type multi core cables with a minimum cross-sectional area of 16 mm². Cabling supplying lighting circuits will be single phase and consideration shall be given to colour coding for ease of identification.

All additional duct work that is required will be installed at the appropriate depth, unless there is already sufficient spare ducting capacity. Note that all control cables must be run in a separate duct from power cables.

The following ducting will be used:

- 150 mm diameter for all LV electrical service and lighting cables;

Cable duct buried under carriageways finished concrete will consist of ducts having a minimum cover of 750 mm and will be protected by concrete surround or similar as directed and agreed with the Client's Engineer. The ducts will typically be twin walled high-density polypropylene with smooth bore of 150 mm in internal diameter to BS EN 50086-2-4, marked accordingly and terminate in an underground draw-in chamber.

When buried in land /soft soil service ducts will typically be twin walled high-density polypropylene with smooth bore of 100 mm in internal diameter to BS EN 50086-2-4. A minimum cover of 450 mm will be provided.

Consideration should be given to a new dedicated electrical distribution board fed from the existing primary distribution supply. Allowance must be made for co-ordination with the current provider to establish the supply arrangement and capacity details before work commences. Distribution will typically comprise a 400V distribution panel complete with moulded case circuit breakers to feed any / all sub distribution boards as required by the prospective demand.

Service voltage will be 400/230 Volt at 50 Hz and all equipment housings and enclosures will be constructed from materials that are resistant to the effects of weather (outdoor marine applications).

Generally, the concept will include but not be limited to:

- Supply and installation of all electrical cabling associated with the new lighting scheme.
- Supply and installation of the new equipment associated with the lighting control system.
- Inspection, testing and commissioning of the complete installation.
- The complete electrical installation will include all cables, glands, fixings, terminations, numbers, supports, tray work, bracketry, cable installation, labelling, junction boxes, local isolators and all equipment necessary to complete the installation in accordance with the specification.

2.1.2.1 Lighting

The concept design proposal is that lighting will be utilised to provide ambient and working illumination, having regard to environmental impact and minimising energy consumption by use of a dimming regime to further reduce lighting levels at pre-determined times. All lighting will be LED type and use a light source that emits zero UV light and reduced blue white output, rather than other commonly used light sources, to further mitigate environmental disruption.

The lighting scheme will be operated by photocells that turn the lighting on at dusk and switches them off again at dawn. There will also be a requirement for a lighting control system to switch the lighting between general and operation mode. It is recommended that luminaires with reduced energy consumption characteristics will be supplied.

Marine lighting will use light types and methods to provide adequate colour rendition without degrading security protection visibility or creating safety concerns. The light source will have a cool white appearance of approximately 4000 K, but further dialogue is required to consider the colour temperature of any existing lighting distribution.

In addition to following HSE – Lighting at work (HSG38) guidance, the illumination levels for the new site lighting system will comply with the requirements of BS EN 12464- Light and lighting. Lighting of workplaces – Outdoor work places documentation. All luminaires will operate at 230V AC and have an ingress protection rating not less than IP65 and luminaires will use electronic control.

Design criteria:

- Lux levels: 20 lux average 5 lux minimum
- Uniformity: 0.25
- Colour Rendering: Ra 20 (note: a higher level will be achieved with LED lighting)
- Colour Temperature: 4000K minimum

The extract below from BS EN 12464-2 forms the basis of the above specified levels.

Table 5.14 — Shipyards and docks

Ref. no.	Type of area, task or activity	\bar{E}_m lx	U_o –	R_{GL} –	R_a –	Specific requirements
5.14.1	General lighting of shipyard area, storage areas for prefabricated goods.	20	0,25	55	40	
5.14.2	Short-term handling of large units	20	0,25	55	20	

Figure 1. Lighting Requirements for Shipyards and Docks

All lighting columns will adopt a loop in / loop out termination method comprising a Tofco type cut-out that will be suitable to terminate SWA 3 core cable (up to 25 mm²). The cut-outs will also be suitable for use with BS88 type fuses. A maintenance, refurbishment and replacement regime of systems and components will be provided to meet the required design life.

2.1.2.2 Protective Earthing and Protective Equipotential Bonding

The installation will form an equipotential zone in the site to provide fault protection, by bonding all extraneous and exposed conductive parts to the main earth terminal in accordance with BS 7430, BS 7671. Where appropriate it will be linked to the existing network to ensure the earth potential is common across the full installation.

2.1.3 Testing & Commissioning

Testing and commissioning of the electrical installation work will be in accordance with the relevant British Standards and on completion of the installation, commissioning of all items of plant and equipment will be carried out to demonstrate the complete installation is operating correctly and in accordance with any project Specification or site standards. As a minimum testing will be carried as per the relevant applicable British standards and specifications in accordance with BS7671.

2.1.4 Assumptions and Exclusions

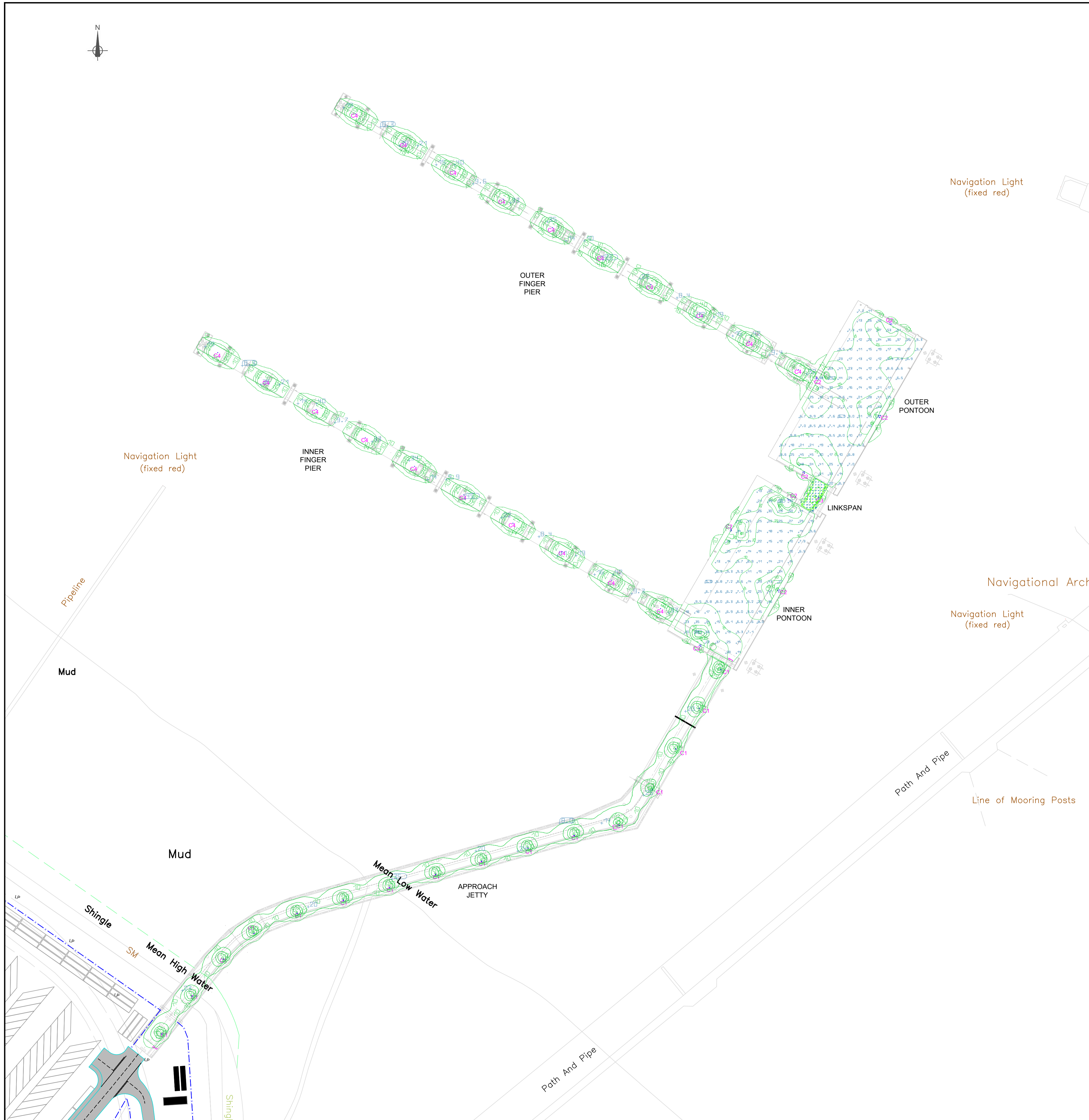
With regards to electrical installations near water there is a specific guidance in BS7671 and further review of this with regards the proposed site will be required.

Further discussion will be required with regard to site standards relating to preferred power distribution equipment or lighting manufacturers to minimise the need for additional training or spares.

This concept design has not taken into consideration of external lighting influences from neighbouring properties.

Appendix A Concept Lighting Layout

C:\Users\MCGARRC\Desktop\Projects\Project Sugar\Latest\B2429400-JAC-00-ZZ-SK-ZZ-0150 P03-edited.dwg - 18/10/2023 12:24:12 - 00430 - MCGARRC



FLOODLIGHTING EQUIPMENT

- Approach Jetty
16X6m masts each carrying the following S-Lum
C1...
1x AL61001_55_4K
Single
Custom Mounted
- Pontoon (inner and outer)
8x8m masts each carrying the following Vago
C2...
3x AL61101v2_17-2AW734K
Triple
Custom Mounted
- Linkspan
1x6m masts each carrying the following S-Lum
C3...
1x AL61002_55_4K
Single
Bracket Projection 1m
Custom Mounted
- Finger Pier (inner and outer)
20x6m masts each carrying the following S-Lum
C4...
2x AL61002_30_4K
Twin
Double Stud Bracket
Custom Mounted

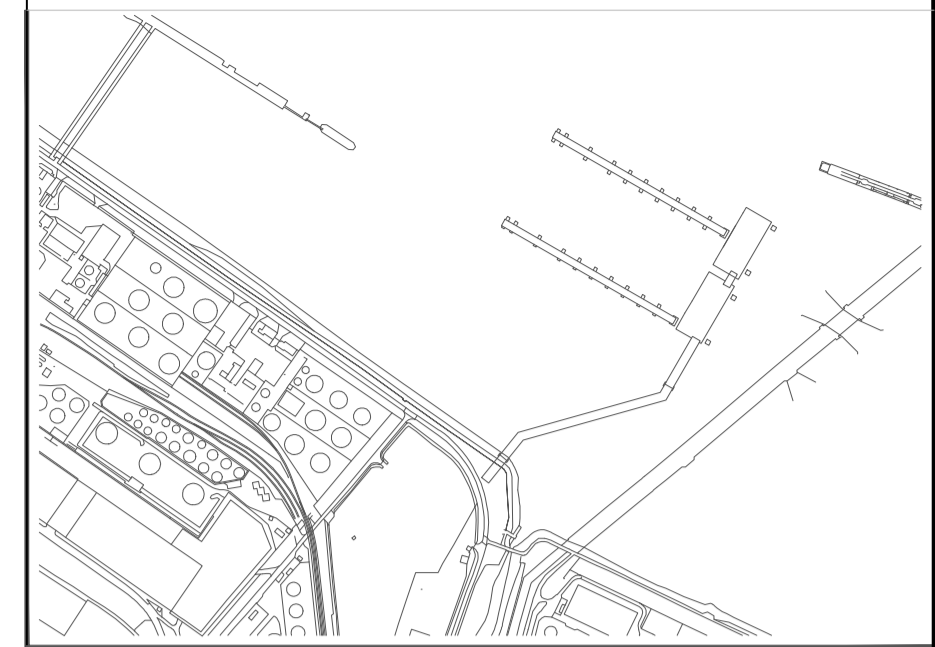
HORIZONTAL ILLUMINANCE LEVELS - SPECIFIED

Average Horizontal Illuminance (E.av): 20 Lux
Minimum Horizontal Illuminance (E.min): 5 Lux
Uniformity Ratio (E.av/E.min): 0.25

HORIZONTAL ILLUMINANCE LEVELS - CALCULATED

- Approach Jetty
Average Horizontal Illuminance (E.av): 20.5 Lux
Minimum Horizontal Illuminance (E.min): 5.13 Lux
Uniformity Ratio (E.av/E.min): 0.25
- Outer Pontoon
Average Horizontal Illuminance (E.av): 20.4 Lux
Minimum Horizontal Illuminance (E.min): 5.28 Lux
Uniformity Ratio (E.av/E.min): 0.26
- Inner Pontoon
Average Horizontal Illuminance (E.av): 20.1 Lux
Minimum Horizontal Illuminance (E.min): 5.51 Lux
Uniformity Ratio (E.av/E.min): 0.27
- Linkspan
Average Horizontal Illuminance (E.av): 37.6 Lux
Minimum Horizontal Illuminance (E.min): 13.4 Lux
Uniformity Ratio (E.av/E.min): 0.36
- Outer Finger Pier
Average Horizontal Illuminance (E.av): 23.4 Lux
Minimum Horizontal Illuminance (E.min): 8.2 Lux
Uniformity Ratio (E.av/E.min): 0.35
- Inner Finger Pier
Average Horizontal Illuminance (E.av): 23.2 Lux
Minimum Horizontal Illuminance (E.min): 8.23 Lux
Uniformity Ratio (E.av/E.min): 0.35

Key Plan



General Notes

- All dimensions in metres unless noted otherwise
- All levels to Ordnance Datum unless noted otherwise
- Contractor shall verify lighting design meets specified criteria, it is the contractor's responsibility to ensure the lighting installation meets the design intent.
- Project scope covers the Approach Jetty, Inner Pontoon, Outer Pontoon, Linkspan, Outer Finger Pier, Inner Finger Pier, and associated restraint dolphins. Calculation and layout of this area to the allowance of the DCO.

P03	2023-09-19	For Comment	CMcG	VY	MG	CN
P02	2023-02	For Comment	BHW	RH	RH	CN
Rev	Rev. Date	Purpose of revision	Orig	Check	Rev	Appr

Jacobs
1st Floor office Aperture, Pynes Hill, Rydon Lane, Exeter. EX2 5AZ
Tel:+44(0)1392 269 800
www.jacobs.com

Client
ABP ASSOCIATED BRITISH PORTS

Project
IMMINGHAM EASTERN RO-RO-TERMINAL

Drawing title
Lighting Project: ABP Humber, IERTT External Lighting.

Drawing status: For Comment
Suitability: S3

Scale: 1:1000
Jacobs No.: B2429400
Client No.: 4021009
Rev: P03

Drawing number
B2429400-JAC-00-ZZ-SK-ZZ-0150

© Copyright 2023 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitations: This drawing has been prepared on behalf of, and for the exclusive use of, Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

Annex B: Building Schedule

Table B.1. Proposed new construction buildings for the Immingham Eastern Ro-Ro Terminal (IERRT)

Building	Description	Location	Building Envelope		
			Footprint		Height
			Length (m)	Width (m)	(m)
Terminal building	2 storey office building to serve administration and management of terminal	Pre-Gate / Southern ro-ro freight storage area	40.0	15.0	10.5
Terminal in / out gate security hut	A small hut for security staff covering the gates	In / out gates	4.0	2.5	3.5
Trailer storage security hut	A small hut for security staff covering the gates	Western ro-ro freight storage area	4.0	2.5	3.5
Workshop building	Maintenance and servicing workshop with fuel storage for the terminal	Workshop area	15.0	10.0	8.0
Toilets/Welfare building.	Single storey toilet/welfare block for customers in marshalling lanes, comprising WCs, vending machines, smoking shelter	Southern ro-ro freight storage area	16.0	8.0	4.5
Substation building	Single storey building containing substation	Northern ro-ro freight storage area	12.0	5.0	5.0
Frequency converter station building	Single storey building contain frequency converter	Northern ro-ro freight storage area	12.0	5.0	5.0

Building	Description	Location	Building Envelope		
			Footprint		Height
			Length (m)	Width (m)	(m)
UKBF Cyclamen Secondary Exam Building	Shed with single drive through bay for HGV's, with small office and welfare facilities for Cyclamen	Central ro-ro freight storage area	20.0	10.0	8.0
UKBF Cyclamen Monitoring Office	Office bay for HGV's, with small office facilities for Cyclamen	Central ro-ro freight storage area	12	4	4.5
UKBF Immigration vehicle PCP booths	2 booths (each with 2 passport control points) servicing 4 lanes (2 freight lanes and 2 vehicle lanes)	Immigration lanes in southern ro-ro freight storage area	4.5	3.0	4.5
UKBF Customs and holding facilities building	2 storey office building for UKBF staff, containing drive through four bay vehicle exam shed, coldstore and holding rooms	Customs area in Southern ro-ro freight storage area	79	25.5	10.5
UKBF X-Ray Scanner Building	Shed with single drive through bay for HGV's, with small office and welfare facilities	Customs area in Southern ro-ro freight storage area	33	8.5	8.5
UKBF Car Search Facility	Shed with single drive through bay for cars, with small office and welfare facilities	Customs area in Southern ro-ro freight storage area	41	10.5	5
Malcolm West office building	2 storey office building to replace existing	Drury Area	12.5	12.5	12.2
Malcolm West building	Shed to replace existing	Drury Area	20.0	5.0	10.0
Gatehouse	Single storey building to replace existing gatehouse	East gate	6.0	3.5	4.5

Building	Description	Location	Building Envelope		
			Footprint		Height
			Length (m)	Width (m)	(m)
Welding bays / presser building	Shed to replace existing building canopy and welding bays	Drury Area	15	13	8
Drury's storage building	Shed to replace existing	Drury Area	20	15	8
Crew Shelters	A small welfare shelter/hut located on each of the pontoons for crews to shelter from weather	Pontoons	6.1	2.5	2.5

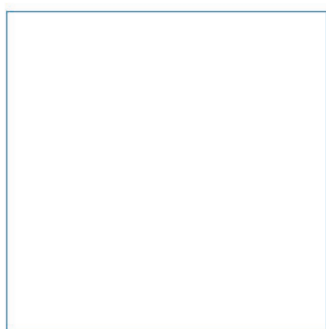
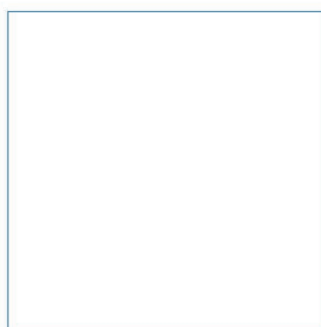
Annex C: Navigational Risk Assessment Addendum

Associated British Ports

Immingham Eastern Ro-Ro Terminal

Proposed Changes – Navigational Risk Assessment Addendum

November 2023



Innovative Thinking - Sustainable Solutions

Page intentionally left blank

Immingham Eastern Ro-Ro Terminal

Proposed Changes – Navigational Risk Assessment
Addendum

November 2023



Document Information

Document History and Authorisation	
Title	Immingham Eastern Ro-Ro Terminal Proposed Changes – Navigational Risk Assessment Addendum
Commissioned by	Associated British Ports
Issue date	November 2023
Document ref	R.3890 (Appendix 10.1)
Project no	R/5035T/11

Date	Version	Revision Details
29/11/2023	1	Issued for client use

Suggested Citation

ABPmer, (2023). Immingham Eastern Ro-Ro Terminal, Proposed Changes – Navigational Risk Assessment Addendum, ABPmer Report No. R.3890 (Appendix 10.1). A report produced by ABPmer for Associated British Ports, November 2023.

Authors

ABPmer

ABPmer

Quayside Suite, Medina Chambers, Town Quay, Southampton, Hampshire SO14 2AQ
T: +44 (0) 2380 711844 W: <http://www.abpmer.co.uk/>

Contents

1	Introduction.....	4
2	Proposed Changes.....	4
3	Updates to risk assessment.....	5
	3.1 Introduction.....	5
	3.2 Stakeholder engagement.....	5
	3.3 Vessel simulations.....	17
	3.4 Review of navigational risks.....	17
4	Summary.....	20
5	Abbreviations/Acronyms.....	21
6	Glossary.....	22

Annexes

A	Proposed Changes Consultation Letter.....	25
B	Navigational Risk Assessment Hazard Logs for Proposed Changes.....	28

Tables

Table 3.1.	Summary of consultation responses	7
Table B.1.	Hazard Category: Allision; Scenario: Commercial vessel with marine works; Risk ID C3	28
Table B.2.	Hazard Category: Allision; Scenario: Vessel proceeding to/from Immingham Eastern Ro-Ro with tanker moored at IOT Finger Pier; Risk ID O1	29
Table B.3.	Hazard Category: Allision; Scenario: Tanker manoeuvring on/off IOT Finger Pier (flood tide); Risk ID O2	30
Table B.4.	Hazard Category: Allision; Scenario: Barge manoeuvring on/off IOT Finger Pier (flood tide); Risk ID O3	31
Table B.5.	Hazard Category: Allision; Scenario: Ro-Ro allision with IOT trunk way; Risk ID O4	32

1 Introduction

- 1.1.1 The Immingham Eastern Ro-Ro Terminal (IERRT) Navigation Risk Assessment (NRA) [APP-089] and Chapter 10 of the Environmental Statement (ES) [APP-046] provided an assessment of the potential effects of the proposed IERRT on commercial and recreational navigation.
- 1.1.2 By way of brief summary only, baseline conditions were determined through a desk-based review of available information, which includes data from the Automatic Identification System (AIS), marine accident/incident data and information from nautical charts.
- 1.1.3 IERRT is located wholly within the Port of Immingham Statutory Harbour Authority (SHA) area where Associated British Ports (ABP) is the SHA. In this capacity, ABP is charged with a set of powers and duties which include the management and regulation of the safety of navigation and marine operations in its SHA area. The AIS data show regular use by port service craft (tugs, pilot boats, survey, line handling vessels etc.) and tankers in the vicinity of the proposed IERRT. There are no recreational facilities based at the Port of Immingham, however, there are approximately 1,000 permanent berths in the wider Humber Estuary. Analysis of incident data show an annual frequency of 183.4 incidents with the most frequent incident type being categorised as 'equipment failure (vessel)'.
- 1.1.4 In the NRA, the assessment considered a total of 21 risks over construction and operational phases, including the possibility of contact of works craft with port infrastructure and contact of commercial vessels with marine works, collision of passing vessels with works craft, payload related incidents, collision due to increased commercial vessel movements, collision with passing traffic, contact with the quay, vessel mooring failure. Consideration was also given to seven potential risks to commercial and recreational navigation as a result of the overlapping construction and operation of the IERRT project. This Addendum should be read alongside the NRA itself which is not repeated here.

2 Proposed Changes

- 2.1.1 Since the Development Consent Order (DCO) application was made, the Applicant has continued to engage with stakeholders during the examination process and to consider any refinements to the design which may provide opportunities to further improve the proposals. As a result of this, the Applicant is proposing four changes to the proposed development (the Proposed Changes) during the Examination stage in order (amongst other things) to address suggestions by interested parties and to implement improvements to the proposed development.

2.1.2 The Proposed Changes include:

- Proposed Change 1: The Realignment of the Approach Jetty and Related Works to the Marine Infrastructure;
- Proposed Change 2: A Realignment and Shortening of the Length of the Internal Link Bridge and Consequential Works;
- Proposed Change 3: The Rearrangement of the UK Border Force Facilities; and
- Proposed Change 4: The Possible Provision of an Additional Impact Protection Measure – in Conjunction with Enhanced Operational Marine Management Controls for Vessels Arriving at Berth 1 of the IERRT.

3 Updates to risk assessment

3.1 Introduction

3.1.1 The NRA [APP-089] produced for the IERRT scheme has been reviewed in the context of the Proposed Changes. Proposed Change 1 and Proposed Change 4 have the potential to affect the previous assessment of navigational risk. However, as Proposed Change 2 and Proposed Change 3 relate to landside infrastructure, they are not considered to affect navigational risk and are not considered further in this report.

3.1.2 A specific stakeholder engagement exercise has been undertaken to inform the review of the NRA. This is described in Section 3.2. Further navigation simulations have also been completed to understand the effects of the Proposed Changes, which is presented in Section 3.3.

3.1.3 The review of navigational risks is presented in Section 3.4.

3.2 Stakeholder engagement

3.2.1 The Port Marine Safety Code Guide to Good Practice (PMSC GtGP) states in paragraph 4.2.6 that - *'It is essential to involve those working in and using the port and others in the risk assessment process and subsequent reviews and development, utilising their specialist knowledge and skills'*.

3.2.2 A formal consultation exercise with respect to the Proposed Changes was launched on 17 October 2023 and ended on 19 November 2023. In addition to this, in line with the PMSC GtGP, key stakeholders have been specifically consulted with respect to the implications of these changes for navigational risk. This consultation was undertaken via a written process in which the following stakeholders were specifically asked their view on potential changes to the risks identified in the NRA [APP-089]:

- Rix;
- Svitzer;
- Exolum;
- SMS towage;
- CLdN;
- Associated Petroleum Terminals (APT)/Immingham Oil Terminal (IOT) Operators;
- DFDS;
- Harbour Master, Humber; and
- Dock Master, Immingham.

3.2.3 A copy of the consultation letter is appended at Annex A.

3.2.4 The views of key stakeholders following the consultation that has been undertaken, along with how they have been considered in the assessment of navigational risk, is presented in the Table 3.1 below.

Table 3.1. Summary of consultation responses

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered
<p>APT (CA 21)</p>	<p>Change Application Consultation 07.11.23</p>	<p>Queried what assessments have been undertaken to address impacts on IOT operations at the IOT Finger Pier brought about by the additional protection barrier both in relation to its construction and operation (noting that the existing finger pier has a roller fender to aid berthing of coastal tankers which will likely be more needed due to amended tidal flow resulting from the blocking effect of the IERRT pontoons).</p>	<p>A review of navigational risks associated with the IERRT project in light of the Proposed Changes is provided in Section 3.</p> <p>Proposed Change 4 includes provision for roller fenders to aid berthing of coastal tankers.</p>
		<p>Request confirmation that an assessment of residual navigation risk has been undertaken with proposed measures in place</p>	<p>An assessment of residual navigational risk including the Proposed Changes is provided in Section 3.</p>
		<p>Queries whether assessments have been undertaken in relation to the IERRT construction and construction/operation phases, and whether it is intended that the additional infrastructure will be constructed prior to the IERRT becoming operational</p>	<p>A review of navigational risks associated with the IERRT project in light of the Proposed Changes is provided in Section 3.</p> <p>It remains the case that the options for the provision of impact protection measures will only be implemented if subsequently considered to be required by the SHA. The relevant risks are considered to be Tolerable and As Low As Reasonably Practicable (ALARP) with the controls that are anticipated without those impact protection measures. It is not currently intended that they would be implemented prior to the IERRT becoming operational.</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered
APT (CA 23)	Change Application Consultation 13.11.23	The proposed measures appear insufficient to adequately address the risks identified in the IOT operators sNRA.	<p>A review of navigational risks associated with the IERRT project in light of the Proposed Changes is provided in Section 3.</p> <p>The outcomes of this assessment remain the same as set out in the original NRA, in that all risks are considered tolerable and ALARP by the SHA with Embedded and Applied Controls in place.</p>
Svitzer (CA 33)	Change Application Consultation 17.11.23	<p>Reference the construction phase of the project and the terminal itself we have no issues. The movement of barges and other craft associated with the project will be controlled by the VTS team as anywhere else on the river. Effective the 1st of January 2024 SMS will take over control of the East tug barge. Any issues we may have had will no longer apply as we won't be operating from that area.</p> <p>We would like for some of our master's to attend simulation berthing trials if possible before the project is finished so they can get up to speed on what may be required for a berthing/ sailing. They may find that some of our tugs are not suitable due to their size etc.</p>	<p>The comments from Svitzer are noted.</p> <p>The Applicant recognises the importance of the towage operators on the Humber and the fact that early engagement should assist them with responding to any potential upsurges in demand for their services.</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered
<p>DFDS (CA 35)</p>	<p>Change Application Consultation 17.11.23</p>	<p>The impact protection added to the end of the IOT Finger Pier may itself have an impact on navigation as it effectively makes the pier longer, not only on vessels using the IERRT but also the south side of the finger pier, and further navigational simulations of such movements should be carried out with the proposed impact protection in place.</p>	<p>Navigation simulations of the Proposed Changes have been undertaken and are provided with the Change Application documentation (Application Document Reference number 10.3.9). The outcomes of this exercise indicate that tankers and barges arriving or departing at IOT finger pier berths, as well as vessels arriving at IERRT, can be done safely with Proposed Change 4 in place (see Section 3.3).</p> <p>This has been taken into account in Section 4.</p>
		<p>With respect to Proposed Change 4, DFDS understand that the Applicant will, in lieu of installing adequate impact protection, require vessels arriving at Berth 1 on the ebb tide to have a mandatory bow tug to protect the IOT Finger Pier in the event of an issue.</p> <p>It is DFDS' opinion that such a measure is not a suitable replacement for, nor as reliable as, physical protection measures. Physical impact protection does not suffer machinery breakdown, lack of availability, towline issues such as parting or fouling of the towline, are not affected by wind nor tide, nor are reliant on any human input.</p>	<p>The comments from DFDS are noted.</p> <p>The risks have been re-assessed in light of Proposed Change 4 in Section 3.4.</p> <p>The outcomes of this assessment remain the same as concluded in the original NRA, in that impact protection measures have been considered as an Applied Control and will only be provided as part of the 'project specific adaptive procedures' if required.</p> <p>The need for physical impact protection will be determined by the SHA and may be introduced in the future, if for example, the level of operational controls are reduced. The effect of installing the impact protection measures as now covered by Change 4 have also been assessed.</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered
		<p>The proposal of these enhanced navigation controls appears to be a cost saving measure which is indicative of a lack of proper cost benefit analysis on the part of the Applicant in their NRA production since had they carried out this crucial analysis, they would not have proposed impact protection measures at ISH3 and then decided against that proposal at this late stage.</p>	<p>The Applicant does not agree with the assertion made by DFDS that the enhanced navigation controls are a “cost saving measure”. The Applicant has clearly explained why Proposed Change 4 differs from that provided at ISH3 in sections 3.20 – 3.42 of the Proposed Change Notification Report [AS-027].</p> <p>The Applicant’s position on impact protection remains the same as at ISH3, in that impact protection measures will only be provided as part of the project specific adaptive controls if required by either of the SHAs. The Applicant provided an update at ISH5 on the discussions that had taken place with the IOT Operators since ISH3.</p>
		<p>DFDS would however support enhanced navigational controls in respect of the Immingham Eastern Jetty. Since the establishment of physical impact protection in this area would be impossible to achieve whilst keeping the Eastern Jetty operational, DFDS, as part of our NRA suggested the implementation of enhanced navigational controls requiring the presence of a standby tug (in addition to ordinary towage requirements) to prevent a vessel bound for IERRT Berths 2 or 3 alliding with a vessel berthed at Eastern Jetty.</p>	<p>The comments made by DFDS are noted. The provision of tugs (which would depend on tidal/wind conditions, as directed by the SHA) is already identified as an Applied Control for Risk ID O9 (Ro-Ro arriving/departing Immingham Eastern Ro-Ro terminal berths 2-3 with a tanker berthed on Eastern Jetty) in the original NRA [APP-089].</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered
		<p>If the Applicant thinks the enhanced management controls are necessary, DFDS suggests the Application should implement this system for the controls already proposed in the NRA, which the Applicant has previously said they cannot do as it interferes with the independence of the Harbour Master.</p>	<p>The Applicant’s NRA concludes that the risks are tolerable and ALARP with the Embedded and Applied Controls in place. While, therefore, the enhanced management controls are not considered necessary, the Applicant is proposing these as an additional measure to further reduce the likelihood and consequence of the risk to the IOT infrastructure in light of the examination submissions received.</p> <p>The proposed implementation is described in Section 3.3 of this ESA. This aligns with current operational practices so as not to interfere with the statutory remit of the Harbour Master.</p>
		<p>DFDS supports the position of IOT Operators that adequate impact protection measures should be required to be installed by the Applicant prior to the start of any construction activities or operation of IERRT, as recommended by DFDS’ own NRA [REP2-043]. It is DFDS view that such measures are needed to mitigate the risks which have been clearly identified to the IOT facility. These measures should be designed to protect the IOT trunkway, the IOT finger pier and any vessels berthed on the IOT finger pier.</p> <p>Accordingly, the Impact Protection Measures as proposed in the Proposed Changes are</p>	<p>The risks have been reassessed in consideration of Proposed Change 4 in Section 3.4.</p> <p>The outcomes of this assessment remain the same as concluded in the original NRA, in that all risks are considered tolerable and ALARP by the SHA with Embedded and Applied Controls in place.</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered
		<p>insufficient as they remain conditional on a recommendation by the Statutory Conservancy and Navigation Authority, as detailed in Requirement 18 of the draft DCO. DFDS has already set out in its Relevant Representation (RR-008, paragraphs 3.48 and 7.17) and Written Representation (REP2-040, paragraph 195) why conditional measures are insufficient and remain of this view – the measures should be required to be implemented before the main works are permitted to commence. DFDS, therefore considers the Proposed Changes to offer little reassurance in respect of navigational safety concerns and the potential impact on users of the Port of Immingham and the Humber Estuary.</p>	
<p>Maritime and Coastguard Agency (MCA) (CA 37)</p>	<p>Change Application Consultation 19.11.23</p>	<p>The MCA has noted the four proposed changes to the IERRT project, and that the NRA is to be reviewed in light of the these ensuring that the worst-case scenarios for shipping and navigation remains as per original assessment. The MCA welcomes further stakeholder consultation on the impact of the proposed changes. The MCA would expect every attempt to be undertaken by the applicant to resolve any concerns raised by the interested parties, with more detailed justification where consensus cannot be achieved and that the proposals are carried</p>	<p>The risks identified in the original NRA have been reviewed in light of the Proposed Changes in Section 4, taking into account the views of stakeholders on how the risks may have changed (see Section 3.2).</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered
		<p>out in accordance with the Port Marine Safety Code (PMSC) and its Guide to Good Practice.</p> <p>The MCA have also confirmed the position of the Statutory Harbour Authority (SHA) - ABP Humber, who have relevant powers under the Harbour Act 1964 (or other) and therefore have jurisdiction. The management of safe navigation and risk within the harbour remains solely with the SHA.</p>	<p>The MCA's comment is noted.</p>
<p>Maritime Bunkering (CA 41)</p>	<p>Change Application Consultation 17.11.23</p>	<p>Maritime Bunkering Ltd as charterers of the Rix Shipping barges object to the proposed construction of the IERRT as the structure will limit our opportunities of loading at all berths of the Finger Pier.</p> <p>The structure causes us both safety and commercial concerns and therefore please take this communication as an objection to the application.</p>	<p>With respect to matters relating to navigation safety, navigation simulations of the Proposed Changes have been undertaken and are provided with the Change Application documentation (Application Document Reference number 10.3.9). The outcomes of this exercise indicate that tankers and barges arriving or departing at IOT finger pier berths can be done safely with Proposed Change 4 in place (see Section 3.3).</p> <p>Matters relating to socio-economics are dealt with in Chapter 16 of the Environmental Statement Addendum.</p>
<p>Harbour Master Humber (CA 42)</p>	<p>Change Application Consultation 17.11.23</p>	<p>In relation to Proposed Change 1, HMM has the following comments on each section of the change as relates to navigational safety: HMM considers that the proposed realignment of the jetty approach should have no adverse effect on the safety of navigation or the ability</p>	<p>The comments from the Harbour Master, Humber are noted and have been considered when reviewing how the Proposed Changes may affect the risks identified in the NRA. Proposed Change 1 is not considered to affect navigational risks which is in accordance with the view of the Harbour Master, Humber.</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered
		<p>of vessels to berth at the proposed IERRT or IOT Finger Pier facilities. HMH considers that the change in number and location of piles should have no adverse effect on the safety of navigation or the ability of vessels to berth at the proposed IERRT or IOT Finger Pier facilities. The effect of the restraint dolphins on the overall infrastructure would need to be considered when assessing the residual risks associated with berthing at IERRT and establishing operating parameters and controls.</p>	
		<p>The Harbour Master, Humber notes that Proposed Change 4 includes an option for the delivery of an additional impact protection barrier at the western end of the IOT finger pier. He is in broad agreement with the effect on risks identified but would reiterate the need for simulations to ensure that there is no adverse effect on navigational safety relating to tankers and barges arriving or departing at IOT finger pier berths 8 and 9. Additional appropriately engineered impact protection measures would be suitable to prevent impact with the finger pier infrastructure, subject to the effect of the change of layout on navigation to and from berths 8 and 9 being assessed.</p>	<p>The Harbour Master, Humber comments are noted. Navigation simulations of the Proposed Changes have been undertaken and are provided at Application Document Reference number 10.3.9 (see Section 3.3 for summary). The outcomes of this exercise indicate that tankers and barges arriving or departing at IOT finger pier can be done safely with the option for additional impact protection barrier at the western end of the IOT finger pier in place.</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered
		<p>The Harbour Master, Humber is satisfied that the methods of enforcing the operational controls described in paragraph 3.3.4 and 3.3.5 of the ESA through directions and operations manuals would be effective as this is how such requirements are generally promulgated and obeyed by vessel operators. He remains convinced that it would not be appropriate for the use of enhanced controls of this kind (tugs, pilots, speed limits etc.) to be prescribed in the DCO, given that Parliament has already determined where the statutory powers to make these operational decisions should lie.</p>	<p>The Harbour Master, Humber comments are noted.</p>
CLdN	Application Consultation 28.11.23	<p>At this stage CLdN does not intend to comment in detail on the scope of further NRA relating to the change request. The change request relates to navigation issues specific to the locality around the port of Immingham.</p> <p>Although we note your comments that the impact protection measures will have no impact on navigation, there still appears to be disagreement between ABP and IOT on the scope/design of the works incorporated in the change request and also the process for providing the impact protection measures in future. In addition, DFDS and IOT remain concerned about the NRA conducted to date. CLdN's position, as set out previously, is that</p>	<p>CLdN's comments are noted. A review of navigational risks associated with the IERRT project in light of the Proposed Changes is provided in Section 3.4. There is continued dialogue between the Applicant, IOT Operators and DFDS regarding navigation.</p>

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed or Considered
		for so long as the local operators (IOT and DFDS) have concerns about navigation impacts in the vicinity of Immingham, CLdN remains concerned about the potential for interruptions to general river traffic – including CLdN / other vessels passing up/downstream to/from Killingholme.	

3.3 Vessel simulations

- 3.3.1 A navigational simulation exercise was undertaken by HR Wallingford on 14 and 15 November 2023. This tested the effectiveness of the use of tugs as an enhanced operational control with respect to the proposed IERRT infrastructure, as well as the effects on vessels navigating to and from the IOT finger pier with the possible provision of impact protection at the end of the IOT finger pier (i.e., Proposed Change 4). The findings of simulation runs are provided with the Change Application documentation, and are summarised below.
- 3.3.2 It was established that 1 single 50t BP ASD tug is sufficient to safely prevent a Transit class vessel, with a full control failure during operations to IERRT, from alliding with or posing a hazard to any IOT infrastructure, in peak ebb flows with a conservative 25 to 30 knot wind also setting towards the IOT. Sensitivity runs show that this can be repeatably demonstrated in other wind conditions. It should be noted this assumes the vessel is also following approach guidelines provided by the Harbour Master.
- 3.3.3 Furthermore, work undertaken to consider the presence of impact protection at the end of the IOT finger pier demonstrates that the new geometry does not affect operations to and from IOT berths.

3.4 Review of navigational risks

New risks

- 3.4.1 In the first instance the full list of potential risks was reviewed to determine whether any new risks are introduced through the inclusion of the Proposed Change 1 and Proposed Change 4.
- 3.4.2 No additional risks have been identified for reasons described below.
- 3.4.3 The realignment of the approach jetty and other marine works (Proposed Change 1) is very minor and not of a scale that would affect the predicted frequency, consequence and as such outcome of any navigational risks. Therefore, all risks associated with the presence of this infrastructure have already been identified in the NRA [APP-089].
- 3.4.4 The inclusion of enhanced management controls and options for impact protection measures (Proposed Change 4) would further mitigate the risks of allision that have already been identified within the NRA if such further mitigation were to be required [APP-089]. The use of operational management measures, such as tugs, has already been considered as an Applied Control within the original risk assessment. In this context Proposed Change 4 simply provides further detail on how these will be introduced.

Similarly, the potential for allision with the newly introduced infrastructure was reviewed within the original NRA.

- 3.4.5 Furthermore, no additional risks have been identified by stakeholders through the consultation process (see Table 3.1).

Existing Risks

- 3.4.6 The full list of risks identified in the NRA [APP-089] was subsequently reviewed to determine whether any of hazard scenarios (both the worst credible scenarios, and the most likely scenarios) would change as a result of Proposed Change 1 and Proposed Change 4. The outcomes in terms of any change in frequency or consequence of the hazard scenarios was also considered in light of the Proposed Changes.
- 3.4.7 To inform this exercise, the views of stakeholders were taken into account, along with the findings of the navigation simulations. A summary of the feedback received from the consultation exercise is provided in Table 3.1 above.
- 3.4.8 Based on the views of key stakeholders (Table 3.1), Proposed Change 1 is not considered to affect the assessment of navigational risk as already set out in the NRA [APP-089].
- 3.4.9 The following risks were identified as having the potential to be affected by Proposed Change 4:
- Allision of commercial vessel with marine works (Risk ID C3);
 - Allision of vessel proceeding to/from Immingham Eastern Ro-Ro with tanker moored at IOT Finger Pier (Risk ID O1);
 - Allision of tanker manoeuvring on/off IOT finger pier with IERRT on flood tide (Risk ID O2);
 - Allision of barge manoeuvring on/off IOT finger pier with IERRT on flood tide (Risk ID O3); and
 - Ro-Ro allision with IOT trunk way (Risk ID O4).
- 3.4.10 These are addressed in turn below. The hazard logs associated with these risks are also provided at Annex B.

Allision of commercial vessel with marine works (Risk ID C3)

- 3.4.11 The worst credible and most likely scenarios for this risk are not considered to be materially changed by Proposed Change 4. This is because these scenarios have already taken account of a tanker proceeding to the IOT finger pier making contact with marine works. Furthermore, the frequency and consequence of both the worst credible and most likely scenarios, with Applied and Embedded Controls in place, remain unchanged. Overall, the

assessment of this risk remains the same as that presented in the NRA [APP-089]. This is presented in the hazard logs in Annex B (Table B1).

Allision of vessel proceeding to/from Immingham Eastern Ro-Ro with tanker moored at IOT Finger Pier (Risk ID O1)

3.4.12 The worst credible and most likely scenarios for this risk are not considered to be changed by Proposed Change 4. Both scenarios already account for a Ro-Ro vessel contacting a tanker on the IOT finger pier. Furthermore, the frequency and consequence of both the worst credible and most likely scenarios are not considered to be affected.

3.4.13 The Applied Controls already proposed for this risk are not materially altered by the Proposed Changes themselves (and already account for the provision of tugs). The further navigational simulations that have been undertaken on the use of tugs to arrest a Transit class vessel validate the risk assessment and the effectiveness of the Applied Controls already identified. However, the enhanced operational marine controls, including the provision of tugs that would not normally be considered necessary in certain conditions, would serve to further reduce the risk. Furthermore, the option for the possible provision of impact protection measures at the end of IOT finger pier may also help to mitigate the risk of an IERRT vessel alliding with a vessel on the IOT finger pier. On a precautionary basis, however, Proposed Change 4 is not considered to reduce this risk to an extent that would change the frequency and consequence categories. Overall, the assessment of this risk remains the same as that presented in the NRA [APP-089]. This is presented in the hazard logs in Annex B (Table B2).

Allision of tanker manoeuvring on/off IOT finger pier with IERRT on flood tide (Risk ID O2)

3.4.14 The worst credible and most likely scenarios for this risk are not considered to be changed by Proposed Change 4. Furthermore, the frequency and consequence of both the worst credible and most likely scenarios remain unchanged. This is because the vessel simulations show the possible provision of impact protection at the end of the IOT finger pier does not affect operations to and from the IOT finger pier (see Section 3.3). The Applied Controls already proposed for this risk are also not altered by the Proposed Changes. Overall, the assessment of this risk remains the same as that presented in the NRA [APP-089]. This is presented in the hazard logs in Annex B (Table B3).

Allision of barge manoeuvring on/off IOT finger pier with IERRT on flood tide (Risk ID O3)

3.4.15 The worst credible and most likely scenarios for this risk are not considered to be changed by Proposed Change 4. Furthermore, the frequency and

consequence of both the worst credible and most likely scenarios remain unchanged. This is because the vessel simulations show the possible provision of impact protection at the end of the IOT finger pier does not affect operations to and from the IOT finger pier (see Section 3.3). The Applied Controls already proposed for this risk are also not altered by the Proposed Changes. Overall, the assessment of this risk remains the same as that presented in the NRA [APP-089]. This is presented in the hazard logs in Annex B (Table B4).

Ro-Ro allision with IOT trunk way (Risk ID O4)

- 3.4.16 The worst credible and most likely scenarios for this risk are not considered to be changed by Proposed Change 4. Furthermore, the frequency and consequence of both the worst credible and most likely scenarios remain unchanged. This is because the vessel simulations demonstrate that tug assistance is sufficient to safely prevent a Transit class vessel, with a full control failure during operations to IERRT, from alliding with or posing a hazard to any IOT infrastructure (see Section 3.3).
- 3.4.17 The Applied Controls already proposed for this risk are not altered by the Proposed Changes as they include the provision of tugs, as well as the possible implementation of impact protection, if considered necessary, as part of project specific adaptive procedures. The further navigational simulations that have been undertaken validate the risk assessment and the effectiveness of the Applied Controls already identified. However, the enhanced operational marine controls, including the provision of tugs that would not normally be considered necessary in certain conditions, would serve to further reduce the risk. On a precautionary basis, however, Proposed Change 4 is not considered to reduce this risk to an extent that would change the frequency and consequence categories.
- 3.4.18 Overall, the assessment of this risk remains the same as that presented in the NRA [APP-089]. This is presented in the hazard logs in Annex B (Table B5).

4 Summary

- 4.1.1 Overall, there is no change to any of the risk outcomes as a result of the Proposed Changes. As such, all risks remain tolerable in accordance with the tolerability criteria set out by the SHA Duty Holder.
- 4.1.2 The information in this document has been presented to, and assessed by, the SHA and Harbour and Safety Board (HASB) on 28 November 2023.

5 Abbreviations/Acronyms

Acronym	Definition
ABP	Associated British Ports
ABPmer	ABP Marine Environmental Research Ltd
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
APT	Associated Petroleum Terminals (Immingham) Ltd
CD	Chart Datum
COLREGs	International Regulations for Preventing Collisions at Sea 1972
DCO	Development Consent Order
DFDS	Det Forenede Dampskibs-Selskab
EIA	Environmental Impact Assessment
ES	Environmental Statement
GLA	General Lighthouse Authority
GtGP	Guide to Good Practice on Port Marine Operations
HAZID	Hazard Identification
HASB	Harbour Authority Safety Board
ID	Identity
IERRT	Immingham Eastern Ro-Ro Terminal
IOT	Immingham Oil Terminal
LLA	Local Lighthouse Authority
LPS	Local Port Services
MCA	Maritime and Coastguard Agency
MCC	Marine Control Centre
NRA	Navigational Risk Assessment
PEC	Pilot Exemption Certificate
PMSC	Port Marine Safety Code
Rix	Rix Petroleum Ltd.
Ro-Ro	Roll-On/Roll-Off
SHA	Statutory Harbour Authority
UK	United Kingdom
VHF	Very High Frequency
VTs	Vessel Traffic Services

Cardinal points/directions are used unless otherwise stated.

SI units are used unless otherwise stated.

6 Glossary

Term	Definition
Adverse weather conditions	Conditions during which navigation or mooring of vessels is adversely affected
AIS failure	A failure of the 'Automatic Identification System' equipment which provides vessel automated location signals
Cargo handling	The management, loading and unloading of goods from a vessel
COLREGs failure to comply	A failure of a crew on a vessel to observe the requirements of the International Regulations for Preventing Collisions at Sea 1972 (as amended), informally known as the 'rules of the road'
Communication failure - equipment	Failure of communications between personnel (specifically due to equipment failure)
Communication failure - Operational/procedural	Failure of communications between personnel (due to equipment failure, language problems or misunderstandings) – which is operational and/or procedural
Communication failure - Personnel	Failure of communications between personnel (due to equipment failure, language problems, procedural reporting failures or misunderstandings)
Competence	A measure of the experience and qualification of the mariner
Designated berth unavailable	The berth at which the vessel is planned to use, is not available
Excessive vessel speed	The vessel is travelling too fast in the given situation
Failure to comply with safe systems of work	A failure to follow the stated 'safety systems of work' as part of the safety management system
Failure to comply with Towage guidelines	When carrying out towing within a port, guidelines for the safe operation of this activity are published
Failure to comply with VTS/LPS/SOPs instructions	A failure of ship or port personnel to follow the stated instructions of the Local Port Service (as written within Standard Operating Procedures)
Failure to follow passage plan	The journey/voyage plan of the vessel, is not followed by the crew or embarked pilot
Fire/Explosion	Fire/Explosion
Human error	Human error

Term	Definition
Human error/fatigue - Port/Marine Personnel	Human error – port/dock employees
Human error/fatigue - Ship Personnel	Errors made by personnel working onboard the vessel
Inaccurate vessel details provided	Information provided by the vessel’s Master, crew or vessel agent is inaccurate
Inadequate bridge resource management	A lack of human resource, or competent resource on the vessels bridge to carry out navigation and/or shipboard functions
Inadequate maintenance/inspection	An inadequate maintenance or inspection regime by the port or a vessel
Inadequate number/type tugs	A lack of tug resource
Inadequate procedures in place onboard vessel	The vessel’s Safety Management System is not followed as stated or does not adequately prescribe for this operation
Inadequate procedures shoreside	The procedures for port or third-party contractor staff are not followed as stated or do not adequately prescribe for this operation
Inadequate training/competence - Others	Training and/or competence of others (not associated with a vessel or the port)
Incapacitated master (drinks/drugs)	Consumption of alcohol or the use of drugs by a mariner, specifically the vessel’s Master (Captain)
Incorrect assessment of tidal flow	An incorrect interpretation of the tidal flow or the effects it will have on vessel navigation by a mariner
Interaction	Vessels interact when one passes close to another, causing a deviation in course or movement in berthed vessels. The greater the speed, the more pronounced the interaction
Language problems	Difficulties caused by language/understanding between personnel
Malicious action by external parties	A third party carried out a malicious, egregious, or intentional action
Protest by external parties	Protests
Restricted visibility	The restriction of visibility through atmospheric conditions, such as fog, mist, heavy rain, or snow
Risk Assessment, Incomplete/not reviewed	Completion of the risk assessment writing, checking or review process

Term	Definition
Ship/Tug/Launch failure	Failure, of any type, by a ship/tug/launch involved in a maritime operation
Shoreside light backscatter	The background lights in the port and/or harbour obscure or affect navigational lights of other vessels or aids to navigation, such as buoys
Tug failure towing equipment	A tug whilst providing services to another vessel, may suffer a failure in the tow wire/rope or associated equipment
Vessel breakdown or malfunction	A breakdown, malfunction or defect with equipment onboard the vessel
Vessel fails to notify hazardous cargo	Vessels carrying dangerous cargoes are required to report these in advance to the harbour authority
Weather and hydro failure - equipment	Failure of equipment used to measure environmental conditions

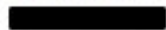
Annexes

A Proposed Changes Consultation Letter



Associated British Ports
 Dock Office
 Immingham
 DN40 2LZ
 Telephone: +44 (0)1472 359181
 e-mail: immingham@abports.co.uk
www.abports.co.uk

10th November 2023



By Email Only

To who it may concern,

I hope you are well. As you will be aware, Associated British Ports (ABP) intend to submit a formal request to the Planning Inspectorate to make changes to the submitted application for a development consent order to construct and operate the Immingham Eastern Ro-Ro Terminal ("IERRT") within the Port of Immingham.

In summary, the Change Request will comprise –

1. The Realignment of the Approach Jetty and Related Works;
2. A Realignment of the Internal Link Bridge and Consequential Works;
3. The Rearrangement and shortening of the UK Border Force Facilities; and
4. Enhanced Management Controls and Options for the (in terms of operating procedures) and the Potential Provision of Additional Impact Protection Measures.

Comprehensive consultation (non-statutory) is being undertaken by ABP on the Proposed Changes (summarised above) from Friday 20 October 2023 until 23:59pm on Sunday 19 November 2023.

A series of consultation documents have been placed on the IERRT project website, which can be found here: <https://www.abports.co.uk/immrora/consultation/>. This includes the Proposed Changes Notification Report which provides further information on the Proposed Changes.

An Environmental Statement Addendum (ESA) is provided at Appendix 1 of the Proposed Changes Notification Report. The purpose of the ESA is to provide an assessment of any new or different significant effects that are likely to result from the Proposed Changes and to support the Examining Authority in developing an informed view of the likely significant environmental effects of the IERRT project. The Proposed Changes are described in Chapter 2 and Chapter 3 of the ESA.

As part of this consultation, ABP is seeking the expert views of key stakeholders within the Port of Immingham as to whether the Proposed Changes may have any implications for commercial and recreational navigation.

Chapter 10 of the ESA deals with commercial and recreational navigation. It is noted within Section 10.2 that it is not possible to reassess these issues without the input of stakeholders. The purpose of this letter is, therefore, to request your views on our proposed changes generally but specifically in relation to navigational issues.

Associated British Ports constituted under the Transport Act 1981. Reference No.ZC000195
 Principal Office: 25 Beedon Street, London WC2E 9LS



ABP | KEEPING BRITAIN TRADING

- Ayr
- Hull
- Port Talbot
- Barrow
- Hams Hall
- Slioth
- Barry
- Immingham
- Southampton
- Cardiff
- Ipswich
- Swansea
- Fleetwood
- King's Lynn
- Teignmouth
- Garston
- Lowestoft
- Troon
- Goole
- Newport
- Plymouth
- Grimsby



Associated British Ports
Dock Office
Immingham
DN40 2LZ
Telephone: +44 (0)1472 359181
e-mail: immingham@abports.co.uk
www.abports.co.uk

To assist in this process, Section 10.2 of the ESA lists the risks that have the potential to be affected by the Proposed Changes, and the potential changes to the assessment outcomes are briefly outlined. Paragraph 10.2.1 of the ESA also states that there are considered to be no new impact pathways or unique risks in relation to commercial and recreational navigation introduced by the Proposed Changes. This is because the realignment of the approach jetty and related marine works (Proposed Change 1) will have no impact on navigation. In this context, it should also be noted that ABP, as the Applicant, also proposes to include within the DCO, the ability for it to provide an additional impact protection barrier at the western end of the IOT finger pier - should it be considered that such a barrier is required, (Proposed Change 4).

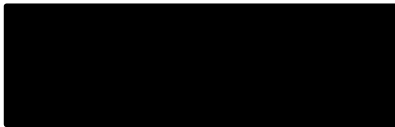
To assist with reviewing if, and how, the risks associated with the IERRT project would be changed as a result of the Proposed Changes, the original hazard logs for these risks can be found within Annexes A, B and C of the Navigation Risk Assessment (NRA) [APP-089].

It should be stressed that until your views on navigational risk have been obtained, the suggestions set out in Chapter 10 of the ESA are purely designed to assist the stakeholder engagement process. Views from all stakeholders will be collated to produce hazards logs, as necessary, using the same approach as the NRA submitted to support the DCO application, albeit not via a Hazard Identification (HAZID) workshop. This fulfils the requirement to undertake stakeholder engagement to inform the level of risk and the decisions of the Statutory Harbour Authority (SHA), as set out in the Port Marine Safety Code (PMSC).

ABP request that your views are submitted in writing by 23:59 on Sunday 19 November 2023 to align with the close of the consultation period for the Proposed Changes Consultation.

ABP look forward to hearing your views. Please could I ask these are responded to with Daniel Landii and Sophie Young in copy.

Kind Regards



ABP Immingham Eastern Ro-Ro Terminal Project Development Manager



Associated British Ports constituted under the Transport Act 1981. Reference No ZC000195
Principal Office: 25 Bedford Street, London WC2E 9ES



ABP KEEPING BRITAIN TRADING

- List of ports: Ayr, Barrow, Barry, Cardiff, Fleetwood, Garston, Goole, Grimsby, Hull, Hams Hall, Immingham, Ipswich, King's Lynn, Lowestoft, Newport, Plymouth, Port Talbot, Silloth, Southampton, Swansea, Teignmouth, Troon

B Navigational Risk Assessment Hazard Logs for Proposed Changes

Table B.1. Hazard Category: Allision; Scenario: Commercial vessel with marine works; Risk ID C3

Risk Analysis		Embedded Controls		Worst Credible Scenario	Frequency	Consequence		Most Likely Scenario	Frequency	Consequence			
Causes	Control	Comment	People			Major (4)	Almost Certain			People	Minor (2)		
Failure to follow passage plan	Passage planning	All vessels are required to operate in accordance with their passage plans	Tanker proceeding to IOT Finger Pier makes contact with marine works resulting in damage to hull and loss of cargo. Incident results in; a single fatality from impact, tier 3 pollution, and international reputation damage. Delay to marine works and operations at IOT during response and following investigation.	Unlikely	2	Property	Major (4)	Tanker transiting to berth makes contact with infrastructure at slow speed, leading to minor damage to vessel, no loss of cargo, minor injuries to crew and minor delays to marine works caused by investigations and ship survey.	5	Property	Minor (2)		
Towing equipment failure	Towage, available and appropriate	Available at the port				Planet	Extreme (5)			Planet	Negligible (1)		
Inadequate number/type tugs						Port	Extreme (5)			Port	Minor (2)		
Excessive vessel speed	Byelaws	Statutory powers of direction		Tanker proceeding to IOT Finger Pier makes contact with marine works resulting in damage to hull and loss of cargo. Incident results in; a single fatality from impact, tier 3 pollution, and international reputation damage. Delay to marine works and operations at IOT during response and following investigation.	2	5	Port		Extreme (5)	Tanker transiting to berth makes contact with infrastructure at slow speed, leading to minor damage to vessel, no loss of cargo, minor injuries to crew and minor delays to marine works caused by investigations and ship survey.	5	Port	Minor (2)
COLREGs failure to comply	International COLREGs 1972 (as amended)	All ships operate in accordance with COLREGs											
Manoeuvre misjudged	Harbour Authority requirements	Expert local knowledge and updated on activities (pilotage PEC requirements)											
Inadequate bridge resource management													
Restricted visibility	Aids to navigation, Provision and maintenance of	Port lights and visual aids overseen by LLA and GLA. Signal lights.											
Adverse weather conditions													
Communication failure - Operational/procedural	Communications equipment	Vessels have VHF radios available											
High traffic density	AIS/Radar coverage	VTS monitor movements of vessels in the Harbour Area											
Notice to Mariners failure to observe	Notices to mariners	Issued by the Harbour Authority with information about the development											
Human error/fatigue - Vessel Personnel	Training of port marine/operations personnel	Port's marine training policy											
Inadequate procedures in place onboard vessel													
Vessel breakdown or malfunction	Port Facility Emergency Plan	Details the Harbour Authority's response to an emergency											
Interaction with passing vessel	Vessel Traffic Services	Coordinate an emergency response and manage traffic in the area; all ships in the Humber area are notified of shipping movements by regular VHF traffic and information broadcasts.											
Poor situational awareness													
Incorrect assessment of tidal flow													
	Oil spill contingency plans	Covers the response to a pollution event											
Further Applicable Controls		Frequency Mitigation	Consequence Mitigation	Comment	Potential Worst Credible Frequency	Potential Worst Credible Consequence		Potential Most Likely Frequency	Potential Most Likely Consequence				
Marking construction area (exclusion zone)	Slight			Marking around the extremity of the construction zone	Rare	People	Major (4)	Likely	People	Minor (2)			
Adaptive procedures	Very Substantial			Training of PEC or Pilots		Property	Major (4)		Property	Minor (2)			
Guard (support) vessel	Fair			Could be tug or additional vessel		Planet	Extreme (5)		Planet	Negligible (1)			
					1	Port	Extreme (5)	4	Port	Minor (2)			
Risk Assessment and Applied Controls		Frequency Mitigation	Consequence Mitigation	Comment	Post Cost Benefit Analysis Worst Credible Frequency	Post Cost Benefit Analysis Worst Credible Consequence		Post Cost Benefit Analysis Most Likely Frequency	Post Cost Benefit Analysis Most Likely Consequence				
Guard (support) vessel	Fair			Should be tug or another suitable vessel	Rare	People	Major (4)	Likely	People	Minor (2)			
Project specific adaptive procedures	Very Substantial			Familiarisation training of PEC or Pilots		Property	Major (4)		Property	Minor (2)			
Marking construction area (exclusion zone)	Slight			Marking around the extremity of the construction zone		Planet	Extreme (5)		Planet	Negligible (1)			
					1	Port	Extreme (5)	4	Port	Minor (2)			

Table B.2. Hazard Category: Allision; Scenario: Vessel proceeding to/from Immingham Eastern Ro-Ro with tanker moored at IOT Finger Pier; Risk ID O1

Risk Analysis		Embedded Controls		Worst Credible Scenario	Frequency	Consequence		Most Likely Scenario	Frequency	Consequence		
Causes	Control	Comment	People			Property	Planet			Port	People	Property
Adverse weather conditions	Monitoring of met ocean conditions	Met Ocean data collected and compared with operation limits	Ro-Ro makes contact with berthed tanker resulting in a significant allision that punctures the tanker's double hull leading to a tier 3 pollution event with possible ignition of the petrochemical. That could cause a fire which significantly damages the vessel and/or infrastructure. Incident results in multiple fatalities, and negative international news that significantly affects the ports reputation and port operations.	Unlikely	2	People	Extreme (5)	An approaching Ro-Ro misses its berth and continues to the IOT Finger Pier which results in a low speed glancing collision, dislodging a tanker from its berth causing a tier 3 pollution event. Major damage to port infrastructure and vessel, serious injuries to personnel, and negative national port reputational damage.	Possible	3	People	Moderate (3)
Incorrect assessment of tidal flow						Property	Extreme (5)			Property	Major (4)	
Restricted visibility						Planet	Extreme (5)			Planet	Extreme (5)	
Inadequate bridge resource management	Passage planning	Required for all commercial vessels				Port	Extreme (5)			Port	Major (4)	
Failure to follow passage plan												
Inadequate procedures in place onboard vessel												
Manoeuvre misjudged												
Vessel breakdown or malfunction	Port Facility Emergency Plan	Details the Harbour Authority's response to an emergency										
Ship/Tug/Launch failure												
Failure to comply with Towage guidelines	Towage guidelines	Correct configuration										
Inadequate number/type tugs	Towage, available and appropriate	Available at the port										
Interaction with passing vessel	Vessel Traffic Services	Control vessel movements and coordinate emergency response										
Poor situational awareness												
Communication failure - Personnel												
Excessive vessel speed	Harbour Authority requirements	Expert local knowledge and updated on activities (pilotage PEC requirements)										
Human error/fatigue - Vessel Personnel												
	Oil spill contingency plans	Covers the response to a pollution event										
Further Applicable Controls		Frequency Reduction	Consequence Reduction	Comment	Potential Worst Credible Frequency	Potential Worst Credible Consequence		Potential Most Likely Frequency	Potential Most Likely Consequence			
Move finger pier to east side of trunk way		Very Substantial	Very Substantial	Control eliminates risk	Rare	People	Negligible (1)	Rare	People	Negligible (1)		
Chartered safety area, berthing procedures		Slight				Property	Negligible (1)		Property	Negligible (1)		
Additional pilotage training/ familiarisation		Minute		<i>(Amalgamated into Adaptive procedures)</i>		Planet	Negligible (1)		Planet	Negligible (1)		
Berthing criteria	Considerable	Fair	Tidal limits, tugs, method etc. (e.g. no vessel movements during high winds)	1	Port	Negligible (1)	1	Port	Negligible (1)			
Risk Assessment and Applied Controls		Frequency Reduction	Consequence Reduction	Comment	Post Cost Benefit Analysis Worst Credible Frequency	Post Cost Benefit Analysis Worst Credible Consequence		Post Cost Benefit Analysis Most Likely Frequency	Post Cost Benefit Analysis Most Likely Consequence			
Project specific adaptive procedures		Considerable	Fair	Adaptive procedures during familiarisation period as operational experience gained (e.g. tugs, tidal restrictions, delayed start of use of berth 1 during familiarisation period)	Rare	People	Moderate (3)	Unlikely	People	Minor (2)		
Chartered safety area, berthing procedures		Slight				Property	Major (4)		Property	Moderate (3)		
Specific berthing criteria for each of the three berths		Considerable	Fair	Tidal limits, tugs, method etc. (e.g. no vessel movements during high winds)		Planet	Moderate (3)		Planet	Major (4)		
					1	Port	Moderate (3)	2	Port	Minor (2)		

Table B.3. Hazard Category: Allision; Scenario: Tanker manoeuvring on/off IOT Finger Pier (flood tide); Risk ID O2

Risk Analysis		Embedded Controls		Worst Credible Scenario	Frequency	Consequence		Most Likely Scenario	Frequency	Consequence		
Causes	Control	Comment	People			Property	People			Property		
Inadequate number/type tugs	Towage, available and appropriate	Available at the port	Tanker manoeuvres off finger pier and collides with Ro-Ro terminal. The allision has potential to cause a single fatality to a shoreman on the Ro-Ro infrastructure. The impact punctures both hulls of the tanker and causes a tier 3 pollution, serious damage to port reputation and negative national publicity. £4 - 8 million of property damages.	Possible	3	People	Major (4)	Tanker collides with another vessel or structure and does not puncture their hull resulting in little local publicity, moderate property damages (£750,000 - £4 million) and no injuries.	Likely	4	People	Negligible (1)
Failure to comply with Towage guidelines	Towage guidelines	Correct configuration				Property	Major (4)			Property	Moderate (3)	
Adverse weather conditions	Monitoring of met ocean conditions	Weather forecasts obtained and compared with limits				Planet	Extreme (5)			Planet	Negligible (1)	
Restricted visibility						Port	Major (4)			Port	Minor (2)	
Incorrect assessment of tidal flow												
Anchors not cleared	Anchors cleared and ready for use	Arrest/slow ship movement prior to impact										
Inadequate bridge resource management	Harbour Authority requirements	Expert local knowledge and updated on activities (pilotage PEC -requirements)										
Inadequate procedures in place onboard vessel												
Excessive vessel speed												
Manoeuvre misjudged												
Poor situational awareness												
Human error/fatigue - Pilot/ Vessel Personnel												
Ship/Tug/Launch failure	Training of port marine/operations personnel	Port's marine training policy										
Vessel breakdown or malfunction												
Communication failure - Personnel												
	Adequate berth fendering	On IERRT infrastructure										
Further Applicable Controls		Frequency Reduction	Consequence Reduction	Comment	Potential Worst Credible Frequency	Potential Worst Credible Consequence		Potential Most Likely Frequency	Potential Most Likely Consequence			
Increased use of tugs		Very Substantial		<i>(Amalgamated into Adaptive procedures)</i>	Rare	People	Moderate (3)	Unlikely	People	Negligible (1)		
Tidal limitations/ weather restrictions		Considerable	Fair	The control may have commercial impact to stakeholder's operations		Property	Major (4)		Property	Moderate (3)		
<i>Moving finger pier</i>		<i>Very Substantial</i>	<i>Very Substantial</i>	<i>Control eliminates risk</i>		Planet	Extreme (5)		Planet	Negligible (1)		
					Port	Major (4)	Port	Minor (2)				
Risk Assessment and Applied Controls		Frequency Reduction	Consequence Reduction	Comment	Post Cost Benefit Analysis Worst Credible Frequency	Post Cost Benefit Analysis Worst Credible Consequence		Post Cost Benefit Analysis Most Likely Frequency	Post Cost Benefit Analysis Most Likely Consequence			
Project specific adaptive procedures		Considerable	Fair	Adaptive procedures during familiarisation period as operational experience gained (e.g. tugs, tidal restrictions, delayed start of use of berth 1 during familiarisation period) Including additional simulation training	Unlikely	People	Moderate (3)	Possible	People	Negligible (1)		
						Property	Major (4)		Property	Moderate (3)		
						Planet	Extreme (5)		Planet	Negligible (1)		
					2	Port	Major (4)	3	Port	Minor (2)		

Table B.4. Hazard Category: Allision; Scenario: Barge manoeuvring on/off IOT Finger Pier (flood tide); Risk ID O3

Risk Analysis		Embedded Controls		Worst Credible Scenario	Frequency	Consequence		Most Likely Scenario	Frequency	Consequence			
Causes	Control	Comment	People			Property	People			Property			
Anchors not cleared	Anchors cleared and ready for use	Arrest/slow ship movement prior to impact	Barge manoeuvres off finger pier and collides with Ro-Ro terminal. Possibility to cause a single fatality which punctures the barge's hull and causes a tier 3 pollution event. Major Impact on port reputation, serious national publicity and £4 - 8 million of damages to property.	Possible	3	People	Major (4)	Barge collides with another berthed vessel or structure and does not puncture the hull; minor little local publicity, minor property damages (£10,000-750,000) and no injuries.	Almost Certain	5	People	Negligible (1)	
Inadequate number/type tugs	Towage, available and appropriate	Available at the port				Property	Major (4)			5	Property	Minor (2)	
Failure to comply with Towage guidelines	Towage guidelines	Correct configuration				Planet	Extreme (5)				Planet	Negligible (1)	
Adverse weather conditions	Monitoring of met ocean conditions	Weather forecasts obtained and compared with limits		Port	Major (4)	Port	Minor (2)						
Restricted visibility													
Incorrect assessment of tidal flow													
Inadequate bridge resource management	Harbour Authority requirements	Expert local knowledge and updated on activities (pilotage PEC requirements)											
Inadequate procedures in place onboard vessel													
Excessive vessel speed													
Manoeuvre misjudged													
Poor situational awareness													
Human error/fatigue - Pilot/ Vessel Personnel													
Ship/Tug/Launch failure	Training of port marine/operations personnel	Port's marine training policy											
Vessel breakdown or malfunction													
Communication failure - Personnel													
	Adequate berth fendering	On IERTT infrastructure											
Further Applicable Controls		Frequency Reduction	Consequence Reduction	Comment	Potential Worst Credible Frequency	Potential Worst Credible Consequence		Potential Most Likely Frequency	Potential Most Likely Consequence				
Control						People	Major (4)	Likely	People	Negligible (1)			
Tidal limitations/ weather restrictions		Considerable	Fair	The control may have commercial impact to stakeholder's operations	Unlikely	Property	Major (4)		Property	Minor (2)			
						Planet	Extreme (5)		Planet	Negligible (1)			
<i>Moving finger pier</i>		<i>Very Substantial</i>	<i>Very Substantial</i>	<i>Control eliminates risk</i>		2	Port	Major (4)	Port	Minor (2)			
Risk Assessment and Applied Control		Frequency Reduction	Consequence Reduction	Comment	Post Cost Benefit Analysis Worst Credible Frequency	Post Cost Benefit Analysis Worst Credible Consequence		Post Cost Benefit Analysis Most Likely Frequency	Post Cost Benefit Analysis Most Likely Consequence				
Control						People	Minor (2)	Possible	People	Negligible (1)			
Project specific adaptive procedures		Considerable	Fair	Adaptive procedures during familiarisation period as operational experience gained (e.g. tugs, tidal restrictions, delayed start of use of berth 1 during familiarisation period)	Unlikely	Property	Moderate (3)		Property	Minor (2)			
						Planet	Extreme (5)		Planet	Negligible (1)			
						2	Port		Moderate (3)	Port	Minor (2)		

Table B.5. Hazard Category: Allision; Scenario: Ro-Ro allision with IOT trunk way; Risk ID O4

Risk Analysis		Embedded Controls		Worst Credible Scenario	Frequency	Consequence		Most Likely Scenario	Frequency	Consequence		
Causes	Control	Comment	People			Planet	People			Planet		
Anchors not cleared	Anchors cleared and ready for use	Arrest/slow ship movement prior to impact	Ro-Ro vessel collides with IOT trunk way, severing the charged pipeline causing a tier 3 pollution incident. Possibility of ignition and fire when the motor spirit pipeline is burst due to its flammability. Two refineries must be closed for a considerable time in order to repair the pipeline. This causes significant impacts for multiple weeks and has national affect to petroleum production. Multiple fatalities, negative international publicity for port and greater than £8 million of damage to port infrastructure.	Possible	3	People	Extreme (5)	Ro-Ro has a slow speed impact with IOT trunk way leading to minor damage to vessel and distortion of pipe line on trunk way. Single fatality to personnel on the trunk way and tier 3 pollution, negative international publicity and greater than £8 million of damages to the port.	Possible	People	Major (4)	
Inadequate number/type tugs	Towage, available and appropriate	Available at the port				Property	Extreme (5)			Property	Extreme (5)	
Failure to comply with Towage guidelines	Towage guidelines	Correct configuration				Planet	Extreme (5)			Planet	Extreme (5)	
Adverse weather conditions	Weather limits	Wind limit e.g. 35 knots				Port	Extreme (5)			Port	Extreme (5)	
Restricted visibility												
Incorrect assessment of tidal flow												
Vessel breakdown or malfunction	Vessel propulsion redundancies	Two propellers, two engines and auxiliary power										
Human error/fatigue - Pilot/ Vessel Personnel	Harbour Authority requirements	Expert local knowledge of the area including tidal regime										
Poor situational awareness	Vessel Traffic Services	Control vessel movements and coordinate emergency response										
Excessive vessel speed	Local Port Service	Immingham Marine Control Centre (MCC)										
Inadequate bridge resource management	Port Facility Emergency Plan	Details the Harbour Authority's response to an emergency										
Inadequate procedures in place onboard vessel	Oil spill contingency plans	Covers the response to a pollution event										
Communication failure - Personnel	Communications equipment	Vessels have VHF radios available										
Ship/Tug/Launch failure	Training of port marine/operations personnel	Port's marine training policy										
Further Applicable Controls		Frequency Reduction	Consequence Reduction	Comment	Potential Worst Credible Frequency	Potential Worst Credible Consequence		Potential Most Likely Frequency	Potential Most Likely Consequence			
Impact protection	Very Substantial	Very Substantial	Impact fendering and buttress protection	Tidal limits, tugs, method etc. (e.g. no vessel movements during high winds)	Rare	People	Minor (2)	Unlikely	People	Minor (2)		
Berthing criteria	Considerable	Fair				Property	Extreme (5)		Property	Moderate (3)		
Additional tug provisions	Considerable	Fair				Planet	Minor (2)		Planet	Minor (2)		
						Port	Minor (2)		Port	Minor (2)		
Risk Assessment and Applied Control		Frequency Reduction	Consequence Reduction	Comment	Post Cost Benefit Analysis Worst Credible Frequency	Post Cost Benefit Analysis Worst Credible Consequence		Post Cost Benefit Analysis Most Likely Frequency	Post Cost Benefit Analysis Most Likely Consequence			
Specific berthing criteria for each of the three berths	Considerable		Tidal limits, tugs, method etc. (e.g. no vessel movements during high winds)	Adaptive procedures during familiarisation period as operational experience gained (e.g. tugs, tidal restrictions, delayed start of use of berth 1 during familiarisation period, impact protection)	Unlikely	People	Extreme (5)	Unlikely	People	Major (4)		
Project specific adaptive procedures	Considerable	Fair				Property	Extreme (5)		Property	Extreme (5)		
						Planet	Extreme (5)		Planet	Extreme (5)		
						Port	Extreme (5)		Port	Extreme (5)		

Contact Us

ABPmer

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

T +44 (0) 23 8071 1840

F +44 (0) 23 8071 1841

E enquiries@abpmer.co.uk

www.abpmer.co.uk



Annex D: Construction Noise Levels and Assumptions

The construction noise predictions have been undertaken using noise data for items of plant and calculation methodologies from BS 5228-1:2009+A1:2014 (BSI, 2014a; BSI, 2014b). Manufacturer's source data together with that extracted from Hong Kong Environmental Protection Department website (www.epd.gov,hk) were also used where source data were not available in BS 5228-1:2009+A1:2014. Predicted noise levels for the construction of the IERRT project have been based on similar construction methods used for developments in the UK.

Predictions have been carried out assuming all of the plant is operating at the realistic closest approach to the Noise Sensitive Receptors (NSRs) (apart from the crusher and screening plant which will be located a minimum of 250 m away from on-site NSRs). This, therefore, is a worst-case scenario, as not all the plant will be at the closest approach for the full duration (or at all), and the construction plant is likely to spread across the site. For NSRs on Kings Road and Queens Road, a -5 dB reduction has been applied, to allow for partial screening due to the existing building and structures between the application site and the residential NSRs.

The potential construction noise levels have also been predicted at the People Asset Management Ltd (PAM) building (a port occupational health services building), the PK Construction (Lincs) Limited Office buildings and the Nippon Gases UK Limited Office building within the port, due to their close proximity to the boundary of the IERRT project site. For the PK Construction Office building and the Nippon Gas Office building no screening correction due to existing on-site structures has been applied. However, the construction predictions assume that temporary acoustic screening will be erected either around construction plant operating near the PAM building or around the PAM building itself throughout the construction works. A -5 dB reduction has been applied to the noise calculations as a result of this screening as a conservative approach as acoustic screening could provide more than 5 dB attenuation.

Table D.1 below provides a list of indicative construction plant and associated sound power levels (L_w)

Table D.1. Indicative construction plant and associated sound power levels

Plant item	Source	Number in Operation	Total Sound power level (L_{wA}) dB
Marine Works			
Pile Hammer (CG 300)	CG 300 Data sheet	2	127
Pile Hammer (CG 300)	CG 300 Data sheet	1	124
Vibratory Hammer (PTC 130 HD)	C3.8*	2	119
Vibratory Hammer (PTC 130 HD)	C3.8*	1	116
Back Hoe Dredger (Manu Pekka)	C.7.2*	1	110
Multipurpose Hopper Barge (Cork Sand)	C.7.2 *	5	117
Crane Barge Inc 350T Crawler Crane (piling)	cnp048**	1	112
Crane Barge Inc 350T Crawler Crane (piling)	cnp048**	1	112
Crane Barge Inc 350T Crawler Crane (deck build)	cnp048**	1	112
Crane Barge Inc 350T Crawler Crane (deck build)	cnp048**	1	112
Crawler Crane 150T	C.3.28*	1	95
Tug / Multi Cat	CNP22**1	2	110
Hatch Barge/Deck Barge	other assessments	3	112
Site Clearance & Demolition			
Dozer (D6)	C2.12*	6	116.8
Hydraulic Excavator 30T	C10.1*	4	114
Dump Trucks 35T	C2.31*	3	119.8
Crushers	C.1.15*	3	116.8
Screening Plants	C.10.16*	3	113.8
Tractors Trailers	C.4.75*	4	113
Tipper	C8.20*	4	113
Peckers	C.1.2*	1	120
Compressors	C5.5*	5	100
Dozer (D6)	C1.2*	2	123
Roads and Hardstanding			
Roller (Bomag 213 DH - 5)	C2.21*	4	105
Road Paver (VOLVO P6820D ABG)	C4.66*	4	103
Asphalt / Concrete Plant	C4.75*	1	107
Tractors Trailers	C.4.75*	4	113
Tipper	C8.20*	4	113
Bridge and Buildings			
Tractors Trailers	C.4.75*	4	113

Plant item	Source	Number in Operation	Total Sound power level (L_{wA}) dB
Tipper	C8.20*	4	113
Concrete Pumps	C4.24*	1	95
Cranes 76-100 Ton	C4.41*	1	99
Cranes 101-150 Ton	C4.41*	1	99
Cranes 151-200 Ton	C4.41*	1	99
Cranes 201-250 Ton	C4.41*	1	99
Cranes 251-300 Ton	C4.41*	1	99
Cranes 301-600 Ton	C4.50*	1	99
Generators	C3.32*	2	104
Transformers	Other assessments	10	98
Automatic Welding Set	C.3.31*	2	104
Drainage			
Tractors Trailers	C.4.75*	4	113
Tipper	C8.20*	4	113
14T Excavator	C4.56*	5	118
Compressor	C5.5*	2	96
Trailer	C.4.7*5	4	113
Dumper	C4.6*	4	113
Test Pump	C.11.1*	1	109
Dewatering Pump	C.11.1*	1	109
Bridge-			
piling -sheet hydraulic jacking	C.3.9	1	91
Power pack	C.3.10	1	96
sheet piling	C.3.8*	1	116
Concrete pump + cement mixer truck	C.4.24*	1	95
Telescopic handler	C.4.55*	2	101
Mobile telescopic crane	C.4.46*	1	95
Hand-held circular bench saw	C.4.72*	2	110
Diesel Generator	C.4.76*	1	89
Water pump (diesel)	C.4.88	1	96
Dredging Only			
Back Hoe Dredger (Manu Pekka)	C.7.2 *	1	110
Multipurpose Hopper Barge (Cork Sand)	C.7.2 *	5	117
Crawler Crane 150T	C.3.28*	1	95
Tug / Multi Cat	CNP221**	2	110
Hatch Barge/Deck Barge	other assessments	3	112
* BS 5228-1:2009+A1:2014 table and row reference			
** Hong Kong Environmental Protection Department website (www.epd.gov.hk)			

Contact Us

ABPmer

Quayside Suite,

Medina Chambers

Town Quay, Southampton

SO14 2AQ

T +44 (0) 23 8071 1840

F +44 (0) 23 8071 1841

E enquiries@abpmer.co.uk

www.abpmer.co.uk

