KEEPING BRITAIN TRADING

IMMINGHAM EASTERN RO-RO TERMINAL

Appendix 1 to Proposed Changes Notification Report - Environmental Statement Addendum
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Immingham Eastern Ro-Ro Terminal

Appendix 1 to Proposed Changes Notification Report - Environmental Statement Addendum

October 2023

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Executive Summary

An application seeking a development consent order 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 associated works to the marine infrastructure;
- **Proposed Change 2:** Realignment and shortening of the IERRT internal bridge;
- **Proposed Change 3:** Rearrangement of the UK Border Force facilities; and
- **Proposed Change 4:** Provision of revised marine impact protection measures and related works.

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 has already been identified in the ES) is considered necessary.

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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 will comprise 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) (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 Proposed Changes to the proposed scheme in summary are:

- **Proposed Change 1:** Realignment of the approach jetty and associated works to the marine infrastructure;
- **Proposed Change 2:** Realignment and shortening of the IERRT internal bridge and consequential works;
- **Proposed Change 3:** Rearrangement of the UK Border Force facilities; and
- **Proposed Change 4:** Options for the provision of revised marine impact protection measures and related works.

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 only covers changes to the Environmental Statement (ES) submitted for the DCO application, 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). If no change is listed in this ESA, then the conclusions are the same as those presented in the ES or the environmental information submitted into the Examination.

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 with this ESA.

1.2.4 Plans submitted with the DCO application will be updated for the DCO Change Application where relevant to the Proposed Changes. If the Proposed Changes are accepted by the Examining Authority, then updated whole sets of plans will be submitted into the Examination library and will supersede the versions of those plans already in the Examination library. A draft version of the plans can be found at Appendix 2 (General Arrangement Plans), Appendix 3 (Engineering Sections and Drawings and Plans) and Appendix 4 (Works Plans) to the Change Notification.

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.

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:** Realignment of the approach jetty and associated works to the marine infrastructure;
- **Proposed Change 2:** Realignment and shortening of the IERRT internal bridge and consequential works;
- **Proposed Change 3:** Rearrangement of the UK Border Force facilities; and
- **Proposed Change 4:** Options for the provision of revised marine impact protection measures and related works.

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 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.

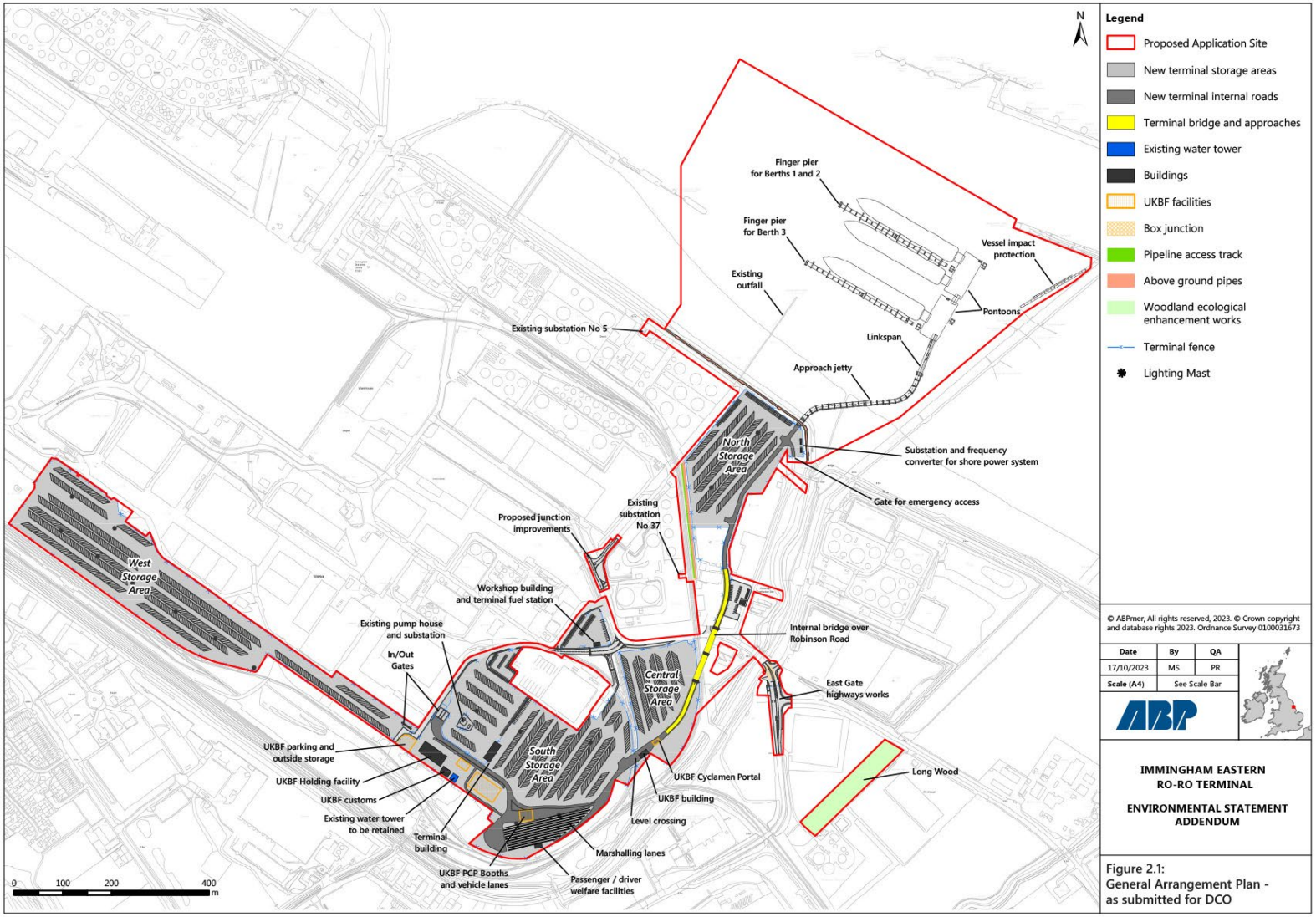

Figure 2.1. General Arrangement Plan as submitted for the DCO application

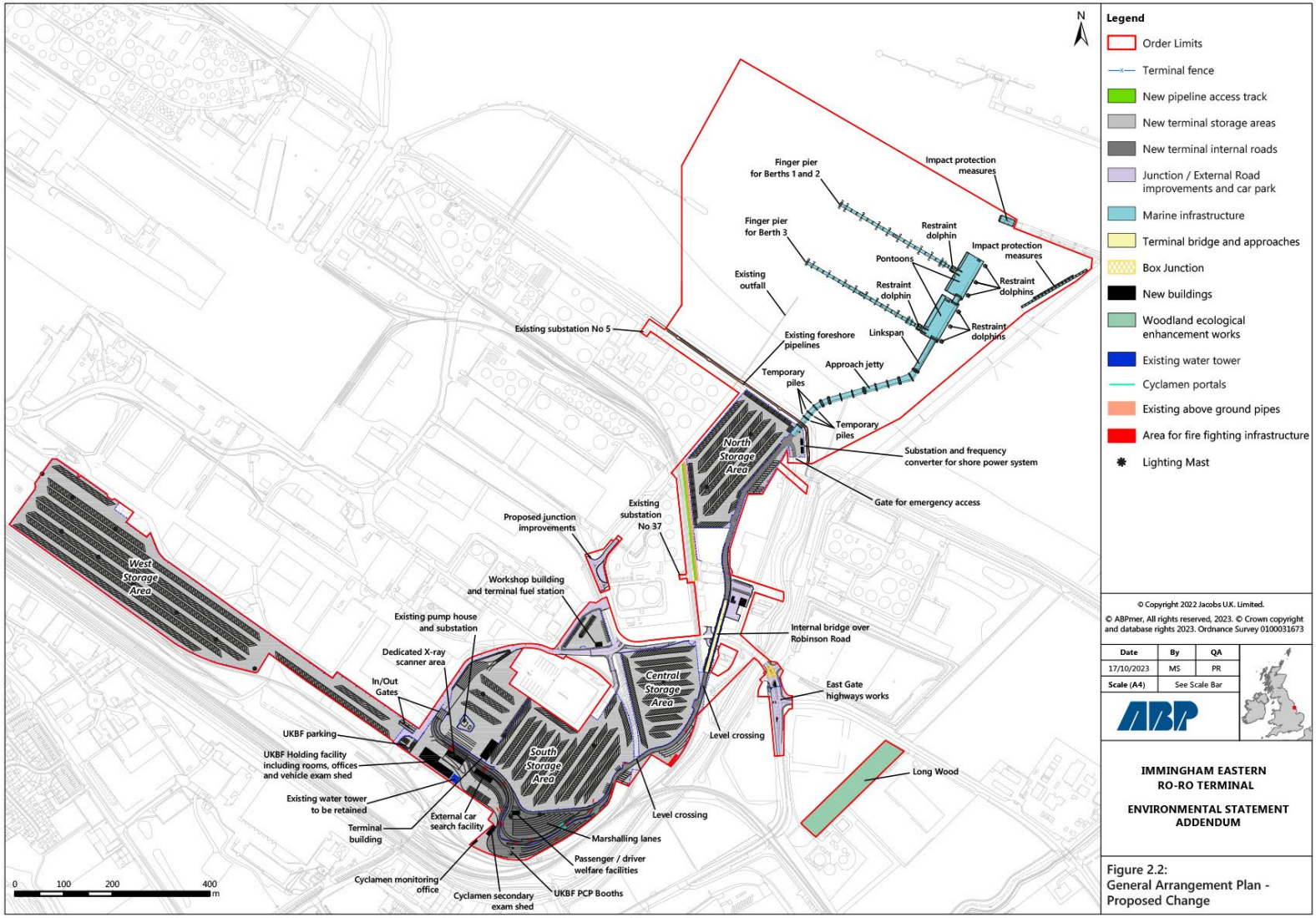

Figure 2.2. General Arranagement Plan showing Proposed Changes

2.2 Proposed Change 1: Realignment of the approach jetty and associated 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 [APP-038]. 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 is 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.

2.2.4 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 last set of piles before the linkspan (this to accommodate the swept path of HGVs)), and 13.5 m in height above chart datum (CD). 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 away from the pipeline 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 above the pipes 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 for the installation of the permanent piles. 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's levels have been reduced to 10.1 m height above CD and an additional two piles have been also added to each of the finger piers to support bollards above and improve mooring performance. An enlarged platform is included on the finger pier to

support the shore to ship power unit, however, this remains less than the maximum width of 13 m as stated in Chapter 2 of the ES (paragraph 2.3.16). When constructed, each finger pier will now be supported by up to 56 piles.

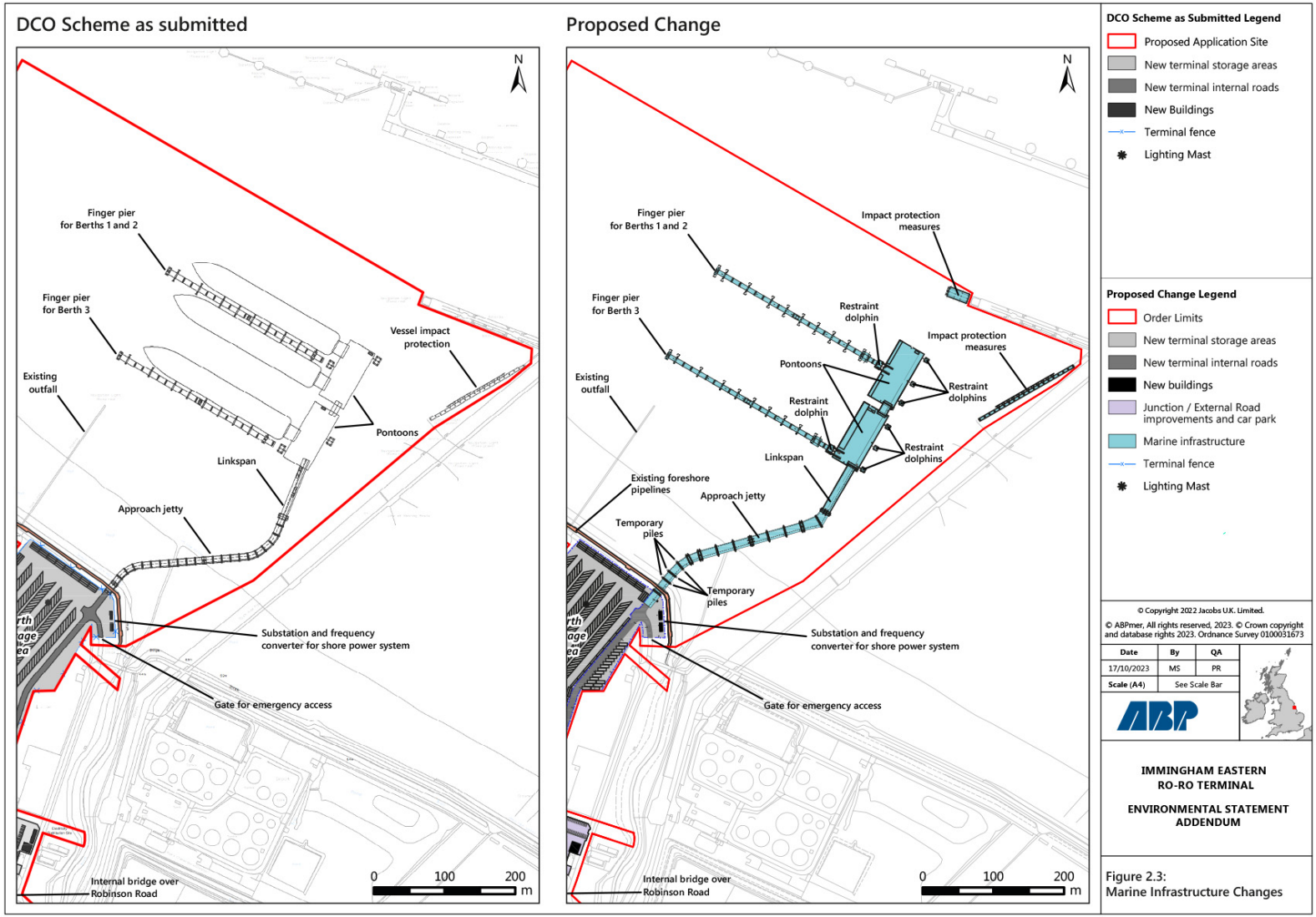

Figure 2.3. Proposed Change relating to marine infrastructure (Proposed Change 1 and Proposed Change 4)

2.3 Proposed Change 2: Realignment and shortening of the IERRT internal 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 was 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 with a maximum height of 11 m above the ground. The maximum width of the bridge would not increase.

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.

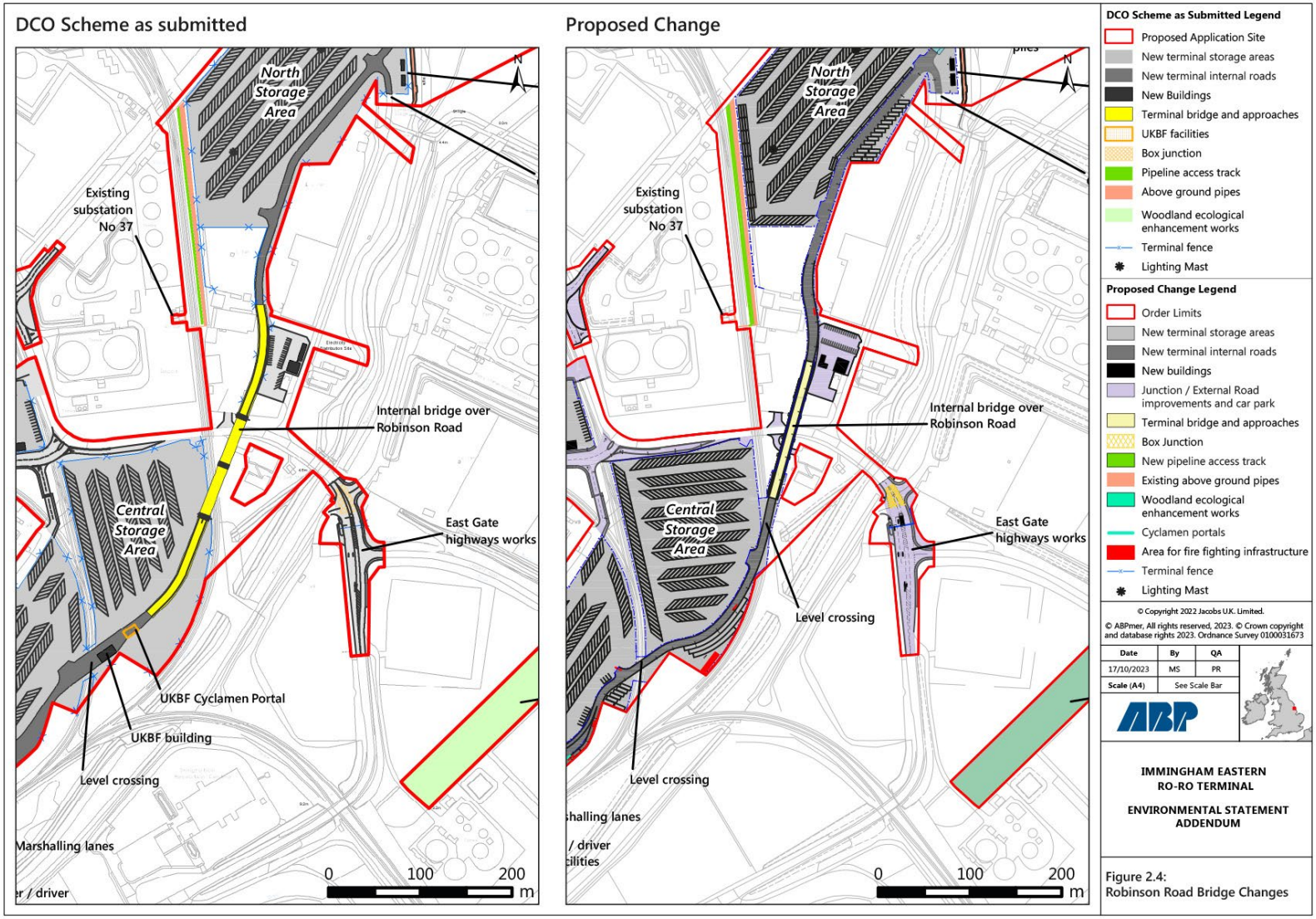

Figure 2.4. Proposed Change 2: Realignment and shortening of the IERRT internal bridge

2.4 Proposed Change 3: 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 between 17 m and 25.5 m in width x 79 m and remains within the limits of deviation as set out in Works Order no. 5. Additionally, it is proposed that the UKBF customs car search bays and Vehicle X-ray scanning are upgraded to X-Ray HGV's Building (33 m x 8.5 m) and Car Search Facility (41 m x 10.5 m) although these remain within the maximum footprint stated in Appendix 2.3 [APP-078] and in Chapter 2 of the ES, and remain within the limit of deviation as set out in Works Order no. 5

2.4.3 Amendments are, as a consequence, being made to the location of the UKBF buildings 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 Search Building:** A minor relocation of the building is proposed within the limits of deviation with no change in size;
- **Cyclamen Portal**: A minor relocation of the portal closer to the UKBF buildings is proposed within the limits of deviation to improve operational efficiency with no change in size; and
- **Passport Control Booth**: 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.

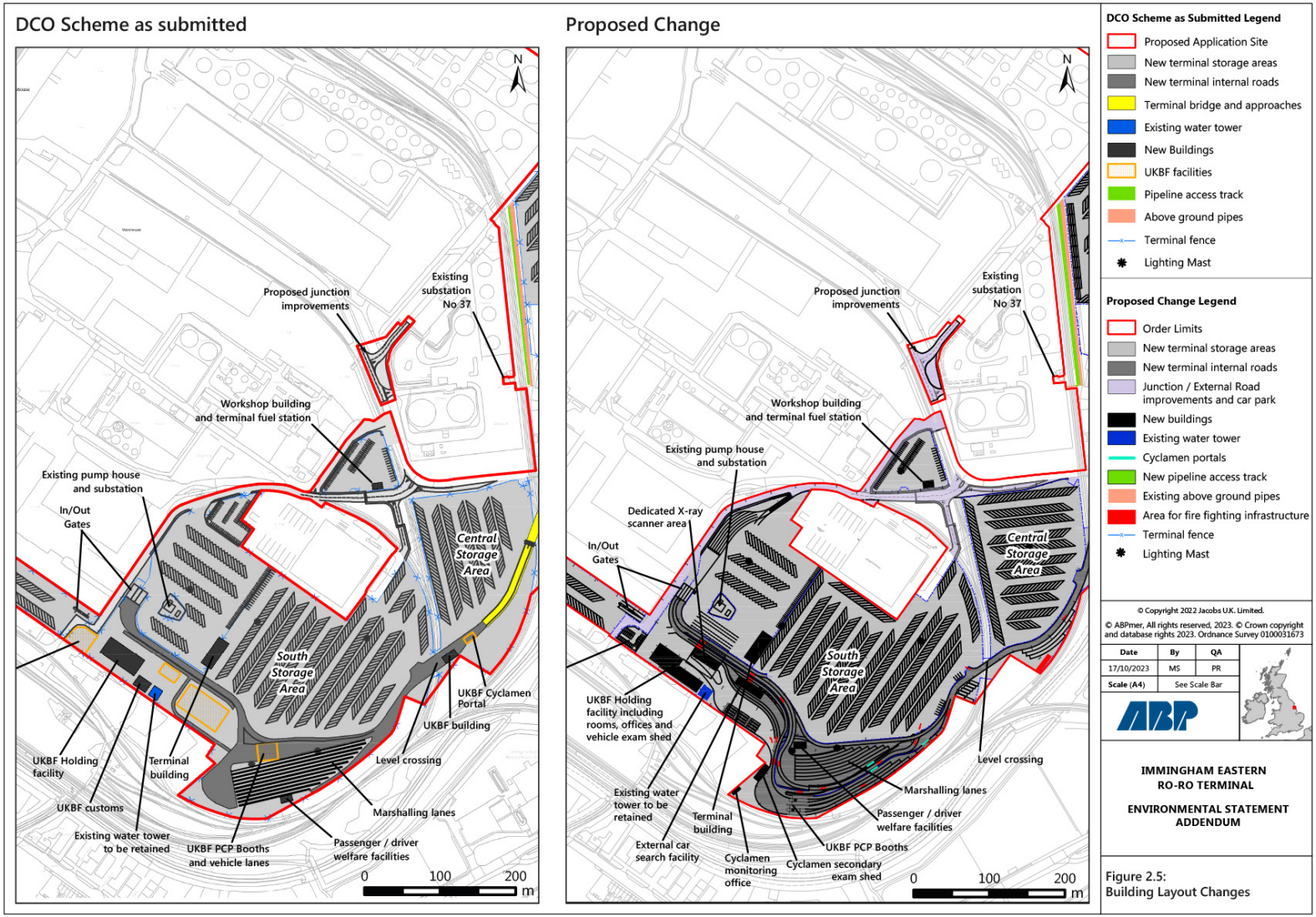

Figure 2.5. Proposed Change 3: Rearrangement of the UK Border Force facilities

2.5 Proposed Change 4: Options for the provision of revised marine impact protection measures and related works

2.5.1 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].

2.5.2 It is proposed that the impact protection measures would consist of an impact protection structure at the 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.

2.5.3 The IOT finger pier impact protection will be a piled dolphin structure consisting of a maximum of 12 piles of 1,520 mm diameter 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. 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.

2.6 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 2.2 and Appendix 2.3 will require updating and updated versions will be submitted with the Change Application. Appendix 2.1 is not affected by the Proposed Changes and does not require updating.

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 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 is 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. This is 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 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 described in the 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 vessel impact protection measures, 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 m³	8 %
Concrete (Precast)	7,800 m³	5 %
Reinforcement	20,200 tonnes	5 %
Steel pontoon	8,000 tonnes	2%
Steel buildings	6,000 tonnes	2 %
Cement stabilised subgrade and sands	150,000 m³	8 %
Aggregates	60,000 m³	10 %
Asphalt	81,000 tonnes	8 %
Demolition material	7,000 m³	75 %
Waste or spoil	94,000 m³	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.

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 requirements for IOT

3.3.4 The Applicant is proposing the publication of enhanced navigational management controls with a view to regulating the management of vessels arriving at or departing from the IERRT berths.

3.3.5 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 which will be on the basis that tug assistance will be deployed for vessel arrivals to Berth 1 during an ebb tide where circumstances so demand.

Storage areas

3.3.6 Further design refinements have been undertaken in order to 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 1,699 (up from 1,430); whilst container ground slots have increased to 65 (up from 40).

3.4 Updates required to figures

3.4.1 No figures in Volume 2 of the ES relating to Chapter 3 of the ES [APP-061] require updating following the Proposed Changes set out in Chapter 2 and Chapter 3 of this ESA.

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.

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 Updates required to ES Chapter 4

4.2.1 The Proposed Changes to the IERRT project and the reasoning behind why they are being sought by ABP are explained in Chapter 2 of this document. That reasoning is not repeated here.

4.2.2 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 evolution of the IERRT proposal designed to further minimise impacts and improve constructability.

4.3 Updates required to figures

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

4.4 Updates required to appendices

4.4.1 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].

4.4.2 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 Updates to ES Chapter 5

5.2.1 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 ES Chapter of the ES.

5.2.2 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, in particular at BGC 1.4 in the Applicant's Response to the ExA's First Written Questions [REP2-009].

5.2.3 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.

5.3 Updates required to figures

5.3.1 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.

5.4 Updates required to appendices

5.4.1 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 Updates required to ES Chapter 6

6.2.1 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. However, additional assessment work has been undertaken, where necessary, to assess the environmental impacts. This is detailed in Chapter 7 to Chapter 20 of this ESA.

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

6.3 Updates required to figures

6.3.1 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.

6.4 Updates required to appendices

6.4.1 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.

6.4.2 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, 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), Nature Conservation and Marine Ecology (Chapter 9), Commercial and Recreational Navigation (Chapter 10) and Coastal Protection, Flood Defence and Drainage (Chapter 11).

7.2 Updates required to impact assessment

7.2.1 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.

7.2.2 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 (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.

- 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

7.2.3 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.

7.2.4 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, which show the baseline flows and predicted changes over peak flood and ebb tides, respectively.

7.2.5 Following the updated impact assessment, the conclusion reached in the ES still holds true. In summary, 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 proposed dredge depths). 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

7.2.6 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.

7.2.7 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, 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, which show the baseline wave heights and predicted changes over the range of wave return period events and approach directions.

7.2.8 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

7.2.9 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.

7.2.10 In summary, 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.

7.2.11 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) result in associated increases to bed shear stress (BSS) (Figure 7.4). 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 shows the difference in bed thickness change against the baseline, with negative values indicating areas of either increased erosion or of reduced accretion.

7.2.12 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 the 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).

7.2.13 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

7.2.14 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.

7.2.15 In summary, 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.

7.3 Updates required to figures

7.3.1 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).

7.4 Updates required to appendices

7.4.1 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].

7.4.2 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.

7.5 Impact assessment summary

7.5.1 Table 7.1 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 7.1. 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		
Construction phase				
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
Operational phase				
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**

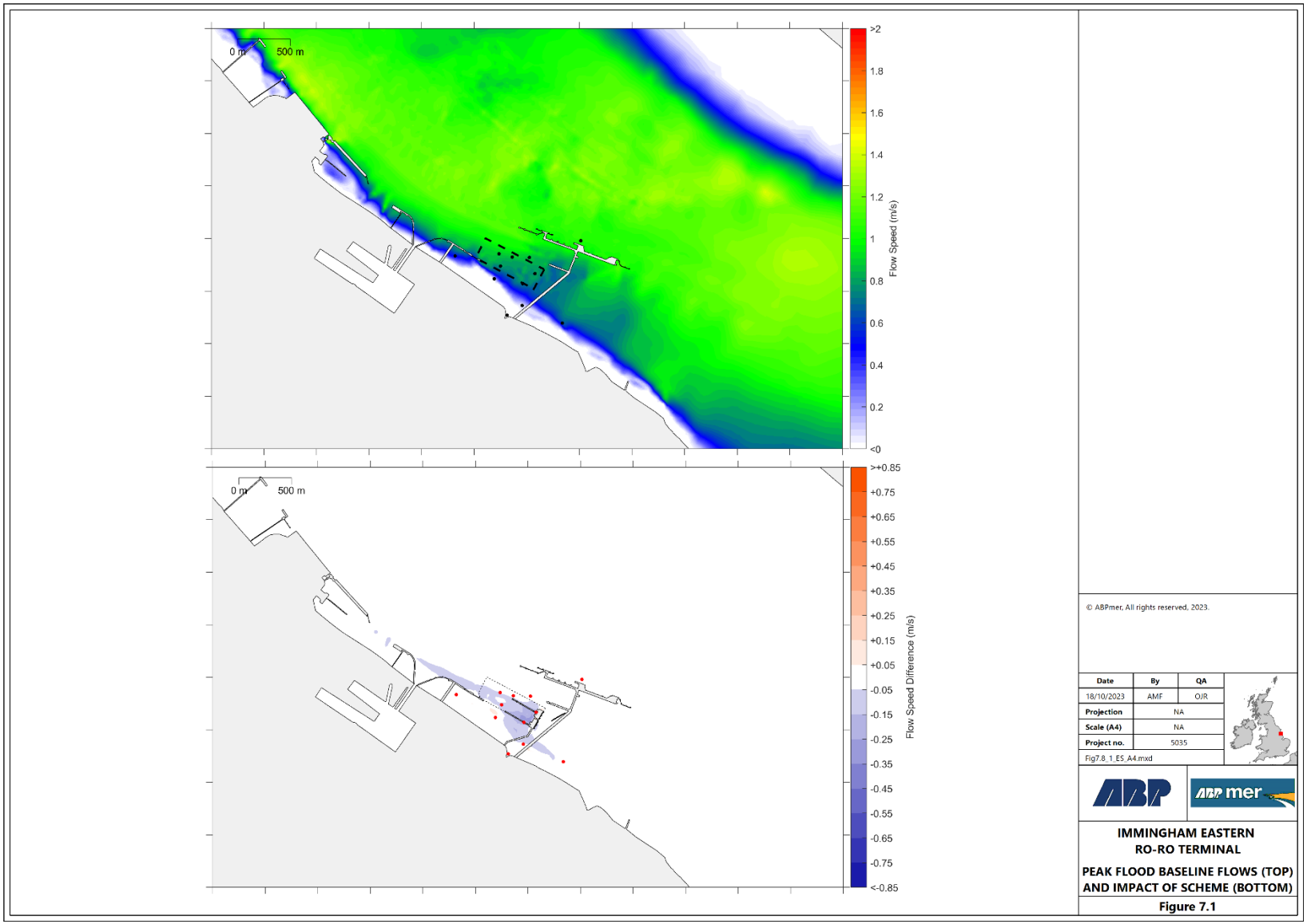

Figure 7.1. Peak flood baseline flow speed and predicted change

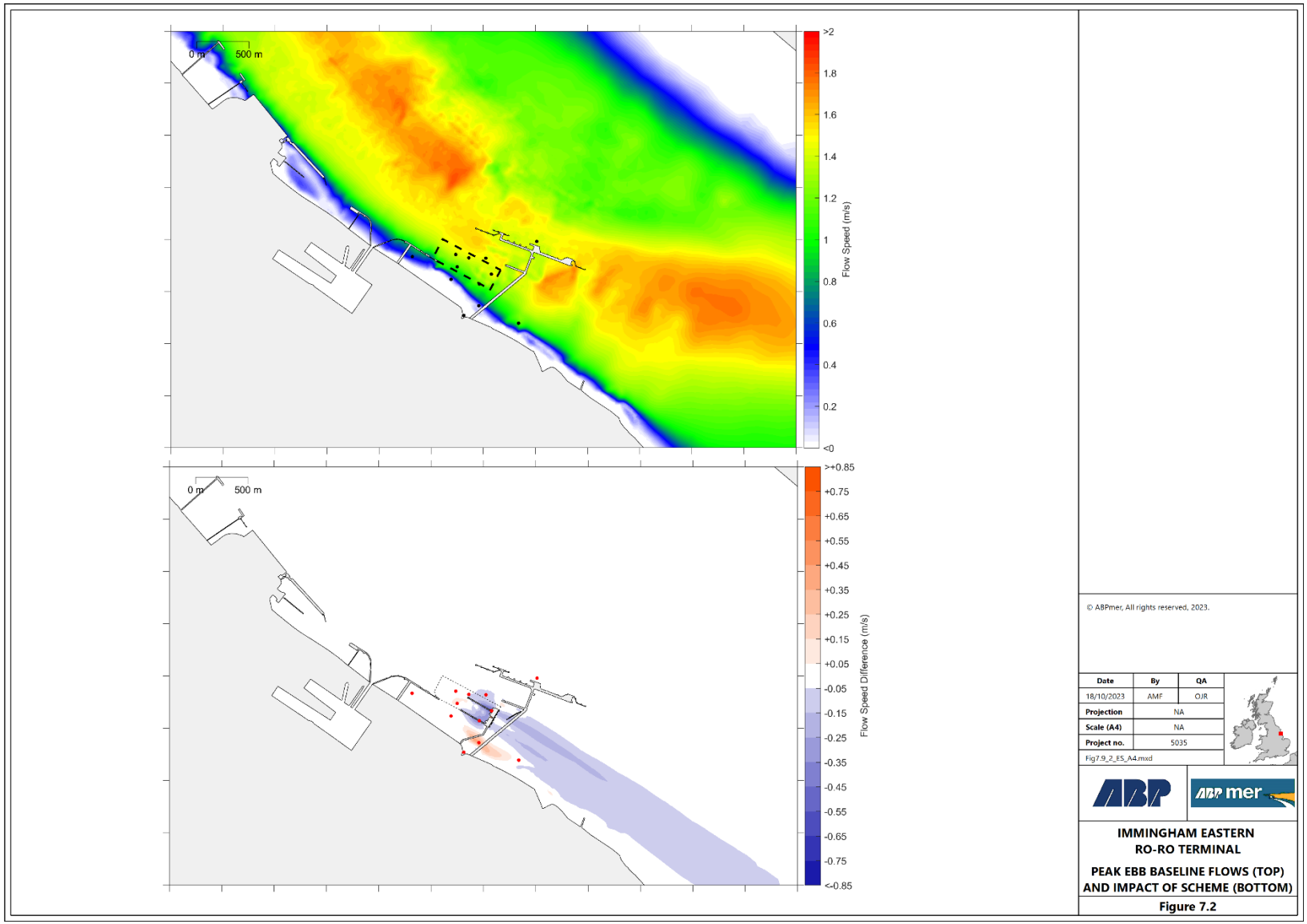

Figure 7.2. Peak ebb baseline flow speed and predicted change

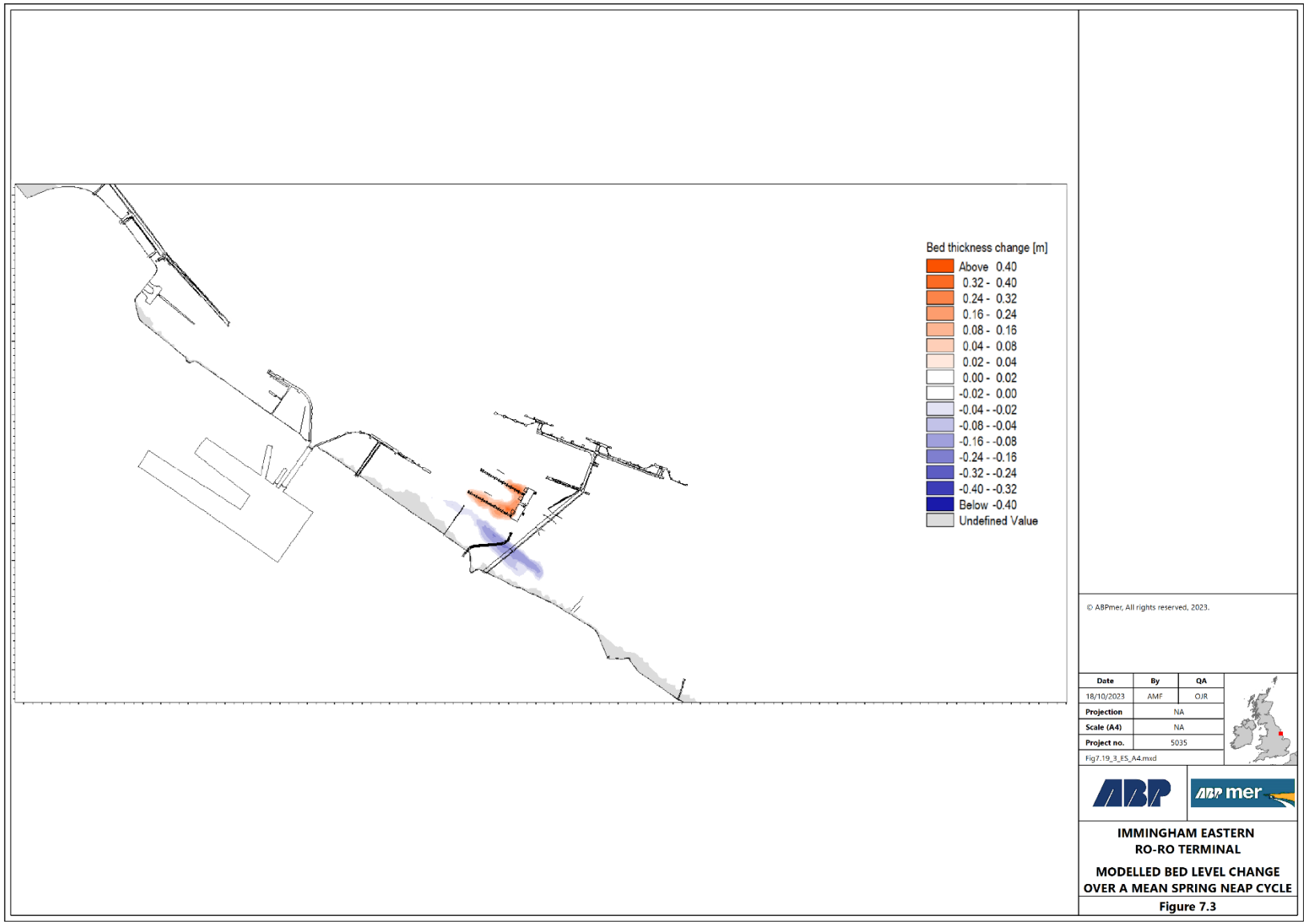

Figure 7.3. Modelled bed level change over a mean spring-neap cycle

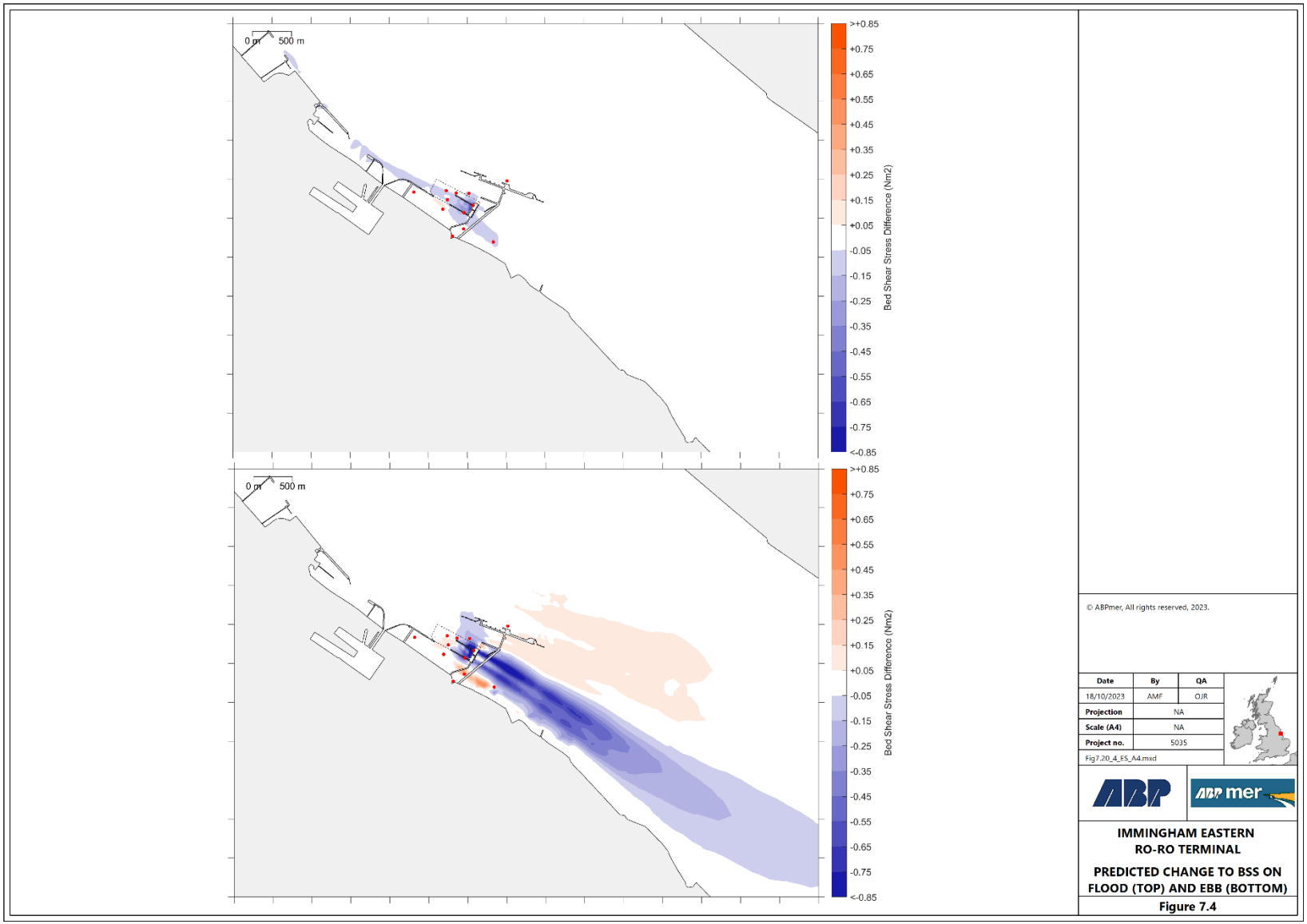

Figure 7.4. Predicted change to BSS on flood and ebb tides

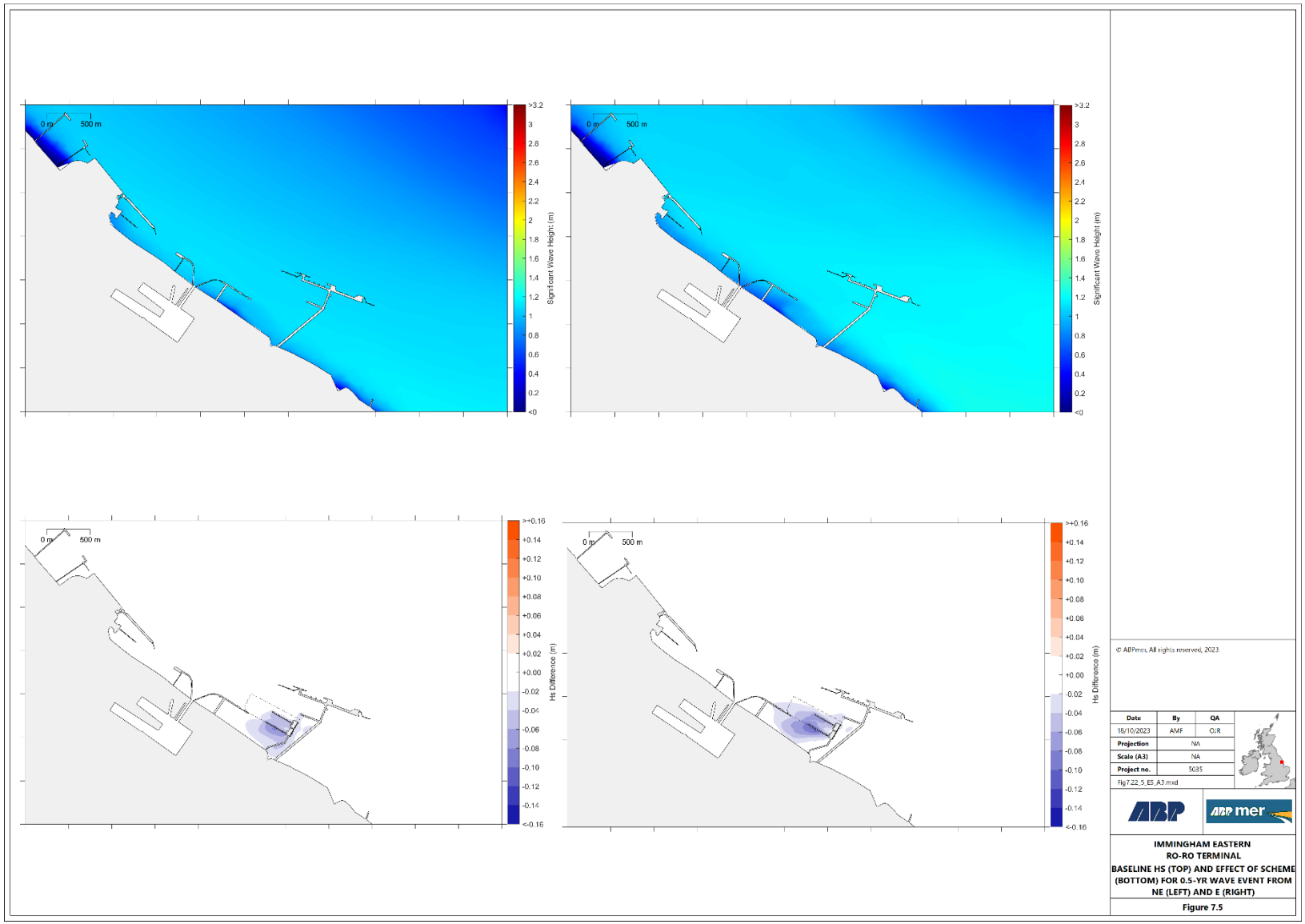

Figure 7.5. Baseline wave height and effect of scheme for 0.5 yr wave event from northeast and east directions

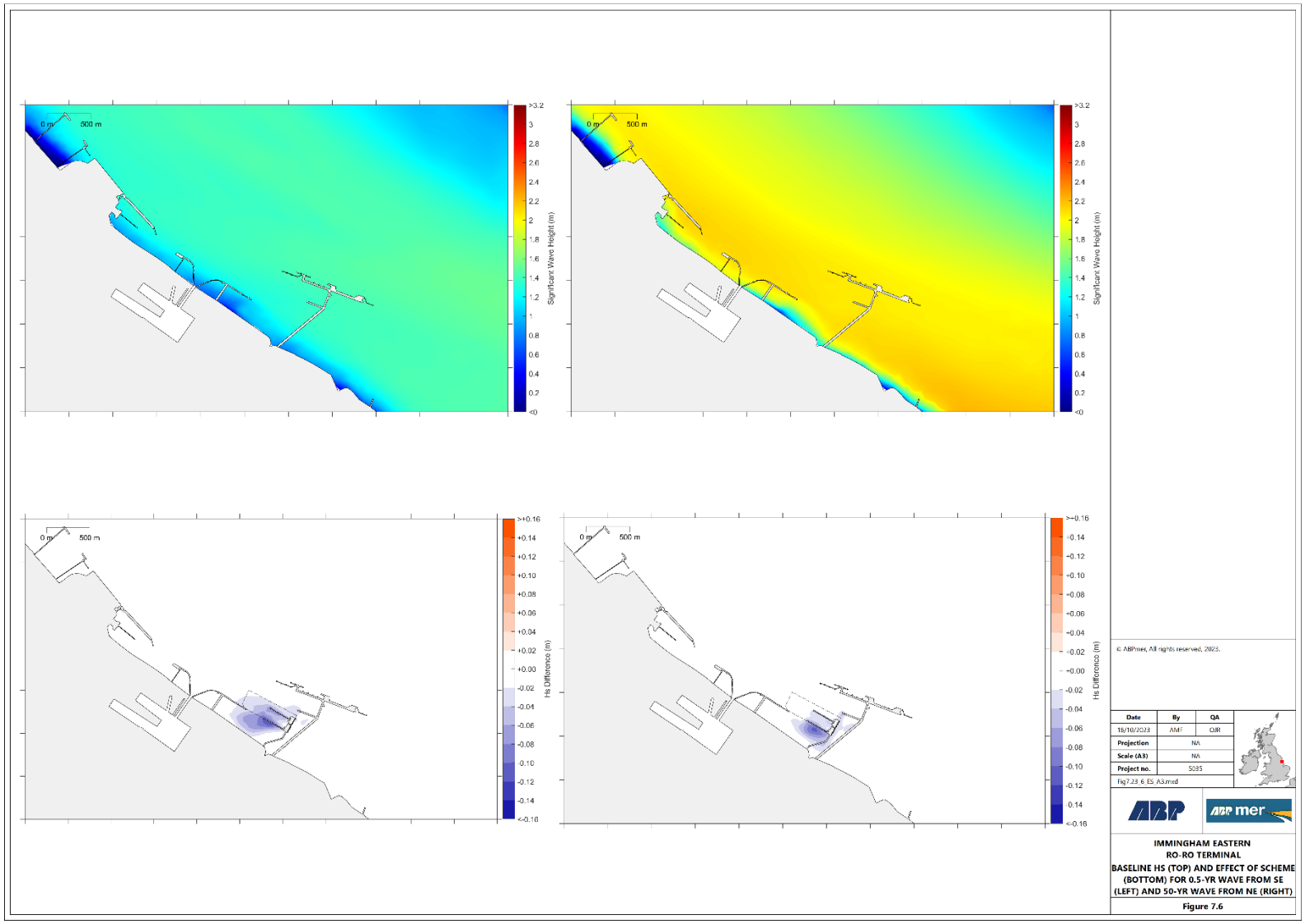

Figure 7.6. Baseline wave height and effect of scheme for 0.5 yr wave event from southeast and 50-yr wave event from northeast directions

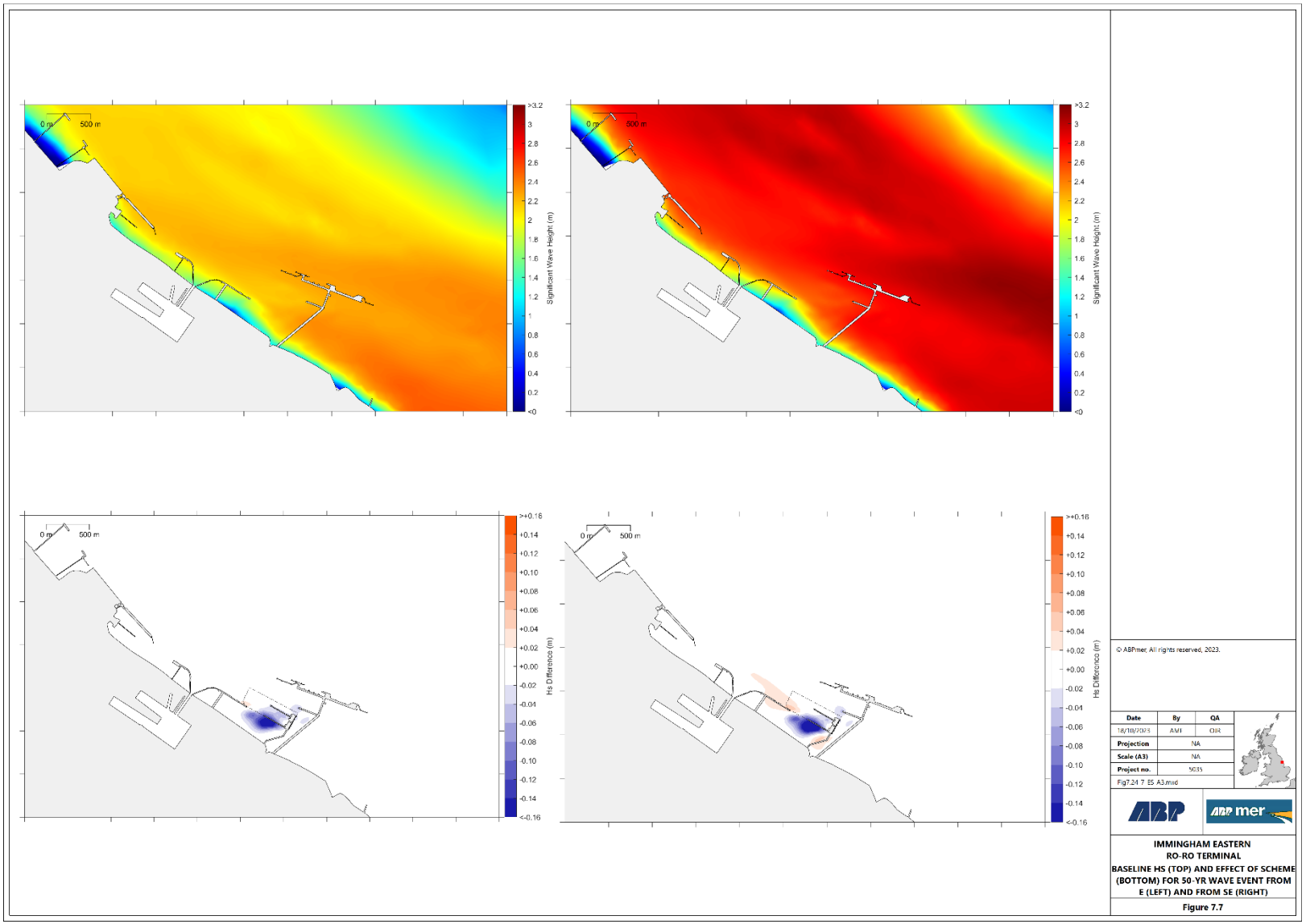

Figure 7.7. Baseline wave height and effect of scheme for 50 yr wave event from east and southeast directions

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, 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 Updates required to impact assessment

8.2.1 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.

8.3 Updates required to figures

8.3.1 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.

8.4 Updates required to appendices

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

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

8.5 Impact assessment summary

8.5.1 Table 8.1 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 8.1. 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				
Construction phase				
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
Operational phase				
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 Updates required to impact assessment

9.2.1 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.

9.2.2 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

9.2.3 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.

9.2.4 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.

9.2.5 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

9.2.6 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.

9.2.7 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.

9.2.8 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 0.031 ha as a result of the Proposed Changes.

9.2.9 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

9.2.10 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.

9.2.11 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.

9.2.12 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).

9.2.13 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

9.2.14 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

9.2.15 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.

9.2.16 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

9.2.17 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.

9.2.18 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.

9.2.19 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

9.2.20 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.

9.2.21 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.

9.3 Updates required to figures

9.3.1 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).

9.4 Updates required to appendices

9.4.1 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].

9.4.2 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.

9.5 Impact assessment summary

9.5.1 Table 9.1 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.

9.6 Updates required to Habitats Regulations Assessment Report

9.6.1 As noted in Section 9.2 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.

9.6.2 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 9.1. 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				
Construction Phase				
Benthic habitats and species				
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**
Fish and shellfish				
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
Marine mammals				
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**
Coastal waterbirds				
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**
Operational Phase				
Benthic habitats and species				
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
Coastal waterbirds				
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 of 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. Analysis of incident data show an annual frequency of 183.4 incidents with the most frequent incident type being categorised as 'equipment failure (vessel)'.

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 Updates required to impact assessment

10.2.1 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.

10.2.2 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 tanker manoeuvring on/off IOT finger pier with IERRT on flood tide;
- Allision of barge manoeuvring on/off IOT finger pier with IERRT of flood tide; and
- Allision of Ro-Ro with the finger pier while manoeuvring on/off berth 1 of the IERRT on an ebb tide.

10.2.3 At this stage, it is not possible to reassess these risks as they will need to be reviewed through comprehensive stakeholder engagement, in the same way that the Navigational Risk Assessment (NRA) was produced [APP-089]. This will be undertaken during the consultation phase following the Change Notification.

10.2.4 However, to assist in this process, the potential changes to the assessment outcomes are briefly outlined below for each risk. It should be stressed that until further consultation has been undertaken, the following suggestions should only be viewed as possible outcomes of stakeholder engagement.

- Allision of tanker manoeuvring on/off IOT finger pier with IERRT on flood tide:
  - The likelihood of the worst credible outcome may be reduced; and
  - The likelihood of the most likely outcome may change to reflect glancing contact with the impact protection.

- Allision of barge manoeuvring on/off IOT finger pier with IERRT of flood tide:
  - The likelihood of the worst credible outcome may be reduced; and
  - The likelihood of the most likely outcome may change to reflect glancing contact with the impact protection.

- Allision of Ro-Ro with the finger pier while manoeuvring on/off berth 1 of the IERRT on an ebb tide:
  - Significant reductions to a range of scenarios due to impact protection measures preventing contact with finger pier.

10.3 Updates required to figures

10.3.1 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.

10.4 Updates required to appendices

10.4.1 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].

10.4.2 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.

10.4.3 However, there is a need to assess the navigational environment with respect to a Ro-Ro vessel, coastal tanker, or bunker barge manoeuvring to their respective berths. This will be done by further consultation, further navigation simulations, and promulgation of hazard logs following stakeholder engagement.

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 Updates required to impact assessment

11.2.1 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.

11.2.2 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.

11.2.3 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.

11.3 Updates required to figures

11.3.1 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.

11.4 Updates required to appendices

11.4.1 The appendix relating to Chapter 11 of the ES is Appendix 11.1 – Flood Risk Assessment [APP-093].

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

11.5 Impact assessment summary

11.5.1 Table 11.1 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 11.1. 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				
Construction phase				
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
Operational phase				
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 Updates required to impact assessment

12.2.1 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.

12.3 Updates required to figures

12.3.1 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.

12.4 Updates required to appendices

12.4.1 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].

12.4.2 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.

12.5 Impact assessment summary

12.5.1 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				
Construction phase				
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
		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. 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.		

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
Groundwater (Bedrock Contamination): Lateral and vertical migration (including as a result of piling) of contamination through leachate, groundwater or surface run off	Moderate/ large adverse (significant)	A GI has been undertaken in May 2022 to confirm baseline conditions and a risk assessment has been undertaken based on the GI data. A confirmatory GI – to inform the detailed design – is being undertaken and will be completed soon after submission of the Development 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	Neutral/ slight adverse (not significant)	**None**

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
		incorporated in the final remediation strategy for the project, the outline for which is provided as Appendix 12.4. Construction works will be carried out in accordance with the CEMP. 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.		
Groundwater (Superficial Contamination): Lateral and vertical migration (including as a result of piling) of contamination through leachate, groundwater or surface run off	Slight adverse (not significant)	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	Neutral/ slight adverse (not significant)	**None**

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

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.		
Operational phase				
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 (NO_2) 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 Updates required to impact assessment

13.2.1 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.

13.2.2 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.

13.2.3 The impact pathway assessed in Section 13.8 of Chapter 13 of the ES [APP-049] that has the potential to be affected by the 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.

13.2.4 The following sections provide the updated impact assessment for this pathway in light of the Proposed Changes.

13.2.5 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

13.2.6 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 (NH_3), 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.

13.2.7 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.

13.2.8 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 NH_3, 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. ($\mu g/m^3$)[1]	NH_3 Conc. ($\mu g/m^3$)[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		**30**[2]	**1 – 3**[3]	**10 – 20**[4,5] **20 – 30**[6]

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 $\mu g/m^3$ 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

13.2.9 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 NH_3 and Table 13.4 for nitrogen deposition.

Table 13.2. Updated annual mean NO_X statisitics from onsite sources (nature conservation receptors)

Receptor ID	Future Baseline Concentration (µg/m³)[1,2,3]	Operational Concentration (µg/m³)[1,2,3]	Change in Concentration (µg/m³)[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/m³ 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 NH_3 statistics from onsite sources (nature conservation receptors)

Receptor ID	Future Baseline Concentration (µg/m³)[1,2,3]	Operational Concentration (µg/m³)[1,2,3]	Change in Concentration (µg/m³)[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/m³ Environmental Assessment Level and only 1 µg/m³ 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 – 30[7]**		

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.).

13.2.10 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.

13.2.11 Table 13.3 shows that the lower range of the air quality standard for NH_3 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.

13.2.12 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 kg/N/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.

13.3 Updates required to figures

13.3.1 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.

13.4 Updates required to appendices

13.4.1 The appendix relating to Chapter 13 of the ES is Appendix 13.1 – Construction Dust Assessment Methodology [APP-101].

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

13.5 Impact assessment summary

13.5.1 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				
Construction phase				
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**
Operational phase				
Human health and amenity sensitive receptors: Onsite emissions sources (marine vessels, land-tugs and Heavy Goods Vehicle (HGV) movement emissions)	Insignificant	Marine Vessels: - Compliance with appropriate emission standards - Sulphur dioxide (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**
Human health and amenity sensitive 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**

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**

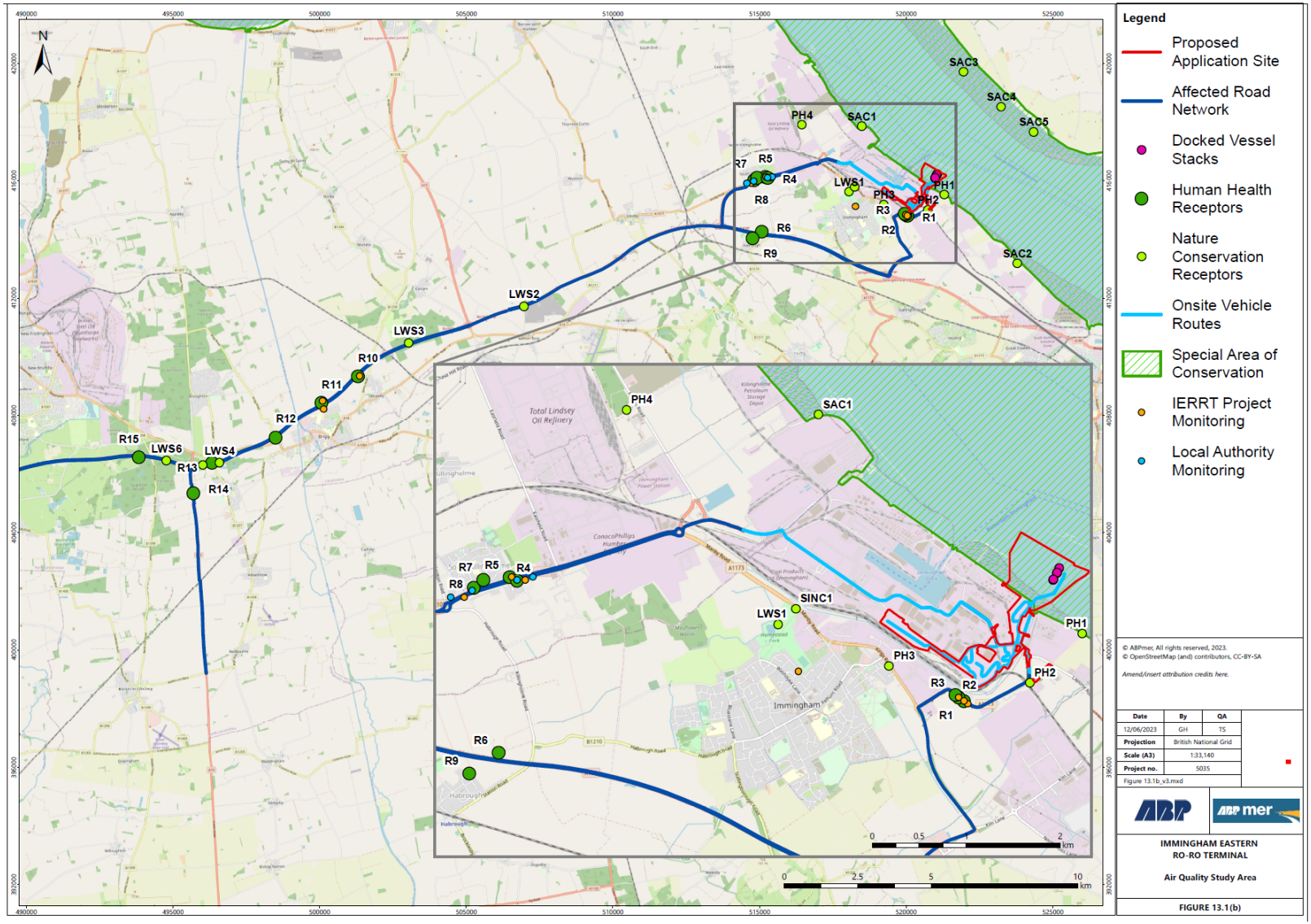

Figure 13.1. Air quality study area

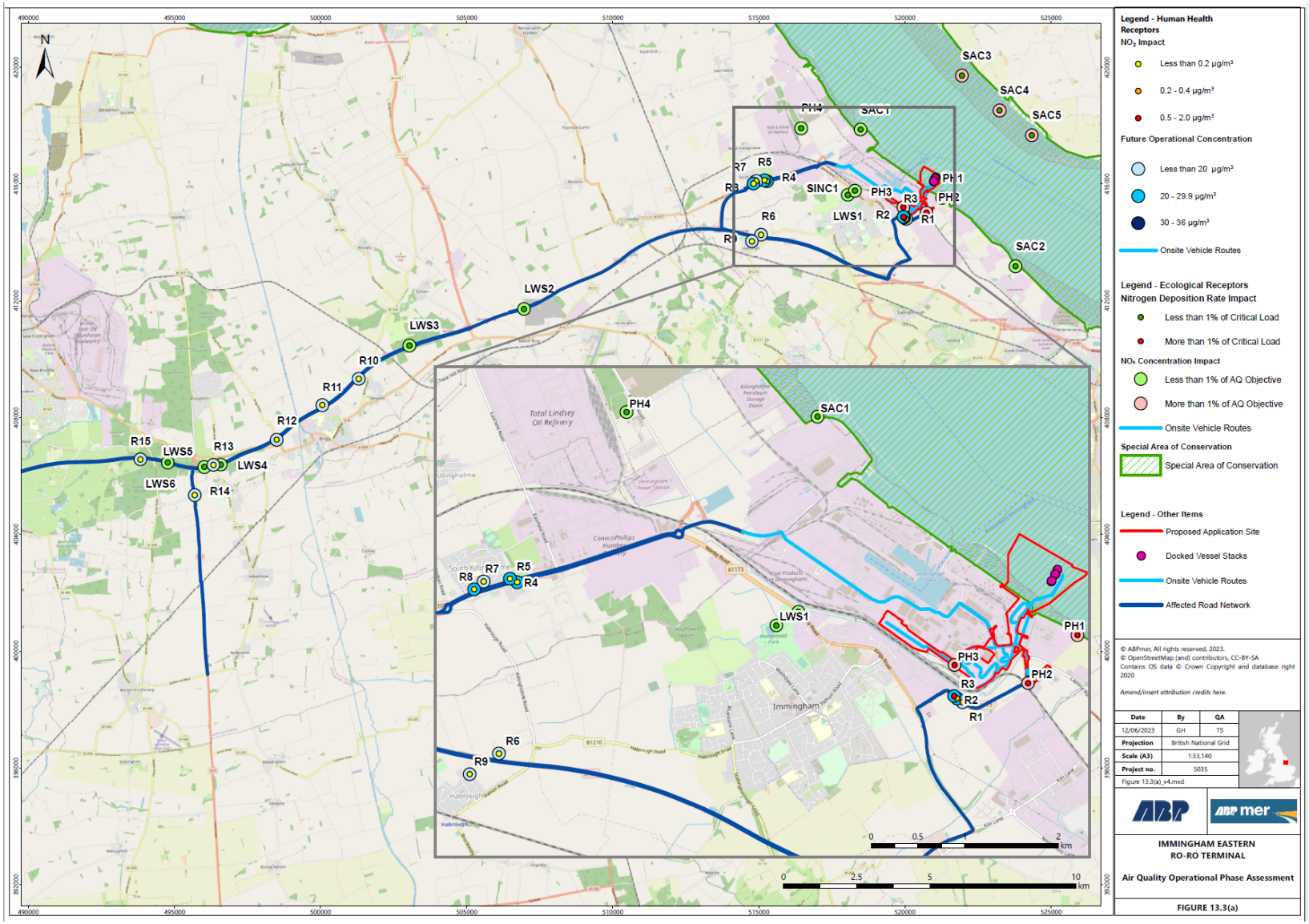

Figure 13.2. Air quality operational phase assessment

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 Updates required to impact assessment

14.2.1 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.

14.2.2 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.

14.2.3 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.

14.2.4 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.

14.2.5 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.

14.2.6 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

14.2.7 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 $L_{Aeq,12\ hr}$ 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].

14.2.8 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 maybe required to pile to refusal. As a worst-case scenario both methods of piling have been included in the assessment.

14.2.9 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 µPa, free-field				

14.2.10 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 $L_{Aeq,12\ hr}$ 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 $L_{Aeq,12\ hr}$ lower cut-off level	PK Construction office building	Difference compared with 65 dB $L_{Aeq,12\ hr}$ lower cut-off level	Nippon Gas office building	Difference compared with 65 dB $L_{Aeq,12\ hr}$ lower cut-off level	Relocated Malcolm West Office building	Difference compared with 65 dB $L_{Aeq,12\ hr}$ 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 µPa, free-field								

14.2.11 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

14.2.12 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.

14.2.13 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

14.2.14 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].

14.2.15 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

14.2.16 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

14.2.17 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.

14.2.18 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.

14.2.19 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

14.2.20 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).

14.2.21 For the marine works, the piling will be vibro-piling to refusal and then percussive piling techniques to reach the final level.

14.2.22 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.

14.2.23 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].

14.2.24 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.

14.2.25 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.

14.2.26 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

14.2.27 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.

14.2.28 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**.

14.2.29 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].

14.2.30 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.

14.2.31 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

14.2.32 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.

14.2.33 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.					

14.2.34 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.

14.2.35 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.

14.2.36 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.

14.2.37 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

14.2.38 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.

14.3 Updates required to figures

14.3.1 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.

14.4 Updates required to appendices

14.4.1 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].

14.4.2 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 A of this ESA.

14.5 Impact assessment summary

14.5.1 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				
Construction phase				
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
		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. 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.		

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

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
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 and doors facing the IERRT closed.	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
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**

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 Updates required to impact assessment

15.2.1 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.

15.3 Updates required to figures

15.3.1 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.

15.4 Updates required to appendices

15.4.1 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].

15.4.2 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.

15.5 Impact assessment summary

15.5.1 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				
Construction phase				
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**
Operational phase				
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 Updates required to impact assessment

16.2.1 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).

16.2.2 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.

16.2.3 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.

16.2.4 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.

16.2.5 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.

16.2.6 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.

16.3 Updates required to figures

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

16.4 Updates required to appendices

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

16.5 Impact assessment summary

16.5.1 Table 16.1 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 16.1. 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				
Construction phase				
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**
Operational Phase				
Employment	Moderate beneficial (significant)	N/A	Moderate beneficial (significant)	**None**
GVA	Minor beneficial (not significant)	N/A	Minor beneficial (not significant)	**None**
Impact on local services and infrastructure	Negligible (not significant)	N/A	Negligible (not significant)	**None**

Impact pathway	Impact significance in ES	Mitigation measures in ES	Residual impact in ES	Changes to impact significance
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 Updates required to impact assessment

17.2.1 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.

17.3 Updates required to figures

17.3.1 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.

17.4 Updates required to appendices

17.4.1 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].

17.4.2 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.

17.5 Impact assessment summary

17.5.1 Table 17.1 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 17.1. 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				
Construction phase				
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**
Operational phase				
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 Updates required to impact assessment

18.2.1 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.

18.2.2 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 includes lorry drivers accompanying their load who are effectively members of the public who may be present in that area - 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).

18.3 Updates required to figures

18.3.1 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.

18.4 Updates required to appendices

18.4.1 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.

18.5 Impact assessment summary

18.5.1 Table 18.1 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 18.1. 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 Updates required to impact assessment

19.2.1 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).

19.2.2 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.

19.2.3 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

19.2.4 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.

19.2.5 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 pontoon which has a total single trip distance of 353 km.

19.2.6 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.

19.3 Updates required to figures

19.3.1 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.

19.4 Updates required to appendices

19.4.1 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.

19.5 Impact assessment summary

19.5.1 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				
Construction phase				
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**
Operational Phase				
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 Updates required to impact assessment

20.2.1 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].

20.2.2 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].

20.3 Updates required to figures

20.3.1 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.

20.4 Updates required to appendices

20.4.1 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.

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Abbreviations/Acronyms

Acronym	Definition
ABP	Associated British Ports
AEOI	Adverse Effect on the Integrity
AEZs	Archaeological Exclusion Zones
AIS	Automatic Identification System
APIS	Air Pollution Information System
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
HGV	Heavy Goods Vehicle
HSE	Health and Safety Executive
IAQM	Institute of Air Quality Management
ICCI	In-combination Climate Change Impacts
ID	Identity
IDB	Internal Drainage Board
IERRT	Immingham Eastern Ro-Ro Terminal
IOH	Immingham Outer Harbour
IOT	Immingham Oil Terminal
JNCC	Joint Nature Conservation Committee
LCRM	Land Contamination Risk Management
LiDAR	Light Detection and Ranging
LWS	Local Wildlife Site
MCZ	Marine Conservation Zone
MLWS	Mean Low Water Springs
NH_3	Ammonia
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
NPPF	National Planning Policy Framework
NRA	Navigational Risk Assessment
NSR	Noise Sensitive Receptors

Acronym	Definition
PAD	Protocols for Archaeological Discoveries
PAM	People Asset Management Ltd
PH	Priority Habitats
PINS	Planning Inspectorate
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
SPA	Special Protection Area
SRN	Strategic Road Network
SSC	Suspended Sediment Concentration
SSSI	Site of Special Scientific Interest
tCO2e	tonnes of Carbon Dioxide equivalent
UK	United Kingdom
UKBF	UK Border Force
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: 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.

The table below provides a list of indicative construction plant and associated sound power levels (Lw)

Table A.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

Plant item	Source	Number in Operation	Total Sound power level (L_{wA}) dB
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
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

Plant item	Source	Number in Operation	Total Sound power level (L_{wA}) dB
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
Trailor	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)

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