

REPORT

Boston Alternative Energy Facility – Environmental Statement

Chapter 18 Navigational Issues

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Table of Contents

18	Navigational Issues	1
18.1	Introduction	1
18.2	Legislation, Policy and Guidance	2
18.3	Consultation	5
18.4	Impact Assessment Methodology	18
18.5	Scope	20
18.6	Existing Environment	22
18.7	Potential Impacts	29
18.8	Cumulative Impacts	51
18.9	Transboundary Impacts	55
18.10	Inter-Relationships with Other Topics	55
18.11	Interactions	56
18.12	Summary	56
18.13	References	61

Table of Tables

Table 18-1	Summary of Consultation Undertaken During the Pre-Application Stage with Specific Regard to Navigation	6
Table 18-2	Sensitivity Criteria and Definition	19
Table 18-3	Magnitude Criteria and Definition	19
Table 18-4	Key Information Sources	21
Table 18-5	Vessel Traffic and Tonnage Data for the Port of Boston, 2014-2019 (Department for Transport, 2020)	23
Table 18-6	Typical and Maximum Dimensions of Vessels Visiting the Port of Boston	24
Table 18-7	Summary of Main Vessels Used Within the Haven	28
Table 18-8	Summary of Projects considered for the CIA in Relation to Navigational Issues	52
Table 18-9	Potential cumulative Impacts with the Boston Barrier Project	53
Table 18-10	Interaction Between Impacts	56
Table 18-11	Impact Summary	58

Table of Plates

Plate 18-1 Berth Location in Relation to the Navigation Channel at the Southern end of the Wharf

42

Table of Figures

Figure 18.1 Port of Boston Extents

Figure 18.2 The Haven Navigation

Figure 18.3 Location of Port of Boston Berths

Executive Summary

The Boston Alternative Energy Facility (the 'Facility') is proposed to be located on banks of The Haven, which is a tidally influenced waterway.

The construction, operation and decommissioning of the proposed Facility have the potential to result in impacts to existing users of The Haven from a navigation perspective.

Part of the infrastructure for the Facility will be a new 400 m wharf, which will have three berthing points to receive vessels that will visit the Facility. Two of the berths will be dedicated to the delivery of refuse derived fuel (RDF); one berth will be dedicated to the loading of lightweight aggregate produced by the lightweight aggregate (LWA) plant within the Facility, and also for the receipt of dredged material and / or clay, which is used as a binder in the production of the lightweight aggregate at the Facility.

The anticipated size of vessels used for the handling of materials to / from the proposed Facility will be similar to the cargo and commercial vessels that currently use The Haven and visit the Port of Boston; with an anticipated length of 100 m, bearing a load of approximately 2,500 tonnes for RDF to 3,000 tonnes for aggregate. All vessels will be required to access the Facility at or around the high tide. It is anticipated that vessels will depart on the following high tide. All vessels will require a pilot to guide the vessel to the berth from The Wash and return.

There is no means of turning the vessels at the proposed Facility, therefore, there will be a requirement to turn vessels either in the Wet Dock at the Port of Boston, or at the Knuckle point just outside the Wet Dock.

A Navigational Impact Assessment (NIA) is presented in this Chapter which has been developed in consultation with key stakeholders in the area, including the Port of Boston, the local fishing fleet and other river users to appropriately and proportionately assess the significance of potential impacts. The findings of this chapter will inform a Navigational Risk Assessment (NRA) which will consider current controls to mitigate risks and further controls that could be adopted to minimise risk as low as reasonably practicable. This will be developed in consultation with the Port of Boston after the Environmental Statement is submitted with the Development Consent Order (DCO) application. The findings of the NRA will inform the Navigational Management Plan (NMP), which is secured through a requirement of the DCO.

Four navigational receptors were identified which regularly use The Haven; the Port of Boston and Pilots, the fishermen, other commercial users and recreational users. Potential impacts to navigational safety arising from the construction of the Facility were

identified to include the installation of the wharf, capital dredging, installation of scour protection, the presence of lighting and the importation of construction materials by barge. The establishment of a Navigation Management Plan (NMP), and implementation of Notice to Mariners (NtM), would ensure all mariners were aware of any safety impacts. Use of construction lighting would be designed carefully to reduce any light pollution up or down The Haven. Following the incorporation of mitigation measures all construction phase effects were assessed as being of either minor or negligible significance.

Operational impacts were determined to include risks to navigation through the increase in number of vessels using The Haven and using the turning circle, the presence and operation of the wharf, maintenance dredging, operational lighting and the accidental release of materials (i.e. RDF bales).

Effective use of communication methods, including the NMP, NtM and the installation of message boards on The Haven advising of vessel movements was determined to mitigate the presence and operation of the wharf as well as maintenance dredging activities to negligible significance. As with construction lighting, operational lighting will be designed to reduce light spill up or down the Haven to avoid reducing visibility and impacting navigational safety and a residual minor significant effect is predicted. To mitigate any potential impact from the release of material into The Haven, a catch-screen or net will be provided under the crane-arm to catch any dropped RDF bale, or any material that could potentially spill from a damaged bale. This mitigation measure will reduce the residual effect to a negligible significance.

The increase in the number of vessels using The Haven and the turning circle as a result of the operation of the Facility, can be mitigated through the implementation of effective communication channels between the Port, the fishermen and all other users of The Haven within an agreed NMP. The residual impact of these impacts to the Port and Pilots, other commercial users and recreational users was found to be of minor to negligible significance, however the residual impact to the fishermen is of moderate significance.

No cumulative or transboundary impacts have been identified.

18 Navigational Issues

18.1 Introduction

- 18.1.1 This chapter of the Environmental Statement (ES) describes the existing environment in relation to commercial and recreational navigation and identifies the potential impacts which could arise during the construction, operation and decommissioning phases of the Boston Alternative Energy Facility (the 'Facility').
- 18.1.2 Consultation with the Port of Boston in November 2018 confirmed that the most appropriate mechanism to assess the potential impacts to existing navigation would be via a Navigational Risk Workshop. An initial workshop to discuss the methodology, receptors and potential impacts was held on 27 March 2019. The workshop was attended by scheme designers, key representatives/stakeholders at the Port of Boston and key individuals responsible for the completion of the impact assessment. At the workshop it was agreed that the content of the final Navigational Impact Assessment (NIA) (this ES chapter), would be developed working with the Port of Boston. The findings of the NIA will then inform the subsequent Navigational Risk Assessment (NRA) which will be produced in consultation with the Port of Boston post-submission. The NRA which will consider current controls to mitigate risks and further controls that could be adopted to minimise risk as low as reasonably practicable. The findings of the NRA will inform the Navigational Management Plan (NMP), which is secured through a requirement of the DCO.
- 18.1.3 A further workshop was held with the Port of Boston on 17 July 2019 in which the potential impacts and the consequent magnitude of any effects arising from these impacts were discussed and agreed. Workshops have also been held with the Boston Pilots on 11 July 2019, Boston and Fosdyke Fishing Society on 26 July 2019, and the Boston Belle and the Inland Waterways Authority on the 6 November 2019 to discuss the potential impacts.
- 18.1.4 Further meetings were held with the Boston and Fosdyke Fishing Society (14 August 2020) and Port of Boston (10 September 2020) to provide updates on changes to the proposed scheme since the Preliminary Environmental Information Report (PEIR) was issued.
- 18.1.5 As such, this chapter of the ES builds on the content of the PEIR chapter and includes the assessment of potential impacts on navigation, proposes mitigation where required and assesses any cumulative impacts.

18.2 Legislation, Policy and Guidance

Legislation

International Regulations for the Prevention of Collisions at Sea (COLREGs) (1972)

18.2.1 The International Regulations for the Prevention of Collisions at Sea (COLREGs) (International Maritime Organisation, 1972) set out navigational rules to be followed by ships and other vessels at sea to prevent collisions between two or more vessels.

18.2.2 The COLREGs include 41 rules divided into six sections: Part A - General; Part B - Steering and Sailing; Part C - Lights and Shapes; Part D - Sound and Light signals; Part E - Exemptions; and Part F - Verification of compliance with the provisions of the Convention. There are also four Annexes containing technical requirements concerning lights and shapes and their positioning; sound signalling appliances; additional signals for fishing vessels when operating in close proximity, and international distress signals.

The Boston Harbour Acts and Revision Order 1812 to 1989

18.2.3 The combination of the Boston Corporation Acts 1812 to 1935 and The Boston Harbour Revision Order 1989 (HMSO, 1989) designated Port of Boston Limited as the Harbour Authority for the Boston port, harbour, dock and anchorage areas in The Wash (**Figure 18.1** and **Figure 18.2**).

Merchant Shipping Act 1995

18.2.4 The Merchant Shipping Act 1995 (HMSO, 1995) consolidated the Merchant Shipping Acts 1894 to 1994 and amongst the many provisions, designated each Harbour Authority as the Local Lighthouse Authority within its area.

National Planning Policy

National Policy Statement for Ports

18.2.5 The National Policy Statement for Ports (Department for Transport, 2012) does not provide any guidance or policy with regard to assessment of impacts to commercial navigation. It specifies thresholds for Port projects that would be considered Nationally Significant Infrastructure Projects (NSIPs) on their own merits. The wharf requirements for the Facility do not meet the thresholds, so the policy implications for the Facility will instead be directed by the policies identified below.

Marine Policy Statement

18.2.6 As outlined within the UK Marine Policy Statement (MPS) (Defra, 2011) (authorised by Section 44 of the Marine and Coastal Access Act (HMSO, 2009)), port development may result in an increase in shipping activity. When considering any potential increase in shipping activity, the MPS states (in Paragraph 3.4.10) that:

“marine plan authorities and decision makers should ensure that the social and economic benefits and environmental impacts are taken into account and that impacts are considered in line with sustainable development principles”.

18.2.7 The MPS also states (in Paragraph 3.4.7) that marine plan authorities (in England, the Marine Management Organisation (MMO)) and decision makers should:

“take into account and seek to minimise any negative impacts on shipping activity, freedom of navigation and navigational safety and ensure that their decisions are in compliance with international maritime law”.

18.2.8 As outlined in Paragraph 3.4.6 of the MPS, environmental impacts arising from shipping activity can be through:

“accidental pollution from ships in the course of navigation or lawful operations, pollution caused by unlawful operations or physical damage caused by collisions”.

18.2.9 The impact assessment which will be undertaken within the ES in consultation with the Port of Boston will address the requirements of the MPS.

18.2.10 The MPS goes on to state (in Paragraph 3.4.6) that:

“other pressures on the environment from shipping activity relate to noise and airborne emissions”.

18.2.11 These potential impacts (specifically noise and airborne emissions) are assessed within the following chapters within this ES (**Chapter 10 Noise and Vibration** and **Chapter 14 Air Quality**), where they are relevant to the proposed Facility.

The East Marine Plan

18.2.12 Through the Marine and Access Coastal Act 2009 (HMSO, 2009), the UK Government introduced several measures to deliver its vision of

“clean, healthy, safe, productive and biologically diverse oceans and seas”.

18.2.13 These measures included the introduction of a marine planning system. Marine Plans, together with the MPS, underpin the new planning system for England’s seas.

18.2.14 Policy PS3 of the East Marine Plan (Defra, 2014) directly addresses navigational impacts. The Marine Plan aims to ensure safe and commercially viable navigation in the seas as well as in the ports and their approaches, consistent with the National Policy Planning Framework (NPPF) and NPS for Ports. Policy PS3 from the East Marine Plan is repeated below for reference.

Policy PS3

Proposals should demonstrate, in order of preference:

- a) that they will not interfere with current activity and future opportunity for expansion of ports and harbours.*
- b) how, if the proposal may interfere with current activity and future opportunities for expansion, they will minimise this.*
- c) how, if the interference cannot be minimised, it will be mitigated.*
- d) the case for proceeding if it is not possible to minimise or mitigate the interference.*

18.2.15 The requirements of Policy PS3 will be taken into account within the impact assessment. The Navigational Risk Workshop was undertaken to discuss the significance of potential impacts and any requirements for mitigation to reduce any potential impacts to within acceptable levels, the findings of which are presented in **Section 18.7** of this chapter.

Local Planning Policy

South-East Lincolnshire Local Plan 2011-2036

18.2.16 The South-East Lincolnshire Local Plan (SELLP) (South-East Lincolnshire Joint Strategic Planning Committee, 2017)) was adopted by the South-East Lincolnshire Joint Strategic Planning Committee on 8 March 2019. The Plan has five main principles: Sustainable Development; Economy; Housing; Environment and Transport. The Plan will guide development in south-east Lincolnshire between 2011 and 2036.

18.2.17 The considerations of Policy ED2 of the Boston Local Plan 1999 were subsumed within a number of policies, including Policy 2: Development Management, Policy

3: Design of New Development, Policy 7: Improving South-East Lincolnshire's Employment Land Portfolio, Policy 28: The Natural Environment, Policy 30: Pollution, and Policy 33: Delivering a More Sustainable Transport Network.

18.2.18 Within Policy 28, paragraph 7.2.11 a project to link Lincoln and Ely with an inland waterway has involved the construction of a lock to link the tidal section of The Haven with the Black Sluice navigation. This project is tourism related and will encourage mariners to visit the area, as well as connecting habitats.

18.2.19 Policy 33 refers directly to the Port of Boston in C:5 by making a provision to ensure the continuous and safe operation of the Port of Boston and the Port of Sutton Bridge.

18.2.20 As such the SELLP ensures that the accessibility of The Haven is maintained for both recreational and commercial uses.

Guidance

18.2.21 The main guidance document that will be considered in the impact assessment in the ES is the Harbour Approach Channels Design Guidelines (PIANC, 2014). Due to the nature of The Haven – a long narrow waterway with tidal restrictions - it is not considered to be a 'typical' harbour, and as such these guidelines will be used with caution. Any conclusions drawn from them will be consulted on with the Port of Boston to ensure they are applicable and proportionate to navigation within The Haven.

18.3 Consultation

18.3.1 Consultation undertaken throughout the pre-application phase has informed the approach taken and the information presented in this chapter of the ES. **Table 18-1** provides a summary of the comments received from The Planning Inspectorate within the Environmental Scoping Opinion (The Planning Inspectorate, 2018) with specific regard to navigation. **Table 18-1** also summarises the outcomes of the meetings held with the Port of Boston and the Boston and Fosdyke Fishing Society in 2018, 2019 and 2020.

Table 18-1 Summary of Consultation Undertaken During the Pre-Application Stage with Specific Regard to Navigation

Consultee and Date	Response	Chapter section where consultation comment is addressed
<p>The Planning Inspectorate Scoping Opinion (July 2018)</p>	<p>The Scoping Report states that information presented in the Boston Barrier ES is deemed applicable to the Boston Alternative Energy Facility because the document refers to the same area of the River Witham (The Haven) and was produced recently (August 2016). The Scoping Report does not provide sufficient detail about the Boston Barrier to allow confidence that this is the case. The ES should contain details of the Study area used for the assessment and demonstrate how any existing data used has been applied to the assessment.</p>	<p>A justification for the evidence used in support of this assessment is presented in Section 18.5.</p>
	<p>The baseline information within the ES should be accurate and fully reflect the existing environment including the existing infrastructure and activities that take place on the River Witham. The baseline information should include anticipated traffic volumes and vessel type.</p>	<p>The baseline environment is presented in Sections 18.5 and 18.6 of this chapter. Please also see Chapter 5 Project Description of the ES.</p>
	<p>The ES must set out the assumptions on which the assessment is based in relation to estimation of operating tonnage and ship movements, and the use of tugs for vessels etc. Where elements are unknown and flexibility is sought, e.g. the number of vessels operation to deliver feedstock, the Inspectorate advises that the ES should assess a worst case scenario and that the ES should explain how this has been determined with respect to navigational concerns.</p>	<p>Chapter 5 Project Description of the ES provides details on the vessel sizes and numbers on which this assessment is based.</p> <p>The NRA and subsequent impact assessment is based on the worst case scenario (WCS) for the construction and operation phases.</p>

Consultee and Date	Response	Chapter section where consultation comment is addressed
	<p>The ES should include an assessment of likely significant effects resulting from impacts on existing activities including dredging and vessel users. As part of this, the ES should provide details of how the wharf will be constructed, including the anticipated timescales and any restrictions on the main river. The Inspectorate considers that lighting from a navigation perspective should also be considered within the ES, and any significant effects assessed.</p>	<p>Please refer to Chapter 5 Project Description of the ES for details on construction of the wharf including anticipated timescales. The impact assessment is presented in Section 18.7. Impact 2 considers construction of the proposed wharf restricting navigation on The Haven.</p>
	<p>The Scoping Report provides minimal information regarding the routing of ships bringing feedstock to the Application Site. The ES should explain the assumptions with regards to the likely source of ships delivering the materials and provide an assessment of the associated impacts these movements may have on existing users of the River Witham.</p>	<p>Please refer to Chapter 5 Project Description of the ES for the anticipated UK port locations the RDF is expected to be delivered from. An assessment of the any associated impacts to existing users of the Haven is assessed and is presented within Section 18.7. Proposed methodology for this assessment is defined in Section 18.4.</p>
	<p>The MMO welcomes the intention in 6.11.20 [of the Scoping Report] to supplement the Navigational Impact Assessment by consultation and would expect consultees to include the RYA and local boat and canoe clubs.</p>	<p>Noted. A meeting with the RYA and local boat and canoe clubs was requested, however, no response was forthcoming.</p>
<p>Port of Boston (July 2018)</p>	<p>A major capital dredging campaign is an essential ingredient in the construction of the new wharf facility, including dredging within and directly adjacent to the main navigation channel. The Port is concerned that the Scoping Report understates this impact, since in order to facilitate safe access for ships onto the newly created river berths, significant dredging will be needed, including extensive transitions upstream and downstream of the facility.</p>	<p>The impact of dredging is fully assessed within the NRA, in consultation with the Port of Boston and other river users and is presented within Section 18.7 (construction impact 1 and operation impact 4). Impacts to hydromorphology, as assessed within Chapter 16 Estuarine Processes, have been used to inform this assessment.</p>

Consultee and Date	Response	Chapter section where consultation comment is addressed
	<p>Whilst the Port accepts the relevance of the Boston Barrier ES to the Boston Alternative Energy Facility project, and that it provides some relevant data upon which to rely, it may not bound the full range of issues that are relevant to this project, and therefore it should be considered informative only, rather than assuming that it remains a reliable baseline.</p>	<p>We have used this information to inform our understanding of the baseline (Section 18.6) and have supplemented this in consultation with the Port of Boston.</p>
	<p>The predominant users of the river are the commercial shipping and the fishing fleet. Recreational traffic and other commercial activity, e.g. tripper boats, is extremely small by comparison.</p>	<p>The statement is noted. Impacts to recreational users have been assessed in consultation with local users and organisations and are reported in the NRA and presented in Section 18.7.</p>
	<p>The description [given in paragraph 6.11.8 of the Scoping Report] is not accurate as the timings of fishing vessel and recreational vessel movements can and do occur at other times to those indicated. The prescriptive description is unhelpful and not representative of the range and timings of movements.</p>	<p>A description of the timings of fishing and recreational vessel movements has been updated following consultation with the Port of Boston and the Boston and Fosdyke Fishing Society (see Section 18.6).</p>
	<p>It is the Harbour Authority that is responsible for the control of shipping. We note that Port of Boston Pilots report to Port Control their position in the river at dedicated reporting points, however, Port Control does not routinely use VHF to notify other river users of shipping movements.</p>	<p>This information is noted and included in Section 18.6.</p>
	<p>The description of the river lights is incorrect [in paragraph 6.11.10 of the Scoping Report]. We note that the river benefits from navigational aids in accordance with Trinity</p>	<p>An updated description of the river lights is provided in Section 18.6.</p>

Consultee and Date	Response	Chapter section where consultation comment is addressed
	House protocols, with Port of Boston being the Local Lighthouse Authority.	
	The tonnage described [in paragraph 6.11.11 of the Scoping Report] are inconsistent with the vessel size indicated elsewhere. We note that 2,500 tonne deadweight vessels with low draught would be more suitable for calling at the port in the majority of tidal conditions.	Please refer to Chapter 5 Project Description of the ES for an updated project description and information on the vessels anticipated to be used at the Facility. Vessels will arrive and leave around the high tide only.
	The potential impacts described exclude: - the impact on passing vessels - the impact on swinging vessels.	Section 18.7 assesses the potential impacts on passing and swinging vessels.
	The Port could not accept reduced manoeuvrability or river width post completion of the project.	This statement is noted. The potential impact of manoeuvrability and reduced river width has been discussed at the March 2019 workshop and will be included within the design of the scheme.
	The Port advises that a Navigation Impact Assessment is carried out, which contains a Navigation Risk Assessment. The Navigation Impact Assessment should look to identify mitigation to inform the detailed design, the construction methodology and construction sequencing. The Navigation Impact Assessment should be carried out in conjunction with the Harbour Authority. Further the Port advises that the Navigation Impact Assessment might be used to inform the development of a Navigation Management Plan that would set out the procedures to be followed and the aids to navigation to be provided to mitigate the risks to navigation	Following an initial meeting with the Port of Boston in November 2018 it was agreed to hold a workshop with the Port to discuss the potential impacts of the project and define appropriate mitigation. This workshop was held on the 27 March 2019 and has influenced all parts of the chapter.

Consultee and Date	Response	Chapter section where consultation comment is addressed
	<p>arising from the construction and operation of the Boston Alternative Energy Facility.</p> <p>Lighting of a large gasification plant this close to the river could have an adverse effect on the safety of navigation and should therefore be scoped into the EIA.</p>	<p>The ES Chapter 5 Project Description covers lighting issues.</p> <p>This impact is considered in full in Section 18.718.7, with the significance of impacts determined through consultation with the Port of Boston and other river users throughout the impact assessment process.</p>
Port of Boston (November 2018)	The Boston Barrier project will upgrade the 'Knuckle' and widen the in-river turning circle which will facilitate in-river turning of vessels. The project is also widening the entrance to Wet Dock and as such the size of vessel entering Wet Dock will increase to 16.5 m in the beam. The maximum draught of vessels will also increase. Wet Dock will be closing in 2020 for this work/	This information is noted and included in Section 18.6 .
Port of Boston (March 2019)	The Harbour River Order covers the Port's anchorage points in The Wash as well (i.e. it extends further than the end of The Haven). Note that these anchorage points should be identified in any Figure that represents the Study area for Navigation.	The Port of Boston anchorage points have been included in Figure 18.1 .
	There are some acts which have not been included (1812 Act, Boston Docks Act, Docks, Piers and Clauses Act)	These have been noted and included in Section 18.2 .
	The Harbour Approach Guidelines (PIANC) are not specific to each river so reference to them should be used carefully.	This is reflected in Section 18.2 .

Consultee and Date	Response	Chapter section where consultation comment is addressed
	Specifically, with reference to river width guidelines, The Haven is likely to be narrower than recommended guidelines.	
	Port of Boston tide timetables should be used as a reliable data source. They use the Boston Sill data. The Sill data should always be quoted alongside any references to AOD when presenting tide data.	All reference to tides and water depth in this chapter are referred to in Ordnance Datum and Boston Sill datum.
	<p>The Port had the following comments on Section 18.6:</p> <ul style="list-style-type: none"> • The port's dredger has a plough/hopper attachment; • Currently the port dredges 20-30,000 tonnes. Their licence allows up to 60,000 tonnes; • The theoretical maximum draught of vessels is 7 m however, the practical maximum is around 6.3-6.4 m; • There are 26 fishing vessels licenced at the Port of Boston; and, • There may be more than 12 Marine leisure cruises – should meet these to confirm. 	These are all reflected in Section 18.6 and a meeting with the Boston Belle and Inland Waterways took place on 6 November 2019.
	<p>The Port had the following comments on Section 18.7:</p> <ul style="list-style-type: none"> • The assessment will have to consider the cumulative impacts such as lighting with the Boston One facility • The main construction related impacts that Port would want to avoid include, closure of navigation, minimising dredging from ships and would want piling to be done from the shore as well. • The Port expects that this project will require no closure to river traffic. 	<p>These are considered in full in Section 18.7.</p> <p>The project team has also confirmed with the Port that there will not be any closures of the river during construction of the Facility. The requirement for maintenance dredging is assessed within Chapter 16 Estuarine Processes.</p>

Consultee and Date	Response	Chapter section where consultation comment is addressed
	<ul style="list-style-type: none"> The Port was also concerned that construction and operation could lead to an increased requirement of maintenance dredging the channel. 	
Port of Boston (July 2019)	The Port of Boston requested that the requirement for a Navigation Management Plan would be added to the ES chapter in order to ensure that navigational issues are managed.	The requirement for a Navigational Management Plan is proposed in Section 18.7 .
	The Port requested that the Pilots should be identified as receptors in their own right because they are self-employed	The Port of Boston Pilots have been added as a receptor in Section 18.6 and considered as such in the impact assessment (Section 18.7). A meeting with the Pilots was held in July 2019.
	<p>The Port provided information on how they would define the Port's sensitivity to each potential impact. The significance of the potential impacts was discussed and agreed with the Port. Activities which the Port expressed concern for included:</p> <ul style="list-style-type: none"> Use of lighting during construction and operation; Increased number of vessels using The Haven; Reduction in river width at the southern end of the proposed wharf; and Increased use of the in-river turning circle. 	The outcome of the impact assessment discussed with the Port is provided in Section 18.7 .
Fosdyke Fishing Society (April 2019)	<p>The fishermen expressed concern for two main items:</p> <ul style="list-style-type: none"> A narrowing of the river width at the Facility would make it difficult for them to pass; and 	These impacts are included within Section 18.7 .

Consultee and Date	Response	Chapter section where consultation comment is addressed
	<ul style="list-style-type: none"> Increased use of the turning circle would delay them leaving or returning to their berths. 	
Fosdyke Fishing Society (July 2019)	<p>The fishermen expressed concerns of the sediment plume created during dredging mobilising harmful sediments and damaging marine life in The Haven, causing a significant impact to the livelihood of the fishermen.</p>	<p>The behaviour of the sediment plume is assessed in Chapter 16 Estuarine Processes of the ES.</p> <p>Impacts to water and sediment quality of The Haven and the Wash are discussed in Chapter 15 Marine Water and Sediment Quality.</p> <p>Impacts to marine ecology are discussed in Chapter 17 Marine and Coastal Ecology.</p>
	<p>The significance of other impacts arising from the construction and operation of the proposed Facility were discussed and agreed with the fishermen. Activities which fishermen expressed concern for included:</p> <ul style="list-style-type: none"> Use of lighting during construction and operation; Increased number of vessels on The Haven; Increased use of the in-river turning circle; and Accidental release of material into the river. 	<p>The outcomes of this discussion are presented in Section 18.7.</p>
Boston and Fosdyke Fishing Society (January 2020)	<p>The tidal time window of 4 hours is optimistic. 3 hours would be more realistic and less than this on smaller tides. Swinging of vessels would need to take place close to or at high water. Tidal flows within The Haven often exceed 2.5 knots; flows of up to 6 knots at all states of the tide can occur during winter which would make swinging vessels in the channel dangerous.</p>	<p>The impact of swinging vessels on navigational receptors, including the fishermen is considered in Section 18.7.</p> <p>The impact assessment has been produced with the fishermen's concerns as a key consideration. Mitigation proposed is designed to reduce the likelihood of any interactions between vessels by using clear communication paths. The NMP would be produced in consultation with the fishermen.</p>
	<p>While vessels are turning fishing vessels will not be able to pass up or down the river. The fishermen have expressed</p>	

Consultee and Date	Response	Chapter section where consultation comment is addressed
	<p>concerns that when 26 fishing vessels return together and cannot get to unload or berth their vessels. A delay of 10 minutes can be the difference between reaching the fishing grounds and a lost day</p> <p>The passing distance between vessels of 10 m is proposed, however passing a 2500 tonne moving vessel, possibly at night or in poor visibility, would be dangerous.</p> <p>Should vessels berth before being turned they would have to cross the path of oncoming traffic which would be a dangerous manoeuvre.</p>	
<p>Boston and Fosdyke Fishing Society (August 2020)</p>	<p>There are 26 vessels working from Boston at the moment, they are moored on London road quay, which is approximately 300 m long, south quay which is approx. 100 m long and the quay at the bottom of St Ann's Lane approximately 180 m long, this is a total of 580 m of quay. We would require the equivalent length of quay wall at any relocation site. The site must have access for articulated lorries and the ability for them to turn plus parking for all fishermen's vehicle's, the site must have concrete quayside for unloading vessels and be secure and well lit, there must be power outlets and water connections to the site. The quay must be dredged down to dock sill level to allow the vessels to go to sea at all states of tide. These are the minimum requirements and are what the fishermen have at their current locations, a more precise list of requirements can be discussed, as we move forward. Relocation of the fishing fleet below the new proposed energy plant is the</p>	<p>The provision of alternative berthing points for the fishermen to relocate to is not part of this DCO. Any such development would be subject to a separate application for consent via the appropriate channels.</p> <p>Mitigation measures are proposed in Section 18.7 and as described above.</p>

Consultee and Date	Response	Chapter section where consultation comment is addressed
	only way the industry could continue to work in a safe and viable way when the plant becomes operational and to some extent while under construction.	
Inland Waterways Authority Meeting 6 November 2019	How many boats will be at the wharf? How wide are the boats? Is this side of the Haven (where the Facility will be situated) having extra flood defences installed? Will the wharf go back to the top of the flood bank? You'll need a de-silting process How many boats a year does the Port currently have? Is there a section 106 agreement or similar? We are currently involved in the Boston to Peterborough Wetland Corridor scheme which needs backing.	Proposed vessel dimensions and numbers are provided in Section 18.6 . The location of the wharf is provided in Chapter 5 Project Description . Issues relating to the flood defence line are provided in Chapter 13 Surface Water, Flood Risk and Drainage Strategy . Issues relating to siltation are covered in Chapter 16 Estuarine Processes . No agreements have been formalised yet relating to the proposed Facility. These are anticipated to be established in the post-submission stage of the consent determination.
Boston Belle Meeting 6 November 2019	More movements will keep river flowing better and prevent it silting up. More activity will be of interest to the Boston Belle customers.	Points noted.
Section 42 Consultation Response – BBC (6 th August 2019)	Concerns about impact on fishing, including; width of modern cargo ships meeting fishing boats in the river; cargo ships have a 3ft bow wave that can, and have, lifted a fishing boat then dumped it onto the mud bank, potentially causing a hazard were the boat to overturn; high mud banks each side of the river all the way to the cut end, a specialist	Please refer to Section 18.7 which assesses the potential impacts to navigational safety on The Haven during the construction and operation of the Facility which may affect the fishing fleet.

Consultee and Date	Response	Chapter section where consultation comment is addressed
	<p>dredging boat is required, Navigation of the river due to there being an S bend in the river; cargo boats turning at the knuckle/ getting stuck across the river.</p>	
	<p>We are mindful that Boston has two AQMAs in operation and we are concerned not to have received the detail in relation to traffic movements for both construction and operation that would enable the Council to fully assess the potential impact, including shipping traffic and how this may be mitigated. We require detailed traffic assessment information before the project progresses further to the next stage.</p>	<p>Vessel traffic movements required during the construction and operation of the proposed scheme are provided in Chapter 5 Project Description. An Air Quality assessment, which includes the emissions arising from vessel traffic and consideration of the AQMAs is presented in Chapter 14 Air Quality.</p>
	<p>What dialogue has there been with the Port as we are interested in the feasibility of boats turning at the knuckle noting the increased traffic proposed to transport the bales to the site and also at this stage, to take away aggregate.</p>	<p>The Port of Boston has been consulted with throughout. A record of this is provided within this table and the Consultation Report (document reference 5.1).</p>
	<p>We note the reference to the aggregate leaving by ship and a dedicated berth – how often will this ship leave and arrive in addition to bale shipping movements.</p>	<p>This information is provided in Chapter 5 Project Description and considered within the Impact Assessment in Section 18.7.</p>
<p>Section 42 Consultation Response – Lincolnshire Wildlife Trust (6th August 2019)</p>	<p>Increase in vessel / traffic movement. It would be useful to understand in more detail, how the assessment of the impact of increased vessel movements on harbour seal within The Wash has been considered. Please could this be provided to our marine specialist?</p>	<p>The potential impacts to marine mammals through the proposed increase in vessel traffic is considered within the Chapter 17 Marine and Coastal Ecology, specifically Section 17.8.</p>

Consultee and Date	Response	Chapter section where consultation comment is addressed
Marine Management Organisation (MMO), September 2020	The MMO would like to highlight that whilst a reduction in the use of vehicles is generally positive, any application should contain a robust consideration of the impacts of the construction of the early part of the wharf. This should include, but should not be limited to, the implications of the additional period of construction and changed timing of works, levels of vessel traffic and impacts to coastal processes.	Noted. The assessment has taken into account changes in timing and vessel numbers in comparison to the assessment completed for the PEIR.
Marine Management Organisation (MMO), September 2020	The MMO advises that any future application should contain a robust assessment of the relevant baselines, impacts and receptors. In particular, this should include any impacts which the proposed project could have upon local fisheries.	Noted; consultation has been ongoing with the Boston and Fosdyke Fishing Society and Eastern Inshore Fisheries and Conservation Authority throughout pre-application and impacts have been considered within this chapter.

18.4 Impact Assessment Methodology

18.4.1 The impact assessment draws upon the outcomes of the consultation meetings held with the Port of Boston, the Boston and Fosdyke Fishing Society and other users of the Haven. The impact assessment presented in this chapter will inform the NRA and the subsequent Navigational Management Plan which will be a dynamic document to be updated throughout the post-application phase and construction of the proposed facility.

18.4.2 The significance of potential impacts with regard to navigation will follow the impact assessment methodology set out below.

Receptors

18.4.3 The navigational receptors within The Haven are defined as the following:

- The Port of Boston;
- The Port of Boston Pilots;
- Fishermen;
- Other commercial operators; and
- Recreational users.

Sensitivity

18.4.4 A receptor can only be affected if there is a pathway through which a source impact can be transmitted between the activity and the receptor. When a receptor is exposed to an impact, the overall sensitivity of the receptor in a navigational context is determined through expert judgement and through consultation with stakeholders.

18.4.5 For the purposes of assessing the impact to receptors, sensitivity must be scored. The criteria range from low sensitivity to very high. The greater the business/safety/operational impact, and/or the lower the ability to adapt to the impact, the greater the sensitivity.

18.4.6 Types of impacts:

- Safety impact –a safety impact is classified as any impact that may influence the navigational safety of the receptor;
- Operational impact – is defined as any impact that affects the receptor’s day to day operation; and

- Business impact – is defined as any impact that affects the receptor's business and is considered in two ways – financial loss and loss of business reputation.

18.4.7 **Table 18-2** presents the sensitivity definitions used for this assessment.

Table 18-2 Sensitivity Criteria and Definition

Sensitivity	Definition
Very high	Very high level of safety/operational/business impact for navigation receptors. Very limited ability to adapt to impact
High	High level of safety/operational/business impact for navigation receptors. Limited ability to adapt to impact
Medium	Medium level of safety/operational/business impact for navigation receptors Some ability to adapt to impact.
Low	Low level of safety/operational/business impact for navigation receptors. Ability to adapt to majority of impact.
Very low	No impact to navigational receptors.

Magnitude

18.4.8 When assessing the magnitude of an impact, the geographical extent, the duration and the likelihood of occurrence of the impact will be considered.

18.4.9 Determining the overall magnitude of navigational impacts also incorporates a degree of subjectivity. The magnitude will be assessed based on professional industry experience in marine structures and navigation in combination with baseline data and consultation with stakeholders.

18.4.10 **Table 18-3** presents the definition of magnitude used in this assessment.

Table 18-3 Magnitude Criteria and Definition

Magnitude	Definition
High	Impacts a geographical area beyond The Haven. Impact present on a permanent basis, throughout the construction or operation of the Facility. Impact is very likely to occur.
Medium	Impact localised to the geographical area of The Haven. Impact present up to a few months (long duration), throughout the construction or operation of the Facility. Impact likely to occur.
Low	Impact localised to a geographical area limited to a section along The Haven (i.e. the future location of the wharf at the Facility). Impact present up to a few weeks (short duration). Impact unlikely to occur.
Very low	Impact is very unlikely to occur.

Impact significance

18.4.11 Based on the sensitivity of the receptor and the magnitude of the potential impact, the significance of the effect is determined according to the matrix presented in **Chapter 6 Approach to EIA, Table 6-1.**

18.4.12 Significant effects in EIA terms are those that are of **major, major/moderate** and **moderate adverse** significance. All other outcomes are not considered significant for the purpose of EIA assessment.

Cumulative Impact Assessment

18.4.13 An assessment of potential cumulative impacts within The Haven arising from the proposed Facility and other plans and projects has been undertaken within this ES chapter, with mitigation measures proposed as required.

Transboundary Impact Assessment

18.4.14 Although most vessels visiting the Port of Boston originate from non-UK locations it is considered that the potential impacts of this project will be localised to The Haven. All of the refuse derived fuel (RDF) that is transported to the Facility will come from UK sources. All of the binder material that will be transported to come to the Facility will come from UK sources. The aggregate is proposed to be transported to UK sources. Therefore, it is unlikely that there will be any transboundary impacts.

18.5 Scope

Study area

18.5.1 The Study area for the navigational assessment includes The Haven, from Tab's Head at the entrance to The Wash, to the upstream limit of the Port of Boston, or Swing Bridge, and the Port of Boston's anchorage areas within The Wash. Please refer to **Figure 18.1** and **Figure 18.2** for an illustration of this Study area.

18.5.2 All references to bed levels and tidal heights will be provided in Ordnance Datum (OD) and Boston Sill Datum (BSD) which is 3.7 m below OD.

Data Sources

18.5.3 The assessment was undertaken with reference to several sources, as detailed in **Table 18-4**.

Table 18-4 Key Information Sources

Data Source	Reference
Environment Agency	Boston Barrier Technical Report: Navigational Impact Assessment (Environment Agency, 2016)
HM Government – Department for Transport	Annual Port Statistics - https://www.gov.uk/government/statistical-data-sets/port-and-domestic-waterborne-freight-statistics-port
Marine Traffic	Port of Boston vessel traffic data - https://www.marinetraffic.com/en/ais/details/ports/17346/United%20Kingdom_port:BOSTON?cb=9401

Assumptions and Limitations

- 18.5.4** The Environment Agency undertook a NIA for the Boston Barrier scheme in 2016 (Environment Agency, 2016). The Study area used for the Boston Barrier NIA extended from the Grand Sluice (to the north of Boston) to the mouth of The Haven. This area encompasses the Study area used for this chapter of the ES. Given that the Boston Barrier NIA (Environment Agency, 2016) was undertaken recently (2016), within a stretch of water which encompasses the Study area used for this chapter, and in consultation with the Port of Boston, the local fishing fleet and recreational users, it is concluded that the information from the NIA is relevant to this assessment.
- 18.5.5** The Annual Port Statistics provided by the Department for Transport are provided to the Department for Transport directly from the Ports. It is therefore assumed that the data are accurate, and it is concluded that there are no limitations associated with using these data.
- 18.5.6** Marine Traffic uses live data from vessels carrying Automatic Identification Systems (AIS), which track real time ship positions as an aid to navigation. A limitation of these data is that the International Maritime Organisation's International Convention for the Safety of Life at Sea only requires AIS to be fitted onboard ships with 300 or more gross tonnage (GT). As such any vessels below 300 GT (such as fishing and recreational vessels) using The Haven will not be included in these datasets. To address this limitation in the data, consultation with the local fishermen was undertaken throughout the impact assessment process.

18.6 Existing Environment

- 18.6.1 The Haven is fully tidal and comprised of the section of the River Witham between the Grand Sluice and The Wash. At the Port of Boston, The Haven is approximately 56 m in width, although the channel width ranges from 20 m to 90 m along its length. The bed level varies between -1.5 m OD (-5.2 mBSD) at Grand Sluice to -3.3 mOD (-7 mBSD) downstream of the Port of Boston entrance (Environment Agency, 2016).
- 18.6.2 The tidal influence of the North Sea and The Wash is obstructed by the Grand Sluice, which defines the upstream tidal limit of The Haven. Boston Gateway Marina is located upstream of the sluice offering moorings for recreational sailors. To the west, The Haven is connected by the Black Sluice lock, which can accommodate vessels up to 21 m long and 6 m wide and has a water retention level ranging from 0 to -0.6 mOD (-3.7 to -4.3 mBSD) depending on the season (Environment Agency, 2016).
- 18.6.3 The navigability of The Haven upstream of the Facility is constrained by three bridges with limited headroom at high water and limited under-keel clearance and channel width at low water (Environment Agency, 2016).
- 18.6.4 The Haven drains into the sea in a general north easterly direction. The Haven receives freshwater flows through artificially maintained sluice structures from the Witham (at Grand Sluice), the South Forty Foot Drain (at Black Sluice), Maud Foster Drain (and Sluice) and Hobhole Drain (and Sluice), until it eventually discharges into The Wash (**Figure 18.1**) (Environment Agency, 2016).

Existing River Users

- 18.6.5 The main users of the Haven from a navigation perspective comprise:
- The Port of Boston;
 - The Port of Boston Pilots;
 - The local fishing fleet;
 - Other commercial operators (specifically Maritime Leisure Cruises); and
 - Witham Sailing Club or the Boston Motor Boat club.
- 18.6.6 Each of these users is discussed in turn below.

The Port of Boston and Pilots

- 18.6.7 The Port of Boston is a privately-owned commercial business. The Port of Boston also acts as the Harbour Authority and Lighthouse Authority within its jurisdiction, which extends from The Wash to Grand Sluice. The Port of Boston provides

compulsory pilotage services for all commercial vessels over 30 m in length through the Port of Boston Pilots service. Pilots board vessels in The Wash, before Tab's Head at the eastern end of the Freeman Channel (**Figure 18.1**).

18.6.8 The Port handles, on average, approximately 800,000 tonnes of cargo per year, the vast majority of which arrives at the Port from the EU (see **Table 18-5** (Department for Transport, 2020)).

18.6.9 From 2014 to 2018, approximately 400 ships arrived at the Port of Boston per year (on average), which equates to approximately eight ships per week (see **Table 18-5** (Department for Transport, 2020)).

18.6.10 The majority of vessels arriving at the Port are cargo vessels transporting bulk and cargo.

Table 18-5 Vessel Traffic and Tonnage Data for the Port of Boston, 2014-2019 (Department for Transport, 2020)

Year	Number of ships	Total traffic (thousand tonnes)	UK traffic (thousand tonnes)	EU traffic (thousand tonnes)	Non-EU traffic (thousand tonnes)
2019	420	821	15	798	9
2018	371	711	0	699	12
2017	377	738	0	718	20
2016	524	850	27	803	20
2015	412	852	23	793	37
2014	382	824	33	769	23

18.6.11 The Haven is largely self-scouring as sediment is moved into The Wash with large freshwater influxes (Richard Walker, Port of Boston, pers. comm, 2018).

18.6.12 The Port of Boston has a licence to dredge 60,000 (wet) tonnes of fine sediment per year from within the Port, at the approach berth (at the entrance to the Wet Dock), the river berths and within Wet Dock, and within The Haven at the Hobhole S Bend, to maintain access for vessels to the berths. **Figure 18.3** illustrates the locations of berths at the Port. Currently the actual volume of material dredged by the Port is 20,000 to 30,000 tonnes per annum, which is undertaken using the Port's grab-hopper dredger (Richard Walker, Port of Boston, pers. comm, 2018). The Port also has a plough dredger which is used to level peaks and troughs in the sediment. The Port disposes of this material at a disposal site located in The Wash (HU170).

- 18.6.13 The number of vessel movements within The Haven per tide can vary greatly, but generally up to four to five commercial vessels can sail The Haven per high tide. Due to the tidal nature of The Haven, vessels can generally transit up or down the Haven from approximately one to two hours before high tide, to 1.5 hours after high tide, giving a maximum tidal window for vessel movements of approximately 3.5 hours around high tide.
- 18.6.14 Navigation of The Haven, from The Wash to the entrance of the Wet Dock at the Port of Boston, takes approximately one hour. Consequently, the Port of Boston operates on a 24 hour/7-day basis to be able to use both high tides per day. (Richard Walker, Port of Boston, pers. comm, 2018).
- 18.6.15 The Haven is largely a one-way channel for the large cargo vessels visiting the Port of Boston. Passing of vessels within the existing channel is possible, however this is limited to localised areas of the channel (specifically within the downstream section of The Haven between Tab's Head and Hobhole, and for approximately half a mile upstream of Hobhole (Richard Walker, Port of Boston, pers. comm, 2018). Please see **Figure 18.1** for an illustration of these locations.
- 18.6.16 The tidal nature of The Haven limits the size of vessels which are able to visit the Port. The current (at the time of writing) maximum dimensions of vessels capable of accessing the Port are listed in **Table 18-6**.

Table 18-6 Typical and Maximum Dimensions of Vessels Visiting the Port of Boston

Dimensions	Typical vessel (m)	Maximum vessel (m)
Length Overall (LOA)	90	119
Beam	13.6	13.6
Draught	5.5	6.4

- 18.6.17 Vessels with a 6.4 m draught can only access the Port of Boston at spring tides and at neap tides the draught is limited to approximately 3.5 m.
- 18.6.18 Visiting vessels are constrained (at the time of writing) in the beam to 13.6 m by the width of the dock entrance and constrained in length to 119 m as this is the largest ship that can be swung within the Port's Wet Dock. Vessels can also be swung in-river, however the maximum length of a vessel manoeuvring within the river is limited to 100 m (Richard Walker, Port of Boston, pers. comm, 2018).
- 18.6.19 Navigational safety of The Haven is the responsibility of all river users; however, overall responsibility for facilitating safe navigation on The Haven rests with the Port of Boston as the Statutory Harbour Authority.

The Boston Barrier Project

18.6.20 As part of the Boston Barrier project developed by the Environment Agency, several construction activities are being undertaken which will provide future benefits to the Port. These include:

- Strengthening the ‘Knuckle’ and South Knuckle berth at the entrance to Wet Dock;
- Widening the entrance to Wet Dock to 18 m; and
- Dredging the in-river turning circle to a larger diameter.

18.6.21 The Port has varied their dredging licence to allow it to undertake dredging for the Boston Barrier project which is in construction at the time of writing (L/2015/00382/2). Once varied this will include increasing the maintenance dredge target depths to accord with the capital dredge depth targets of the Barrier, the increase in size of the in-river turning circle, and changes to the method of dredging the NAABSA (Not Always Afloat But Safely Aground) river berths to plough dredging (Richard Walker, Port of Boston, pers. comm, 2018).

18.6.22 The widening of the Wet Dock entrance will increase the maximum size of vessels able to visit the Port to 119 m LOA, 16.5 m beam and 7 m draught (Richard Walker, Port of Boston, pers. comm, 2018).

18.6.23 The widening of the in-river turning circle will facilitate the turning of more vessels in-river, as most vessels are currently turned within Wet Dock (Richard Walker, Port of Boston, pers. comm, 2018).

Fishing fleet

18.6.24 The fishing fleet at Boston berth upstream of the Swing Bridge. The fleet comprises conventional ‘modern’ steel hulled commercial fishing boats, with a typical registered length of between 10 m and 14 m. The fleet currently consists of approximately 26 vessels which are Boston (BN) registered of which 17 are over 10 m LOA and nine are under 10 m LOA (Marine Management Organisation, 2020a and 2020b).

18.6.25 The fishing fleet targets cockles, mussels and shrimp in the Wash at various times of the year. Generally, cockles are caught during April to October and are harvested using hydraulic suction dredgers or raked by hand from the intertidal sand banks within the entrance of The Haven (Environment Agency, 2016).

18.6.26 Shrimp is primarily caught during autumn and is taken from the edge of the channels on the Boston side of The Wash. Peak catches generally occur from October to November. Harvesting activity extends through the winter into spring

depending on stocks (Environment Agency, 2016).

18.6.27 The fishing vessels have a minimum draught of 1.4 m and as such can navigate The Haven over a wider state of tide than the commercial vessels visiting the Port of Boston. Fishing vessels are also able to pass each other whilst navigating The Haven. The fishing vessels are known to take approximately 40 minutes to either get to or return from the fishing grounds in The Wash, although with strong tidal flow against the direction of travel, this can increase to up to an hour (Environment Agency, 2016).

18.6.28 Cockle fishing takes place over a single tide. For handpicked cockles, vessels leave at high tide to be over the beds and grounded at low tide. For suction dredging, vessels leave on a rising tide to be over the cockle beds at high tide (Environment Agency, 2016).

18.6.29 Mussel fishing also takes place over a single tide. Natural mussel beds are harvested in a similar method to the handpicked cockles. Shrimp are either caught over a single tide trip, or for longer trips up to 36 hours (Environment Agency, 2016; Boston and Fosdyke Fishing Society, pers. comm., 2019).

18.6.30 The fleet is able to operate on any day of the year when the tide is suitable. However, the fishing operation is more opportunistic and is often governed by a combination of fish stocks, regulations, vessels, weather and the receiving market (Environment Agency, 2016).

Other commercial operators

18.6.31 Maritime Leisure Cruises Ltd (MLC) own and operate the Boston Belle, a passenger boat, on trips of the River Witham, upstream of Grand Sluice, and of the Haven down and into The Wash (Boston Belle, 2018). Trips out to The Wash depart from the Boston Gateway Marina, upstream of Grand Sluice, on a rising tide as soon as there is sufficient water clearance through Grand Sluice lock. The trip returns approximately 4.5 hours later on the falling tide, before the water level is too low to pass through Grand Sluice lock (Boston Belle, 2018).

18.6.32 These trips are seasonal and dependent on a favourable tide. In 2018, 12 trips were scheduled between April and October (Boston Belle, 2018), however the Boston Belle also undertakes private trips, so the actual number of trips undertaken on The Haven could be more.

Other users of The Haven

18.6.33 As well as the commercial operators and fishing fleet reported above, The Haven is also used by recreation vessels. Recreational users are generally affiliated with the Witham Sailing Club or the Boston Motor Boat club, which both have moorings

located upstream of the Grand Sluice lock. Vessels are reported to leave Boston on the falling tide and return on the incoming tide to make use of tidal flows (Environment Agency, 2016).

18.6.34 **Table 18-7** summarises the main vessel characteristics and operating traffic patterns of the main users of The Haven.

Navigational aids/regulations

18.6.35 There is a speed limit of 6 knots over The Haven. This speed restriction was put in place by the Environment Agency to protect the river banks (Richard Walker, Port of Boston, pers. comm, 2018). The Port of Boston do not enforce this speed limit and only advise safe speed under the COLREGs. The speed of vessels, especially large cargo vessels, is restricted on The Haven due to water depth, the weather and the bends in the river.

18.6.36 The navigational channel from Tab's Head to Swing Bridge is marked by navigational aids in accordance with Trinity House protocols, with the Port of Boston being the Local Lighthouse Authority.

18.6.37 The Port, as the Harbour Authority, is responsible for the control of shipping. Communication with the Port of Boston is via VHF channel 12. The Port of Boston Pilots report their position in the river at dedicated reporting points to Port Control, however Port Control does not routinely use VHF to notify other river users of shipping movements. The Port does not monitor leisure, fishing or other vessels on The Haven, only port traffic.

18.6.38 The Port of Boston issues Notice to Mariners for any unusual activities.

18.6.39 **Table 18-7** summarises the commercial and recreational users of The Haven.

Table 18-7 Summary of Main Vessels Used Within the Haven

Typical fleet	Typical vessel (m)			Maximum vessel (m)			Operating pattern	Journey time from berths to the Wash
	LOA	Beam	Draught	LOA	Beam	Draught		
Cargo vessel	90	13.6	5.5	119	16.5	6.4	Ships time their arrival/departure to allow for enough clearance over the dock entrance sill – arriving or departing within 1-2 hours of high tide. The maximum vessel will increase to 119 m LOA, 16.5 m beam and 7 m draught following the completion of the dock entrance widening undertaken as part of the Boston Barrier project (estimated to be 2020/2021).	1 hour
Dredger	34	11	2.4	-	-	-	Dredging occurs on an ad-hoc basis following visual inspection of the berths.	n/a
Pilot vessel	13	3	1.5	-	-	-	Pilot vessels travel from Port of Boston to The Wash to meet cargo vessels.	30 minutes
Fishing vessel	11.5	5	1.4	-	-	-	Depart and return on an incoming or outgoing tide. Trip duration varies from a single tide to over 36 hours. Based upon an observed visit on 18 August 2020, the fishing fleet return on a staggered basis with over 45 minutes between the first vessel and the last.	1 hour
Boston Belle	20	5	-	-	-	-	Depart on a rising tide as soon as Grand Sluice lock opens when there is sufficient draught in The Haven. Returns approximately 4.5 hours later on the falling tide before Grand Sluice lock closes.	1 hour
Sailing boat	6	2.4	1.5	10	3.5	2.1	Departs on the falling tide and return on the rising tide such that there is sufficient time to transit The Haven while there is enough draught.	1 hour
Motor boat	9	2.7	2.3	9	2.7	2.3	Same as for sailing boats.	1 hour

18.7 Potential Impacts

Embedded Mitigation

18.7.1 Methodologies proposed for the construction and operation of the Facility, which have been embedded into the project design and are considered to provide mitigation of relevance to navigational safety on The Haven, include:

- Carrying out capital and maintenance dredging of the wharf from land, using land-based equipment; and,
- Carrying out construction of the wharf from land.

18.7.2 These measures will allow the construction of the wharf to take place without requiring the closure of The Haven, which is a fundamental requirement of the Port and the fishermen. These measures also will not result in a restriction in, or narrowing of, the width of the river at the location of the wharf.

Additional Mitigation

Navigation Management Plan

18.7.3 In order to manage the potential impacts which could arise from the construction and operation of the Facility it is proposed that a Navigation Management Plan (NMP) will be produced in conjunction with the Port of Boston to manage navigational safety. The NMP will be produced during the design process when the design for the wharf is finalised and the contractor is in place and will define the potential risks taking into account the findings of this ES chapter and the subsequent NRA. The NMP will set out the procedures to be followed and aids to navigation to be provided to mitigate risks to navigation arising from the construction and operation of the Facility. Specifically, the NMP will set out the construction timelines, the potential risks to navigation, how often the contractor will communicate with the Port (and the public with respect to piling), and how each stage of the construction process will be managed to ensure a minimal impact on the safety of navigation in The Haven.

Potential Impacts during Construction

18.7.4 The following construction phase activities have potential to result in **adverse** impacts to operators who currently utilise The Haven for navigational purposes:

- Impact 1: Capital dredging at the proposed wharf;
- Impact 2: Construction of the proposed wharf;
- Impact 3: Installation of scour protection;
- Impact 4: Presence of lighting during construction; and,

- Impact 5: Increase in shipping traffic and use of the turning circle during construction.

18.7.5 The assessment of these impacts has been undertaken considering each receptor individually, with the impact significance and mitigation (if relevant) stated for each receptor.

Impact 1: Capital dredging at the proposed wharf restricting navigation on The Haven

18.7.6 Capital dredging along the length of the proposed wharf is required to create a berthing pocket and excavate the riverbank to allow for the installation of the wharf. It is proposed that this will be undertaken by land-based plant initially to create a pocket away from the navigational line of The Haven, behind Mean High Water Spring (MHWS) to the flood line. Once this has been created, floating plant would be able to complete the dredging required along the riverbank without impeding on the navigational use of The Haven.

18.7.7 As discussed in the earlier section on Embedded Mitigation, the use of land-based plant will not result in a reduction of the river width at any point along the length of the wharf, nor would it require a temporary closure of The Haven during the construction period. As such this activity will not result in a restriction on manoeuvrability in The Haven. However, due to the presence of the land-based and floating plant, vessels will be required to pass at a slower speed to minimise ship wash and suction forces. The construction of the wharf will take approximately 15 to 18 months.

Magnitude of impact

18.7.8 It is not considered that any interaction between the dredging plant and passing vessels is likely, and as the activity is also localised directly at the wharf it is considered that the magnitude of this activity is **low** for all receptors.

Sensitivity of receptors

The Port of Boston and Pilots

18.7.9 The presence of land-based and floating plant presents a safety impact to passing commercial vessels and Pilots. The commercial vessels visiting the Port and Pilots are therefore considered to be of a **high** sensitivity to this activity due to the size of the vessels which navigate The Haven and their lack of manoeuvrability.

Fishermen

18.7.10 The presence of land-based plant and floating plant will also present a safety impact to passing fishing vessels, however because these vessels are smaller in

the beam and more manoeuvrable than the cargo vessels visiting the Port it is considered that the commercial fishermen are of **medium** sensitivity to this activity.

Other Commercial Users

18.7.11 The presence of land-based plant and floating plant will also present a safety impact to other passing commercial vessels, such as the Boston Belle. However, in the same manner as the fishing vessels, these vessels are smaller in the beam and more manoeuvrable than the cargo vessels visiting the Port and as such it is considered that other commercial users are of **medium** sensitivity to this activity.

Recreational Users

18.7.12 This activity will also present a safety impact to passing recreational craft, such as motor boats and yachts. However, these vessels are much smaller in the beam and more manoeuvrable than cargo vessels and as such it is considered that recreational users are of **low** sensitivity to this activity.

Significance of effect

18.7.13 The significance of the activity is therefore **moderate adverse** for the Port of Boston and Pilots, and **minor adverse** for the fishermen, other commercial users and recreational users of The Haven.

Mitigation

18.7.14 The NMP will set out the procedures to be followed and aids to navigation to be provided to mitigate risks to navigation arising from the construction of the Facility. Specifically, the NMP will define how communication with the users of The Haven will be undertaken and how often and how each stage of the construction process will be managed to ensure a minimal impact on the safety of navigation in The Haven.

18.7.15 In addition, prior to the works commencing, and in advance of any new activities occurring, a Notice to Mariners (NtM) will be published by the Port to inform the users of the Haven of the nature and duration of the activity. The NtM will also advise caution to mariners while passing the wharf location, reducing their speed to minimise the effects of shipwash on construction plant.

18.7.16 The potential impact of increased transit time past the Facility was agreed with the Port (Richard Walker, Port of Boston pers. comm., 2019) to be negligible as ships passing this area of The Haven are already travelling slowly as they are on the final approach to the Port.

Residual effects

18.7.17 The mitigation presented above will increase navigational safety within The Haven during the capital dredging activities which is considered to reduce the sensitivity of each receptor to this impact. The residual effect is therefore **minor adverse to negligible** for all receptors.

Impact 2: Construction of the proposed wharf and associated mitigation restricting navigation on The Haven

18.7.18 Similarly to the proposed methodology for dredging the berthing pocket, the construction of the wharf itself will be undertaken in the majority by land-based plant although some floating plant may be required to complete the excavation of the berthing pocket towards the edge of the main channel, due to the distance from the wharf edge (up to 50 m). This is part of the embedded mitigation within the construction of the Facility to prevent a closure of The Haven, prevent any restrictions of river width and minimise any potential impacts to navigational safety on The Haven.

18.7.19 The construction of the wharf will take place once the dredging of the riverbank is completed. Land-based plant will construct the wharf from the bank side out to the proposed edge of the wharf, which will be 40 m away from the edge of the navigation channel, at the narrowest point.

18.7.20 In advance of construction of the wharf an area of saltmarsh over 200 m downstream from the wharf location will be enhanced to improve the roosting and foraging habitat for waders (**Figure 17.9**). These Habitat Mitigation Works will be undertaken by a small excavator on the saltmarsh which will potentially be delivered to site on a floating pontoon. If required, the pontoon (either pulled by a small vessel or self-propelled) will deliver and recover the excavator outside of the high tide period so as to not cause a hazard to vessel movements. These Habitat Mitigation Works are anticipated to take no longer than a week to complete (weather and tide dependent).

18.7.21 Due to the presence of the land-based and floating plant vessels will be required to pass at a slower speed to minimise ship wash and suction forces. The overall construction of the wharf will take approximately 18 months.

Magnitude of impact

18.7.22 It is not considered likely that there will be any interaction between the construction plant and vessels in the navigation channel. Any potential impacts will be localised to the location of the wharf itself, and the Habitat Mitigation Area. As such the magnitude any potential impacts to navigational safety arising from

this activity are considered to be **low** for all receptors.

Sensitivity of receptors

The Port of Boston and Pilots

18.7.23 The presence of floating plant at the edge of the navigational channel presents a safety impact to cargo vessels and Pilots. Due to the size of the vessels visiting the Port, and their lack of manoeuvrability, the sensitivity of the Port and Pilots is considered to be **high** as there is a limited ability to adapt or avoid any impact.

Fishermen

18.7.24 Due to the smaller vessels used by the commercial fishing fleet at Boston, and their greater manoeuvrability, it is considered that they will be able to adapt to the majority of this activity. Therefore, their sensitivity is considered to be **medium**.

Other commercial users

18.7.25 Due to the smaller vessels used by other commercial users of The Haven, and their greater manoeuvrability, it is considered that they will be able to adapt to the majority of this activity. Therefore, their sensitivity is considered to be **medium**.

Recreational users

18.7.26 Due to the smaller vessels used by recreational mariners, and their greater manoeuvrability, it is considered that they will be able to adapt to the majority of this activity. Therefore, their sensitivity is considered to be **low**.

Significance of effect

18.7.27 The significance of any effect arising from this activity is therefore **moderate to minor adverse**.

Mitigation

18.7.28 As discussed in Impact 1 the NMP will set out the procedures to be followed and aids to navigation to be provided to mitigate risks to navigation arising from the construction of the Facility. Specifically, the NMP will define how communication with the users of The Haven will be undertaken and how often and how each stage of the construction process will be managed to ensure a minimal impact on the safety of navigation in The Haven.

18.7.29 Prior to the works commencing, and in advance of any new activities occurring, a NtM will be published by the Port to inform the users of the Haven of the nature and duration of the activity. The NtM will also advise caution to mariners while passing the wharf location, reducing their speed to minimise the effects of ship

wash on construction plant. The potential impact of increased transit time past the Facility was agreed with the Port (Richard Walker, Port of Boston pers. comm., 2019) to be negligible as ships passing this area of The Haven are already travelling slowly as they are on the final approach to the Port.

Residual effects

18.7.30 The mitigation presented above enhances navigational safety within The Haven which is considered to reduce the sensitivity of each receptor to this impact. The residual effect is therefore **minor adverse** to **negligible** for all receptors.

Impact 3: Installation of scour protection restricting navigation on The Haven

18.7.31 It is envisaged that the dredged slope under the suspended deck and at either end of the wharf will require some form of slope stability or scour protection, as shown in **Chapter 5, Figure 5.2**. This will form either articulating precast concrete units or grout mattresses which are laid on the slope and pumped full of concrete. To minimise impacts the detailed design will prioritise a solution that avoids habitats loss and disturbance.

18.7.32 The scour protection will be designed to withstand the river currents and vessel propeller generated water flows. It will be maintained in position by fixing it to the top of the slope where it meets the sheet pile wall and where it is wrapped around the supporting piles for the wharf. It will also be protected from being under scoured at the bottom of the slope by forming the toe feature where it is placed in an over-dredged pocket and buried beneath the timber level of the NAABSA berths.

18.7.33 The scour protection will be installed after dredging is completed and the piles for the wharf deck have been driven, and before the deck is formed as this allows easy access to the area using cranes and or excavators from land to place the scour protection mattress.

Magnitude of impact

18.7.34 As the installation of the scour protection under the proposed wharf will be undertaken using land-based plant and will be at least 40 m away from the navigation channel the magnitude of any effects of this activity is considered to be **very low** for all receptors.

Sensitivity of receptors

The Port of Boston and Pilots

18.7.35 The land-based activities required for this activity are not located on the edge of the navigation channel therefore the risk of collision between a cargo vessel and

the land-based plant is lower compared to Construction Impacts 1 and 2. Therefore the sensitivity of the Port and Pilots is considered to be **medium** as there is an increased ability to adapt.

Fishermen

18.7.36 Due to the smaller vessels used by the commercial fishing fleet at Boston, and their greater manoeuvrability, it is considered that they will be able to adapt to the majority of this activity. Therefore, their sensitivity is considered to be **low**.

Other commercial users

18.7.37 Due to the smaller vessels used by other commercial users of The Haven, and their greater manoeuvrability, it is considered that they will be able to adapt to the majority of this activity. Therefore, their sensitivity is considered to be **low**.

Recreational users

18.7.38 Due to the smaller vessels used by recreational mariners, and their greater manoeuvrability, it is considered that they will be able to adapt to the majority of this activity. Therefore, their sensitivity is considered to be **very low**.

Significance of effect

18.7.39 The significance of any effect arising from this activity is therefore **minor adverse** to **negligible**.

Mitigation

18.7.40 No specific measures are necessary to mitigate this impact however, the measures outlined in Impacts 1 and 2 will contribute to reducing the impacts associated with Impact 3.

Residual effects

18.7.41 The residual effect is therefore **negligible** for all receptors.

Impact 4: Presence of lighting during construction limiting visibility on The Haven

18.7.42 Throughout the Facility's construction period (48 months), lighting will be required to illuminate the entire Facility to ensure a safe working environment for contractors during working hours. Construction activities would take place six days a week (Monday to Saturday) between 8am and 8pm (with an option of 7am to 7pm), with no bank holiday or public holiday working. There may be short periods of 24hr working where concrete is being poured.

18.7.43 Lighting has the potential to adversely affect mariners on The Haven at night by

reducing visibility and masking the presence of vessels upstream and preventing safe navigation of The Haven by 'blinding' Pilots and other commercial and recreational mariners.

18.7.44 The construction phase lighting will be designed and controlled to limit any potential impact on the surrounding area by minimising sky-glow, glare and light spillage.

Magnitude of impact

18.7.45 Any reduction or other effect on visibility would present a considerable risk to navigational safety for all mariners on The Haven. This impact would be present throughout the construction of the Facility but is localised to the geographical area of The Haven. Therefore, the magnitude of this impact is considered to be **medium** for all receptors.

Sensitivity of receptors

18.7.46 It is considered that any impairment to visibility on The Haven represents a significant risk to the safety of all mariners, with limited ability to adapt. As such it is considered that the sensitivity of **all** receptors to this impact is **high**.

Significance of effect

18.7.47 The significance of this effect is therefore **major adverse**.

Mitigation

18.7.48 Lighting will have to comply with the minimum safety standards required on a construction site, however, mitigation can be employed to reduce the significance of this impact by:

- the careful locating of lighting columns within the Facility;
- the careful design of the lighting columns to ensure that they are no taller than needed;
- angling the face of lights downwards, away from the river and avoiding angling them up or downstream to prevent light spilling down The Haven;
- ensuring the lighting is passive, i.e. it automatically dims when there is no movement within the Facility such as when there is no construction activity at night; and
- restricting the use of mobile lighting that is taller than any fixed lighting columns and not operating such lighting outside of normal construction hours.

18.7.49 In addition to the measures outlined above there will be regular communication between the contractor and river users to ensure that any concerns of the lighting

are shared at the earliest opportunity and can therefore be remedied as soon as possible to prevent any navigational issues. Communication routes for complaints relating to navigational safety will be provided within the NMP and the Code of Construction Practice.

Residual effects

18.7.50 The use of the mitigation measures outlined above are considered to reduce potential risks of visual impairment and impacts to navigational safety on The Haven. Therefore, the residual effect is considered to be **minor adverse** for all receptors.

Impact 5: Increase in shipping traffic and use of the turning circle during construction

18.7.51 Raw materials for the construction of the Facility will need to be delivered to the Application Site. These will be delivered by both ship and road. To facilitate this the first phase of the wharf will be constructed first in order to provide a berth and unloading capabilities at the Facility for receiving construction materials. Construction of this first phase of the wharf will take approximately six months to complete. Once in operation it is anticipated that there will be approximately 89 shipments of raw materials to the wharf over the subsequent two-year period of the construction phase. The peak weekly vessel number will not exceed five vessels per week during the construction period.

18.7.52 Current levels of vessel movements handled by the Port average two per day, therefore the WCS of five construction vessel movements during a week will increase this to three per day. The Port has advised that it can handle five arriving vessels over one tide.

Magnitude of impact

18.7.53 The impact of this will not be discernible above the current incoming and outgoing traffic visiting the Port and will be very infrequent. As such it is considered that the magnitude of this effect is **low**.

Sensitivity of receptors

18.7.54 Due to the minimal additional vessel traffic it is considered that all receptors will have the ability to adapt to this impact. Therefore, the sensitivity of **all** receptors is considered to be **low**.

Significance of effect

18.7.55 Consequently, the significance of this effect is **minor adverse**.

Mitigation

18.7.56 No measures are necessary to mitigate this impact however, the measures outlined in Construction Impacts 1 and 2 will provide beneficial safety measures.

Residual effects

18.7.57 The residual effect is **negligible**.

Potential Impacts during Operation

18.7.58 The following operational phase activities have potential to result in adverse impacts to operators who currently utilise The Haven for navigational purposes:

- Impact 1: Increase in the number of vessels using The Haven;
- Impact 2: Presence and operation of the wharf;
- Impact 3: Increased use of the turning circle;
- Impact 4: Maintenance dredging at the facility;
- Impact 5: Presence of lighting; and,
- Impact 6: Accidental release of materials (i.e. RDF bales).

18.7.59 The assessment of these impacts has been undertaken considering each receptor individually, with the impact significance and mitigation (if relevant) stated for each receptor.

Impact 1: Increase in the number of vessels using The Haven

18.7.60 The operation of the Facility will require the importation of RDF to be used in the energy production process, and the exportation of aggregate which is the by-product of the process.

18.7.61 It is estimated that approximately 480 vessels will import RDF to the Facility per year, and 100 vessels per year will be required to export the aggregate by-product, totalling 580 vessels per year. In 2019, 420 vessels visited the Port which, including their outgoing journey represents over two vessel movements per day. This represents an increase of almost 140 % over the reported number of vessels visiting the Port per year (see **Table 18-5**).

18.7.62 The addition of 580 vessels per year visiting the Facility will increase the number of vessel movements by three per day (ingoing and outgoing), resulting in approximately five vessel movements per day (over two tides) within the Haven. This is considered to be a significant increase above current levels and could

increase the risk to navigational safety on The Haven, however the Port of Boston has in the past managed this level of vessel traffic (Richard Walker, pers. comm, 2019).

- 18.7.63 The distance between the Port and open water, at the Boston anchorage, is 9 km. There is compulsory pilotage from Buoy No.9 which is 7 km from the Port. The 6 knot speed limit over The Haven means it takes approximately one hour to navigate to/from Buoy No.9 from the Port and should vessels have to pass in The Haven this is increased by 10 to 15 minutes.
- 18.7.64 The Port has advised that two vessels can arrive, and two vessels can leave during one high tide (maximum 6-hour window) and the Port has handled five arriving vessels over one tide.
- 18.7.65 Once at the Facility each vessel will be berthed for 12 hours to allow for loading/unloading which would enable a vessel to depart on the next high tide. An unladen vessel would have a shallower draft and therefore have a wider tidal window either side of high tide for departure. Ideally vessels would be turned on arrival to ensure that they are facing towards the sea and enable a direct departure on completion of unloading/loading. However, turning a vessel before departure is also viable and may be quicker due to the shallower draft. Should delays to loading/unloading occur the vessels would be berthed for 24 hours and depart on the following high tide.
- 18.7.66 The Facility will not 'go online' all at once but will have a phased start up. This means that the three thermal treatment lines will be brought online one at a time over the course of the first year until the Facility is operating at full capacity. This will enable a steady increase in vessel traffic over the year, allowing users to adjust over a period of time to the increase.
- 18.7.67 In addition, incoming vessels may have to cross the path of outgoing vessels in order to berth at the wharf if they are not to be turned first, creating an additional navigational risk to all vessels. Alternatively, the laden vessels would be swung in the in-river turning circle, or the wet dock before docking. The potential effect of the additional vessels turning at the Port is discussed separately below.

Magnitude of effect

- 18.7.68 The increase in the number of vessels is a requirement of the production at the Facility, and as such is very likely to occur, however it is limited to the geographical area of The Haven. Additionally, the increase in vessels will occur throughout the lifetime of the operation of the Facility. As such it is considered that the magnitude of this effect is **medium**.

Sensitivity of receptors

The Port of Boston and Pilots

18.7.69 The Port of Boston and Pilots are considered to be of **medium** operational sensitivity to this effect as they have some ability to adapt to this impact. As the harbour authority for the Haven, the movement of vessels in and out of the Port will be controlled by the Port and the Pilots will accompany each vessel throughout its navigation of The Haven. If required, the Port has the ability to increase the capacity of the anchorage areas in the Wash by 30 to 40 % to manage the increased volume of vessel traffic (Richard Walker, pers. comm, 2019).

Fishermen

18.7.70 The increase in commercial vessel traffic will present an additional risk to fishermen transiting The Haven. There are only a few places on The Haven where passing vessels is considered safe. Any increase in time taken to reach fishing grounds, or delay in delivering the catch could result in an adverse effect on their business and income. As such the sensitivity of the fishermen is considered to be **high**.

Other commercial users

18.7.71 The increase in commercial vessel traffic will also present a navigational safety risk to other commercial users in the same manner as the fishermen as they will largely travel up or down the Haven around high tide when there is enough draught for them to pass through Grand Sluice. It is considered that commercial users will have some ability to adapt to this effect as they may have more flexibility as to when they choose to leave on a trip or return. As such the sensitivity of other commercial users on The Haven is **medium**.

Recreational users

18.7.72 The increase in commercial vessel traffic will also present a navigational safety risk to recreational users in the same manner as the fishermen as they will largely travel up or down the Haven around high tide when there is sufficient water depth and they are able to pass through Grand Sluice. It is considered that recreational users will have some ability to adapt to this effect as they also may have more flexibility as to when they choose to leave on a trip, or return, as they are shallower in the draught. As such the sensitivity of recreational users on The Haven is considered to be **low**.

Significance of effect

18.7.73 This effect is of **major adverse** significance to the fishermen, of **moderate**

adverse significance to The Port of Boston and Pilots and other commercial users, and of **minor adverse** significance to recreational users.

Mitigation

18.7.74 As part of the management of safe navigation on The Haven, the NMP will set out procedures, windows of movement for the vessels and communication channels to be used between the Facility, the Port, the fishermen and other users of The Haven.

18.7.75 The Port and Pilots will have the greatest ability to adapt as they will, in close partnership with the Facility, manage the movement of vessels on The Haven. All vessels will request passage to the Port and have a Pilot on board in the same manner as all other cargo vessels. Open and frequent communication between the Facility and the Port, as set out in the NMP, will be maintained throughout the lifetime of the project to ensure the safety of navigation on The Haven and the continued safe operation of the Port.

18.7.76 The NMP will also set out communication channels between the Facility, Port and fishermen to ensure that there are no operational or business impacts to any user of The Haven. It is proposed that fully open communication between the Facility, the Port and the fishermen is established and maintained to allow for transparency regarding the scheduled start of the arrival or departure of commercial vessels from the Port and the Facility. If suitable this could allow the fishermen to leave the Port or leave the fishing grounds before the commercial vessels start their transit and reach passing places to meet vessels transiting up, or down, The Haven. This can be set out in the NMP which will be produced in consultation with the fishermen to ensure the measures put in place will be effective.

18.7.77 In addition, there are large matrix messaging boards present at locations along the River Witham/The Haven to provide information on the status of the Boston Barrier, radio monitoring, and vessel priorities dependent on the state of the tide. These could also be established at appropriate locations to increase awareness and inform mariners of vessel movements associated with the Facility.

18.7.78 The measures put in place to ensure safe navigation will also be applicable to other commercial users and recreational users of The Haven. Clear communication methods, including the establishment of any messaging boards, will be set out in the NMP.

Residual effects

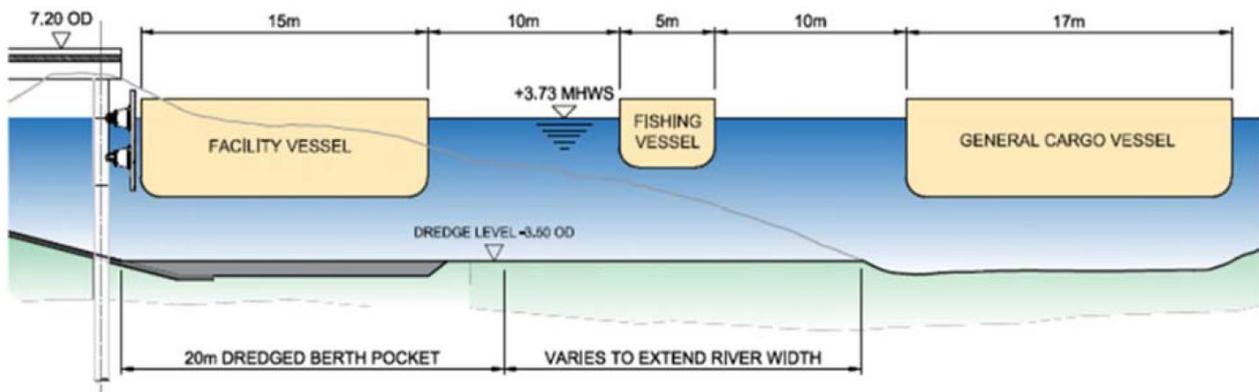
18.7.79 The procedures and communication methods set out in the NMP will ensure the safe navigation on The Haven for all users. As such the residual effect on the fishermen is considered to be **moderate adverse**, **minor adverse** for Port and

Pilots and other commercial users and **negligible for** recreational users.

Impact 2: Presence and operation of the wharf

18.7.80 The presence of the wharf in The Haven could present an extra hazard to commercial and recreational mariners. The wharf has been designed in consultation with the Port such that there should be sufficient space for a large commercial vessel, with a maximum beam of 17 m, and a fishing vessel, with a maximum beam of 5 m, to pass a moored vessel at the wharf with a clear distance between each vessel. The wharf has been designed with 10 m as a safe passing distance which is based on twice the beam of the fishing vessel. The minimum width of the channel based on this scenario is 57 m.

18.7.81 The river is narrowest at the southern end of the wharf. At this location the wharf berthing line has been designed to be 60 m from the edge of the far side of the channel (**Plate 18-1**). This will ensure that there is sufficient water to



accommodate the scenario above, of both a fishing and commercial vessel passing a vessel moored at the wharf.

Plate 18-1 Berth Location in Relation to the Navigation Channel at the Southern end of the Wharf

18.7.82 As can be seen in **Figure 5.2** the remainder of wharf is set back far enough from the usable width of The Haven, so navigation is not restricted at any point along the length of the wharf.

18.7.83 A speed restriction will also be placed on vessels navigating past the wharf of 4 knots to ensure any passing manoeuvres can be made safely.

Magnitude of effect

18.7.84 As this impact is limited to the location of the wharf the magnitude of this impact is considered to be **low**.

Sensitivity of receptors

18.7.85 The sensitivity of navigational receptors to this impact is considered to be **low** as

the width of the river is not reduced and will enable to safe passage of vessels past moored vessels at the wharf, therefore all users of The Haven will have an ability to adapt to the impact.

Significance of effect

18.7.86 The significance of this effect on all receptors is therefore **minor adverse**.

Mitigation

18.7.87 On completion of the first phase of the wharf the Port will issue a NtM which will advise vessels to take a slower speed of less than 4 knots through this section of the river. They do not envisage that this will have a significant impact on vessels movements in the area as they are already moving at speeds less than 4 knots as they are on the approach to the Port. The NtM will also advise caution in the area so all mariners are aware and can take appropriate measures in the vicinity of the Facility.

Residual effects

18.7.88 With open communication through the publication of NtM it is considered that the residual effect would be **negligible** for all receptors.

Impact 3: Increased use of the turning circle

18.7.89 As discussed in operational Impact 1, the volume of vessels required to import and export material from the Facility will increase the number of vessels on The Haven by approximately 140 %. This increase in the number of commercial vessels navigating The Haven will consequently increase the number of vessels that require turning, either within the Wet Dock or using the in-river turning circle.

18.7.90 The Port estimates that it takes approximately 10 to 15 minutes for a vessel to turn in the in-river circle. Should the vessel be turned within the Wet Dock this would increase to approximately 20 to 30 minutes. The use of the in-river turning circle is restricted by the state of the tide providing sufficient under-keel clearance therefore turning should only be undertaken within the four-hour tidal window at high tide. This window would decrease on smaller tides (i.e. neap tides) where the depth of water will be less.

18.7.91 While vessels are turning it is not possible for other commercial vessels, fishing vessels or recreational vessels to pass, whether they are incoming or outgoing. This would therefore create a delay to journeys of 10 to 15 minutes.

18.7.92 Currently the Port turns approximately one vessel per day. The Facility will require up to three vessels per day to arrive or depart, therefore requiring up to two vessels to be turned per day. Ideally all vessels would be turned on arrival to

ensure they are facing in the right direction once loaded/unladen for a direct departure as soon as the tide allows, however this isn't essential for the operation of the wharf and they can be turned before departure. The turning of vessels will be scheduled and managed by the Port to ensure all vessel operations on The Haven are coordinated.

18.7.93 Turning of vessels could take place simultaneously within the in-river turning circle and the Wet Dock, provided there is space within the Wet Dock to do this. The Port has advised they have handled this volume of shipping before (Richard Walker, pers. comm. 2019) however organising the turning of the vessels to take into account other commercial vessels, the tide and weather may result in some delays.

Magnitude of effect

18.7.94 This effect will take place on a very localised area of The Haven however, as the effect will be ongoing throughout the lifetime of the Facility and an impact to receptors is likely, it is considered the magnitude of this effect is **medium**.

Sensitivity of receptors

The Port of Boston and Pilots

18.7.95 The increase in the number of vessels could present a safety impact to the Port and Pilots. This effect will also have an operational impact on the Port and Pilots through the increased requirement for careful planning to ensure the smooth operation of both the Port and the Facility. The turning of all commercial vessels will be managed by the Port using their local knowledge and judgement.

18.7.96 It is therefore considered that the Port and Pilots have the ability to adapt to this effect, however due to the scale of the increase in vessel numbers a sensitivity of **medium** is assigned.

Fishermen

18.7.97 The increased use of the in-river turning circle is considered to present a safety, operational and business impact to the fishermen. A delay to fishermen on an incoming or outgoing trip, due to a turning vessel blocking The Haven, could prevent them from landing their catch to meet transport deadlines or reaching fishing grounds in time. The fishermen are therefore considered to have a sensitivity of **high** to this effect.

Other commercial users

18.7.98 Other commercial users, such as the Boston Belle, would be delayed on an incoming or outgoing journey by a turning vessel. This would present an

operational impact as it may either limit the amount of time spent out in the Wash or prevent the vessel from reaching its berth while there is sufficient water depth to pass through Grand Sluice Lock before it closes. It is considered that this represents a medium level of operational impact and other commercial users have some ability to adapt. Therefore, a sensitivity of **medium** is assigned.

Recreational users

18.7.99 Recreational users will also be affected by any delays caused by turning vessels preventing incoming and outgoing movement on The Haven. However, it is considered that this represents a low safety impact to recreational users as they are able to use The Haven over a wider tidal window due to their shallower draught and turning vessels would be moving slowly and present an obvious obstacle within the river. Therefore, a sensitivity of **low** is assigned.

Significance of effect

18.7.100 This effect is therefore of **major adverse** significance to the fishermen, and of **moderate adverse** significance to the Port and Pilots and other commercial users. The effect is of **minor adverse** significance to recreational users.

Mitigation

The Port and Pilots

18.7.101 The operational effect on the Port and Pilots can be mitigated through the implementation of the NMP which will set out careful, regular and thorough communication methods with the Captains of vessels visiting / departing the Facility to allow the effective management of the turning requirement.

18.7.102 The Port and Pilots have invaluable knowledge of The Haven and the Captains of vessels visiting / departing the Facility will be required to defer to their judgement on whether to turn vessels on their incoming journey or their outgoing journey. It is understood that this will also depend on the requirements for vessel movements on the next tide. As the Harbour Authority for The Haven, all decisions on vessel movements will be made by the Port.

Fishermen

18.7.103 The NMP will set out clear management procedures for the use of the turning circle to ensure that the requirements of the fishermen especially when sailing to / returning from fishing grounds to land their catch are taken into account when scheduling turning vessels including use of turning within the Wet Dock. The NMP will also set out the communication avenues that should be used between the Port, Captains of vessels visiting / departing the Facility and fishermen to ensure everyone an optimal window that allows passage of all

Other commercial users

18.7.104 The measures set out above and established within the NMP – clear procedures and communication methods, will benefit other commercial users as well.

18.7.105 In addition, there are large matrix messaging boards present at locations along the River Witham/The Haven to provide information on the status of the Boston Barrier, radio monitoring, and vessel priorities dependent on the state of the tide. These could also be established at appropriate locations to increase awareness and inform mariners of vessel movements associated with the Facility.

Residual effects

18.7.106 The procedures set out above are considered to mitigate any adverse operational or safety impacts to navigational receptors to one of **minor** significance for the Port and Pilots and other commercial users. A **negligible** effect is predicted for recreational users. It is considered that the significance of this impact to the fishermen is **moderate adverse**.

Impact 4: Maintenance dredging at the wharf

18.7.107 Throughout the lifetime of the Facility maintenance dredging will be required to keep the berths free of excess sediment and allow the moored vessels to safely take the ground at low tide.

18.7.108 To inform maintenance dredging requirements, **Chapter 16 Estuarine Processes** uses estimated siltation rates of 0.5 m/year (50 cm/year). Using this as a baseline sedimentation rate in the berthing areas over an area of 16,000 m² (dredged footprint of the berthing areas; 400 m long by 40 m wide) would lead to accumulation of mud of approximately 8,000 m³/year.

18.7.109 Dredging would be undertaken using land-based plant from the wharf. All material would be lifted directly onto the wharf prior to use as a binder within the lightweight aggregates manufacture process at the Facility; and any resulting run-off will be collected and transferred to a holding tank.

Magnitude of effect

18.7.110 The magnitude of this impact is considered to be **low** due to the highly localised area of The Haven affected – the wharf at the Facility and the short duration of the activity when required (up to a few weeks). As dredging is

proposed to be undertaken using land-based plant from the wharf, and the arisings will be stored onshore and used at the Facility it is highly unlikely that this activity could cause any collision with a passing vessel.

Sensitivity of receptors

18.7.111 The sensitivity of navigational receptors to this impact is considered to be **low** as the width of the river will not be reduced and will enable the safe passage of vessels past the dredging activities at the wharf, therefore all users of The Haven will have an ability to adapt to the impact.

Significance of effect

18.7.112 The significance of the effect for **all** navigation receptors is therefore **minor adverse**.

Mitigation

18.7.113 A NtM will be published prior to the commencement of any dredging activities to notify river users and advice caution when transiting past the wharf.

18.7.114 Note that it is possible that the frequent movement of vessels at the berths may prevent the wharf from building up much, if any, siltation. During the first five operational years of the Facility bathymetric surveys will be undertaken every six months to monitor the build-up of silt and inform dredging requirements.

Residual effects

18.7.115 The residual effect is therefore of **negligible** significance.

Impact 5: Presence of lighting

18.7.116 Throughout the operation of the Facility, lighting will be required 24 hours per day to illuminate the entire Facility to ensure a safe working environment for employees. This has the potential to adversely affect mariners on The Haven at night by reducing visibility and masking the presence of vessels upstream and preventing safe navigation of The Haven by 'blinding' Pilots and other commercial and recreational mariners. The operational phase lighting will be designed and controlled to limit any potential impact on the surrounding area by minimising sky-glow, glare and light spillage.

Magnitude of impact

18.7.117 Any reduction in visibility would present a significant risk to navigational safety for all mariners on The Haven. As this impact would be present throughout the lifetime of the Facility but is localised to the geographical area of The Haven the magnitude of this impact is considered to be **medium** for all receptors.

Sensitivity of receptors

18.7.118 It is considered that any reduction in visibility on The Haven represents a significant risk to the safety of all mariners, with limited ability to adapt. As such it is considered that the sensitivity of **all** receptors to this impact is **high**.

Significance of effect

18.7.119 The significance of this effect is therefore **major adverse**.

Mitigation

18.7.120 While the lighting required will have to comply with the minimum safety standards required for a working Facility, mitigation will be employed to reduce the significance of this impact which could include:

- the careful locating of lighting columns within the Facility;
- the careful design of the lighting columns to ensure that they are no taller than needed, to minimise the angle that could be achieved by the lighting;
- angling of lights downwards, away from the river and avoiding angling them up or downstream to prevent light spilling down The Haven;
- ensuring the lighting is passive, i.e. it automatically dims when there is no movement within the Facility such as when there are fewer operational activities; and
- minimising the use of mobile lighting taller than any fixed lighting columns and not operated outside of normal construction hours.

18.7.121 In addition to the measures outlined above there will be regular communication between the Facility and the Port to ensure that any concerns of the lighting are shared at the earliest opportunity and can therefore be remedied as soon as possible to prevent any navigational issues. Communication routes for complaints relating to navigational safety will be provided within the NMP.

Residual effects

18.7.122 The use of the mitigation measures outlined above are considered to mitigate any potential risks to navigational safety on The Haven through the careful design of the lighting at the Facility and the residual effect is considered to be **minor adverse** for all receptors.

Impact 6: Accidental release of materials (i.e. RDF bales).

18.7.123 During the unloading of RDF bales from vessels there is a risk of the accidental loss of a bale, or of a bale breaking apart, into the navigational channel of The Haven. This would cause an obstruction to navigation and potentially

present a collision risk to other vessels.

18.7.124 The suppliers of the RDF bales will have several contractual requirements to minimise waste impacts:

- The suppliers will be required to check the bales to ensure that there are no unacceptable wastes (for example hazardous wastes, gas cannisters, infectious wastes etc.) baled along with the RDF. This is to ensure bales are not rejected at the Facility.
- The suppliers of the RDF will not be permitted to load any damaged bales onto the vessels prior to shipping to the Application Site. This will be a contractual requirement for the supplier.

18.7.125 Any bale that is damaged whilst in transit to the storage area, or whilst being loaded onto the conveyors will be removed and taken to the re-baling facility behind the wharf.

Magnitude of effect

18.7.126 The accidental release of any bales or material from within bales into The Haven would represent a collision risk to any passing vessels. However, the risk is limited to the location of the wharf and the measures outlined above are considered to effectively manage the risk of this impact so that it is unlikely to occur. Should any bales enter the water they will be located close to the wharf and would be able to be recovered before they drifted into the navigation channel. Therefore, the magnitude of this impact is **low**.

Sensitivity of receptors

18.7.127 The sensitivity of navigational receptors to this impact is considered to be **low** as it is considered that they would have the ability to adapt to this impact.
Significance of effect

18.7.128 The significance of the effect is therefore **minor adverse**.

Mitigation

18.7.129 A catch-screen or net will be provided under the movement of the crane-arm to catch any dropped bale, or material that could potentially fall from a damaged bale. A re-baling facility is provided directly behind the wharf. Any bales that are damaged will be immediately transferred to the re-baling facility.

18.7.130 No other mitigation is required to reduce the significance of effect. Prior to the commencement of operation at the Facility a NtM will be issued by the Port of Boston advising mariners of the recommended speed to take whilst transiting past the Facility and advising caution to ensure safe navigation.

18.7.131 The residual effect is therefore of **negligible** significance.

Potential impacts during decommissioning

18.7.132 The following decommissioning phase activities have potential to result in adverse impacts to operators who currently utilise The Haven for navigational purposes:

- Impact 1: Increase in the number of vessels using The Haven to remove materials from the Facility;

18.7.133 The assessment of these impacts has been undertaken considering each receptor individually, with the impact significance and mitigation (if relevant) stated for each receptor.

Impact 1: Increase in the number of vessels using The Haven to remove materials from the Facility

18.7.134 The Facility will be designed to operate for an expected period of at least 25 years, after which ongoing operation will be reviewed and if it is not appropriate to continue operation the plant will be decommissioned. As the wharf will replace the existing flood defence it is not envisaged that the wharf itself will be decommissioned. This impact therefore considers the impact of the importation and exportation of materials from the wharf during the decommissioning of the Facility.

18.7.135 The quantity of material that would be removed from the decommissioning of the Facility and transported by vessel is not yet known. It cannot be assumed that the requirement for vessel usage during construction will be the same as that for decommissioning because the requirements for vessels during construction were to deliver raw materials for the manufacture of concrete and cement structures on-site.

18.7.136 When the decommissioning timeframe is known, a Decommissioning Plan will be produced. This Plan will identify how the wharf will be used to facilitate decommissioning; and how many vessels will be required to complete this task over the relevant decommissioning period. However, no effects of any greater significance than those identified for the construction of the wharf (construction impact 2) are predicted with impacts of **minor to negligible** significance predicted following incorporation of mitigation. Full account of the decommissioning will be mitigated through the Decommissioning Plan.

18.8 Cumulative Impacts

- 18.8.1 The navigational impacts that have been assessed for the Facility alone are anticipated to result in **moderate adverse** to **negligible** effects to navigational receptors on The Haven. As such, there may be potential cumulative effects on some of the receptors arising from interaction with navigational impacts generated by other plans, projects and activities (**Table 18-8**).
- 18.8.2 It is noted that there is wider list of potential cumulative schemes that have been proposed by Boston Borough Council as potentially relevant to the Facility. However, only one scheme has direct relevance to activities affecting shipping and the marine environment. This is the Boston Barrier Flood Defence (Boston Barrier) scheme.
- 18.8.3 The other schemes are land-based developments. The full list is provided in **Appendix 6.1 List of Cumulative Schemes**.

Table 18-8 Summary of Projects considered for the CIA in Relation to Navigational Issues

Project	Status	Development Period	Distance from the Application Site	Project Definition	Project Data Status	Included in CIA	Rationale
Boston Barrier Flood Defence	Transport and Works Act Order consented	2017 – ongoing (completed August 2021)	Boston Barrier at closest point to the Application Site is 500 m.	Environmental Statement	Complete / high	Yes	Construction of the barrier involves work within the Haven, therefore a cumulative impact on navigation receptors with the construction of the Facility may occur. This will only be relevant if the construction periods overlap

18.8.4 Potential cumulative impacts have been identified with the construction of the Boston Barrier project and the construction of the Facility. Given the proposed construction timetable for the Boston Barrier and the likely consenting timescale for the Facility, it is unlikely that both schemes will be in construction at the same time. However, the following assessment covers a potential worst-case position that there is an overlap.

18.8.5 The works for the Boston Barrier scheme include construction activities and new structures within the navigable river channel upstream of the Facility and the Port of Boston. There is proposed to be an increase in river traffic as construction plant may comprise barges or safety craft and it is assumed that 90 % of construction material for the Boston Barrier scheme would be brought to site by barge (Environment Agency, 2016). This would result in a reduction in the available navigable channel width which would lead to reduced manoeuvrability of all vessels in the vicinity of the construction works. There is also the potential requirement for one-way traffic through the by-pass channel for larger vessels.

18.8.6 The Boston Barrier scheme construction activities could have the following navigational impacts which could have a cumulative impact with the construction of the Facility:

- Reduced manoeuvrability, increased river traffic and reduced river width;
- Increased collision risk; and,
- River restrictions/closures.

18.8.7 A summary of the potential cumulative impacts with the Boston Barrier scheme is set out in **Table 18-9**.

Table 18-9 Potential cumulative Impacts with the Boston Barrier Project

Impact	Potential for Cumulative Impact	Data Confidence	Rationale
Construction Impact 1: Capital dredging at the proposed wharf;	No	High	Dredging undertaken during construction of the Facility will not affect the navigation channel and will not pose a significant cumulative collision risk to navigation receptors.
Construction Impact 2: Construction of the proposed wharf;	No	High	The construction of the wharf will not affect the navigation channel and will not pose a significant cumulative collision risk to navigation receptors.
Construction Impact 3: Installation of scour protection;	No	High	The installation of scour protection at the wharf will not affect the navigation channel and will not pose a significant

Impact	Potential for Cumulative Impact	Data Confidence	Rationale
			cumulative collision risk to navigation receptors.
Construction Impact 4: Presence of lighting during construction	No	High	As discussed above the lighting required during the construction of the Facility will be positioned and angled to avoid causing any navigational safety issues for vessels passing up and down The Haven. The Boston Barrier scheme also requires lighting for construction purposes however, this is located further upstream and within the area of the town and Port, as such the lighting used for the Barrier will be masked by the background lighting of these areas and will not present a hazard to mariners.
Construction Impact 5: Increase in shipping traffic and use of the turning circle during construction	Yes	High	During the construction of the Facility and the Boston Barrier there will be an increase in the number of vessels using The Haven. As part of the Boston Barrier project the Wet Dock will be closed for a period of time while the entrance is upgraded and the in-river turning circle is dredged.

18.8.8 As outlined in **Table 18-9** above there is the potential for cumulative impacts on navigational safety caused by the increase in the number of vessel movements required for the construction of both projects. It is understood that the Barrier is now operational, and the temporary bypass has been closed (BMMJV, 2020).

18.8.9 The remaining works include:

- upgrading the Port of Boston's quay walls;
- widening of the Wet Dock Entrance (requires the closure of the Wet Dock); and,
- widening and deepening the in-river turning circle (BMMJV, 2018).

18.8.10 These activities will affect the available navigation width, such that one-way navigation is required, and increase the number of commercial vessels berthing and manoeuvring in The Haven.

18.8.11 However, the construction of the Boston Barrier scheme is scheduled to be completed in August 2021 and therefore it is unlikely that navigation issues during the construction of both schemes will overlap. As such, no cumulative impact to navigation arising from the construction of both projects is predicted.

18.9 Transboundary Impacts

18.9.1 Although most vessels visiting the Port of Boston originate from non-UK locations, it is considered that the potential impacts arising from the construction and operation of the Facility will be localised to The Haven. The RDF will be dispatched to the Facility from UK ports. The specific departure locations will be dictated by market conditions at the time of supply however, a list of potential ports has been identified as follows:

- Glasgow KGV;
- Montrose;
- Grangemouth;
- Fleetwood;
- Hartlepool;
- Hull;
- Great Yarmouth;
- Ridham;
- Sheerness;
- Southampton;
- Port Talbot; and
- Belfast

18.9.2 The dredged arisings from the capital dredge as part of the construction of the wharf will be retained on land for recovery (used as part of the site preparation works) or sent for recovery or disposal elsewhere on land. The maintenance dredging carried out during the operation of the wharf will be used as binder material in the manufacture of aggregate at the Facility. The aggregate produced as part of the processing at the Facility is proposed to be transported to UK sources only. Therefore, it is unlikely that there will be any transboundary impacts.

18.10 Inter-Relationships with Other Topics

18.10.1 The impact assessment for commercial and recreational navigation has been undertaken with consideration of the findings of **Chapter 16 Estuarine Processes** (specifically with regard to the potential for maintenance dredging during the operational phase of the proposed Facility and the potential implications on existing vessel traffic within The Haven).

18.10.2 There are also inter-relationships with **Chapter 10 Noise and Vibration Chapter 14 Air Quality** and **Chapter 17 Marine and Coastal Ecology** with regard to the environmental impact of vessel movements during the construction and operation of the Facility which will be discussed within the relevant ES chapters.

18.11 Interactions

18.11.1 The impacts identified above have the potential to interact with each other, which could give rise to synergistic impacts because of that interaction.

18.11.2 The worst-case impacts assessed within the chapter take these interactions into account and for the impact assessments are considered conservative and robust. For clarity, the areas of interaction between impacts are presented in **Table 18-10**, along with an indication as to whether the interaction may give rise to synergistic impacts.

Table 18-10 Interaction Between Impacts

Potential interaction between impacts						
Construction						
	Impact 1	Impact 2	Impact 3	Impact 4	Impact 5	-
Impact 1	-	Yes	Yes	Yes	Yes	
Impact 2	Yes	-	Yes	Yes	Yes	
Impact 3	Yes	Yes	-	Yes	Yes	
Impact 4	Yes	Yes	Yes	-	Yes	
Impact 5	Yes	Yes	Yes	Yes	-	
Operation						
	Impact 1	Impact 2	Impact 3	Impact 4	Impact 5	Impact 6
Impact 1	-	Yes	Yes	Yes	Yes	Yes
Impact 2	Yes	-	Yes	Yes	Yes	Yes
Impact 3	Yes	Yes	-	Yes	Yes	Yes
Impact 4	Yes	Yes	Yes	-	Yes	Yes
Impact 5	Yes	Yes	Yes	Yes	-	Yes
Impact 6	Yes	Yes	Yes	Yes	Yes	-

18.12 Summary

18.12.1 The assessment of the construction and operational phases of the Facility could cause a range of effects on navigation. The receptors that have been specifically



identified in relation to navigation are the Port of Boston and Pilots, the fishermen, other commercial users and recreational users. In all cases, the effects that have been assessed resulted in **moderate adverse** to **negligible** effects to these receptors. A summary of impacts to these receptors are listed in **Table 18-11**.

Table 18-11 Impact Summary

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Construction						
Impact 1: Capital dredging at the proposed wharf	Port of Boston and Pilots	High	Low	Moderate adverse	Publication of a NMP and NtM as required.	Minor adverse
	Fishermen	Medium		Minor adverse		Negligible
	Other Commercial Users	Medium				
	Recreational Users	Low				
Impact 2: Construction of the proposed wharf	Port of Boston and Pilots	High	Low	Moderate adverse	Publication of a NMP and NtM as required.	Minor adverse
	Fishermen	Medium		Minor adverse		Negligible
	Other Commercial Users	Medium				
	Recreational Users	Low				
Impact 3: Installation of scour protection	Port of Boston and Pilots	Medium	Very low	Minor adverse	Publication of a NMP and NtM as required.	Negligible
	Fishermen	Low		Negligible		
	Other Commercial Users	Low				
	Recreational Users	Very low				
Impact 4: Presence of lighting during construction	All	High	Medium	Major adverse	Careful design of lighting structures to minimise spill, glare and skyglow. Use of passive lighting.	Minor adverse
Impact 5: Increase in shipping traffic and use of the turning circle during construction	All	Low	Low	Minor adverse	Publication of a NMP and NtM as required.	Negligible

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Operation						
Impact 1: Increase in the number of vessels using The Haven	Port of Boston and Pilots	Medium	Medium	Moderate adverse	Publication of an NMP with clear procedures and communication methods and use of messaging boards.	Minor adverse
	Fishermen	High		Major adverse		Moderate adverse
	Other Commercial Users	Medium		Moderate adverse		Minor adverse
	Recreational Users	Low		Minor adverse		Negligible
Impact 2: Presence and operation of the wharf	All	Low	Low	Minor adverse	Publication of an NMP with clear procedures and communication methods.	Negligible
Impact 3: Increased use of the turning circle	Port of Boston and Pilots	Medium	Medium	Moderate adverse	Publication of an NMP with clear procedures and communication methods and use of messaging boards.	Minor adverse
	Fishermen	High		Major adverse		Moderate adverse
	Other Commercial Users	Medium		Moderate adverse		Minor adverse
	Recreational Users	Low		Minor adverse		Negligible
Impact 4: Maintenance dredging at the facility	All	Low	Low	Minor adverse	Publication of NtM.	Negligible
Impact 5: Presence of lighting	All	High	Medium	Major adverse	Careful design of lighting structures to minimise spill, glare and skyglow. Use of passive lighting.	Minor adverse
Impact 6: Accidental release of materials (i.e. RDF bales)	All	Low	Low	Minor adverse	Catch-screen or net below the crane arm.	Negligible
Decommissioning						
Impact 1: Increase in the number of vessels on the	Port of Boston and Pilots	High	Low	Moderate adverse	Publication of a Decommissioning Plan	Minor Adverse

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Haven	Fishermen	Medium		Minor Adverse		Negligible
	Other Commercial Users	Medium				
	Recreational Users	Low				

18.13 References

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