A17/1- Environmental Statement:
Volume 1: Main Report

Transport and Works Act 1992
Boston Barrier Order
We are the Environment Agency. We protect and improve the environment. Acting to reduce the impacts of a changing climate on people and wildlife is at the heart of everything we do.

We reduce the risks to people, properties and businesses from flooding and coastal erosion.

We protect and improve the quality of water, making sure there is enough for people, businesses, agriculture and the environment. Our work helps to ensure people can enjoy the water environment through angling and navigation.

We look after land quality, promote sustainable land management and help protect and enhance wildlife habitats. And we work closely with businesses to help them comply with environmental regulations.

We can’t do this alone. We work with government, local councils, businesses, civil society groups and communities to make our environment a better place for people and wildlife.
EIA Quality Mark

This Environmental Statement, and the Environmental Impact Assessment (EIA) carried out to identify the significant environmental effects of the proposed development, was undertaken in line with the EIA Quality Mark Commitments.

The EIA Quality Mark is a voluntary scheme, operated by the Institute of Environmental Management and Assessment (IEMA), through which EIA activity is independently reviewed, on an annual basis, to ensure it delivers excellence in the following areas:

- EIA Management
- EIA Team Capabilities
- EIA Regulatory Compliance
- EIA Context & Influence
- EIA Content
- EIA Presentation
- Improving EIA practice

To find out more about the EIA Quality Mark please visit: [www.iema.net/qmark](http://www.iema.net/qmark)
This page has been left intentionally blank.
## Contents

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Non-technical summary</td>
<td>ii</td>
</tr>
<tr>
<td>1</td>
<td>Introduction</td>
<td>2</td>
</tr>
<tr>
<td>1.1</td>
<td>Overview</td>
<td>2</td>
</tr>
<tr>
<td>1.2</td>
<td>Background and Project justification</td>
<td>2</td>
</tr>
<tr>
<td>1.3</td>
<td>Objectives</td>
<td>4</td>
</tr>
<tr>
<td>1.4</td>
<td>Purpose of environmental statement</td>
<td>4</td>
</tr>
<tr>
<td>1.5</td>
<td>Structure of environmental statement</td>
<td>5</td>
</tr>
<tr>
<td>1.6</td>
<td>Availability of the Environmental Statement</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>Project description</td>
<td>10</td>
</tr>
<tr>
<td>2.1</td>
<td>Project location</td>
<td>10</td>
</tr>
<tr>
<td>2.2</td>
<td>Project components</td>
<td>11</td>
</tr>
<tr>
<td>2.3</td>
<td>Project construction</td>
<td>19</td>
</tr>
<tr>
<td>2.4</td>
<td>Project operation</td>
<td>33</td>
</tr>
<tr>
<td>2.5</td>
<td>Project alternatives</td>
<td>37</td>
</tr>
<tr>
<td>2.6</td>
<td>Design alterations after confirmation of preferred approach at scoping</td>
<td>45</td>
</tr>
<tr>
<td>3</td>
<td>Environmental assessment methodology</td>
<td>48</td>
</tr>
<tr>
<td>3.1</td>
<td>EIA requirements</td>
<td>48</td>
</tr>
<tr>
<td>3.2</td>
<td>EIA process</td>
<td>49</td>
</tr>
<tr>
<td>3.3</td>
<td>Implementation</td>
<td>54</td>
</tr>
<tr>
<td>4</td>
<td>Legislation and planning policy</td>
<td>56</td>
</tr>
<tr>
<td>4.1</td>
<td>Legislation and planning policy</td>
<td>56</td>
</tr>
<tr>
<td>4.2</td>
<td>National Planning Policy Framework</td>
<td>56</td>
</tr>
<tr>
<td>4.3</td>
<td>East inshore and offshore marine plans</td>
<td>58</td>
</tr>
<tr>
<td>4.4</td>
<td>Local Policies</td>
<td>62</td>
</tr>
<tr>
<td>4.5</td>
<td>Lincolnshire Minerals and Waste Local Plan</td>
<td>66</td>
</tr>
<tr>
<td>5</td>
<td>Consultation</td>
<td>68</td>
</tr>
<tr>
<td>5.1</td>
<td>Overview</td>
<td>68</td>
</tr>
<tr>
<td>5.2</td>
<td>Background</td>
<td>68</td>
</tr>
<tr>
<td>5.3</td>
<td>Consultation to date</td>
<td>69</td>
</tr>
<tr>
<td>5.4</td>
<td>Future engagement</td>
<td>71</td>
</tr>
<tr>
<td>6</td>
<td>Cultural heritage</td>
<td>72</td>
</tr>
<tr>
<td>6.1</td>
<td>Introduction</td>
<td>72</td>
</tr>
<tr>
<td>6.2</td>
<td>Assessment methodology</td>
<td>72</td>
</tr>
<tr>
<td>6.3</td>
<td>Baseline</td>
<td>74</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>13.3</td>
<td>Baseline</td>
<td>144</td>
</tr>
<tr>
<td>13.4</td>
<td>Impact assessment</td>
<td>146</td>
</tr>
<tr>
<td>13.5</td>
<td>Summary</td>
<td>148</td>
</tr>
<tr>
<td>14</td>
<td>Navigational impact assessment</td>
<td>150</td>
</tr>
<tr>
<td>14.1</td>
<td>Introduction</td>
<td>150</td>
</tr>
<tr>
<td>14.2</td>
<td>Assessment methodology</td>
<td>150</td>
</tr>
<tr>
<td>14.3</td>
<td>Baseline</td>
<td>152</td>
</tr>
<tr>
<td>14.4</td>
<td>Impact assessment</td>
<td>154</td>
</tr>
<tr>
<td>14.5</td>
<td>Summary</td>
<td>161</td>
</tr>
<tr>
<td>15</td>
<td>Traffic and transport</td>
<td>164</td>
</tr>
<tr>
<td>15.1</td>
<td>Introduction</td>
<td>164</td>
</tr>
<tr>
<td>15.2</td>
<td>Assessment methodology</td>
<td>164</td>
</tr>
<tr>
<td>15.3</td>
<td>Baseline</td>
<td>166</td>
</tr>
<tr>
<td>15.4</td>
<td>Impact assessment</td>
<td>167</td>
</tr>
<tr>
<td>15.5</td>
<td>Summary</td>
<td>172</td>
</tr>
<tr>
<td>16</td>
<td>Air quality</td>
<td>174</td>
</tr>
<tr>
<td>17</td>
<td>Community</td>
<td>176</td>
</tr>
<tr>
<td>17.1</td>
<td>Introduction</td>
<td>176</td>
</tr>
<tr>
<td>17.2</td>
<td>Assessment methodology</td>
<td>176</td>
</tr>
<tr>
<td>17.3</td>
<td>Baseline</td>
<td>177</td>
</tr>
<tr>
<td>17.4</td>
<td>Impact assessment</td>
<td>181</td>
</tr>
<tr>
<td>17.5</td>
<td>Summary</td>
<td>183</td>
</tr>
<tr>
<td>18</td>
<td>Summary significant residual effects</td>
<td>186</td>
</tr>
<tr>
<td>18.1</td>
<td>Introduction</td>
<td>186</td>
</tr>
<tr>
<td>18.2</td>
<td>Construction effects</td>
<td>187</td>
</tr>
<tr>
<td>18.3</td>
<td>Operational effects</td>
<td>190</td>
</tr>
<tr>
<td>19</td>
<td>Cumulative effects and climate change</td>
<td>192</td>
</tr>
<tr>
<td>19.1</td>
<td>Introduction</td>
<td>192</td>
</tr>
<tr>
<td>19.2</td>
<td>Types of cumulative effects</td>
<td>192</td>
</tr>
<tr>
<td>19.3</td>
<td>Scope of cumulative assessment</td>
<td>192</td>
</tr>
<tr>
<td>19.4</td>
<td>Cumulative effect assessment</td>
<td>199</td>
</tr>
<tr>
<td>19.5</td>
<td>Inter-project effects</td>
<td>206</td>
</tr>
<tr>
<td>19.6</td>
<td>Climate change</td>
<td>213</td>
</tr>
<tr>
<td>20</td>
<td>Environmental Action Plan</td>
<td>214</td>
</tr>
<tr>
<td>20.1</td>
<td>Overview</td>
<td>214</td>
</tr>
<tr>
<td>20.2</td>
<td>Contractual status</td>
<td>214</td>
</tr>
</tbody>
</table>
Table 9.2: Summary of predicted construction noise impacts from construction traffic 104
Table 10.1: Definitions used to classify the significance of effects 111
Table 10.2: Good practise measures to be implemented for non-significant ecological receptors 120
Table 13.1: Conceptual site model during construction 146
Table 13.2: Potentially active pollutant linkages identified 147
Table 14.1: River users 153
Table 14.2: Traffic pattern of the main users of the Haven 154
Table 17.1: Sensitivity of receptors 177
Table 17.2: Significance matrix 177
Table 18.1: Summary of predicted residual effects during Project construction 187
Table 18.2: Summary of predicted residual effects during Project operation 190
Table 19.1: Certainty of outcome for development and development status 194
Table 19.2: List of future developments 196
Table 19.3: Potential in-combination effects during construction 200
Table 19.4: Potential in-combination effects during operation 203
Table 19.5: Inter-Project cumulative effects 207
Table 20.1: Relevant contact details 221
Table 20.2: EAP pre-construction phase 222
Table 20.3: Pre-construction sign-off 228
Table 20.4: EAP construction phase 229
Table 20.5: Construction Phase signoff 237
Table 20.6: EAP post construction phase 238
Table 20.7: Post construction sign-off 240
Table B.1: Topics scoped into Environmental Statement 288
Table C.1: Original Scoping Report stakeholder consultation and location of responses 292
Table D.1: Updated Scoping Report stakeholder consultation and location of response 302
Table E.1: Comments of the draft Environmental Statement (2016) 314
Table G.1: Cumulative in-combination Project effects during Project construction 362
Table G.2: Cumulative in-combination Project effects during Project operation 366
This page has been left intentionally blank.
Non-technical summary
This page has been left intentionally blank.
Introduction and background

Overview

The Environment Agency intends to manage the risk of flooding from the tidal River Witham (known as ‘the Haven’ in this location) in Boston, Lincolnshire. To achieve this, the Environment Agency proposes to build a tidal barrier, which can be raised and lowered, within the Haven and associated flood defences along sections of both the right (south of the river) and left bank (north of the river). The tidal river presents a potential flood risk to Boston, particularly during tidal surges, such as those which occurred in December 2010 and 2013.

The locations of the proposed tidal barrier and associated works are shown in Plate 1 and Plate 2.

Plate 1: Location of Project

Source: Mott MacDonald 2016
The tidal barrier and associated works (‘the Project’) would offer protection against an ‘extreme’ tidal flood event. An ‘extreme’ tidal flood event is considered to be a 1 in 300 (0.33%) chance of a tidal flood event happening in one year over a 100-year time period.

The Project is considered the best option to address the risk of flooding from the Haven in Boston from a technical, environmental and value for money perspective. Consultation was carried out with the local communities in Boston, relevant statutory organisations and other key local stakeholders that have an interest in the area to inform the selection of the most appropriate option.

**Approach to obtaining consent for the Project**

Permission is required for the construction, operation and maintenance of the Project. As the Project is located within the navigational system along the Haven, the Environment Agency is making an application to the Secretary of State for Environment, Food and Rural Affairs for an
Order under the Transport and Works Act, 1992 and an associated request for a deemed planning permission under the Town and Country Planning Act 1990.

In addition to the above:
- A separate application for a Listed Building Consent is being made to Boston Borough Council in relation to works proposed within the vicinity of the Maud Foster Sluice, a Grade II listed building; and
- A separate application for a Marine Licence under the Marine and Coastal Access Act 2009 will be submitted to the Marine Management Organisation for works in the marine environment.

As part of the Transport and Works Act Order application, and to support the Listed Building Consent and Marine Licence, an Environmental Impact Assessment (EIA) has been carried out. The EIA for the Project has identified and assessed the likely significant effects on the environment. It has considered both positive and adverse impacts and has identified measures to reduce and manage any significant adverse impacts while enhancing positive impacts. Results of the EIA are reported in detail in an Environmental Statement (ES).

The EIA for the Project has followed the relevant EIA regulations and best practice guidance. This document is a Non-Technical Summary (NTS) that summarises the main findings of the Boston Barrier Tidal Project ES. The NTS is a stand-alone document provided to support the ES.

**Availability of the Environmental Statement**

The ES will be available for review at the following locations (Table 1):

<table>
<thead>
<tr>
<th>Location</th>
<th>Address</th>
<th>Opening Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boston Barrier Community Hub</td>
<td>Boston Barrier Community Hub, Riverside Industrial Estate, Marsh Lane, Boston, PE21 7PJ</td>
<td>Wednesday 12:00 – 19:00</td>
</tr>
<tr>
<td>Environment Agency - Peterborough</td>
<td>Environment Agency, Goldhay Way, Orton Goldhay, Peterborough, Cambridgeshire, PE2 5ZR</td>
<td>Monday to Friday, excluding all bank holidays 09:00 – 16:30 Viewing by appointment on 020 847 47371</td>
</tr>
<tr>
<td>Boston Borough Council</td>
<td>Municipal Buildings,</td>
<td>Monday to Thursday 08:45 - 17:15</td>
</tr>
</tbody>
</table>
### Location
<table>
<thead>
<tr>
<th>Location</th>
<th>Address</th>
<th>Opening Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Street</td>
<td>West Street, Boston, Lincolnshire, PE21 8QR</td>
<td>Friday 08:45 – 16:45</td>
</tr>
</tbody>
</table>
**Description of the Boston Barrier Tidal Project**

**Overview**

The Project involves the construction of a new tidal barrier, to the south of central Boston, Lincolnshire (Plate 1). The Project would be constructed within the Haven, between Black Sluice and Maud Foster Sluice (Plate 2). The works would take place within this section of the Haven as well as along the left bank to the Maud Foster Sluice and towards the Western Power Distribution substation on the right bank. The total area within which works could be undertaken (including land and water) is approximately 34ha.

The barrier gate would be operated under the following conditions:
- Tidal flooding events (5.3mAOD or greater);
- Operational maintenance (monthly, yearly and 5-yearly);
- To train staff on or to test the barrier operation; and
- For construction or maintenance works in or beside the Haven.

The Project components include:
- Barrier structure;
- Barrier control building;
- Wet Dock Entrance (WDE) widening and installation of a gate;
- Control building for the wet dock entrance gate;
- Sheet piled flood walls on the right bank, upstream and downstream of the river;
- Sheet piled and concrete flood wall on the left bank, including vehicle access gates;
- Demolition of the wooden quay and steel sheet piled structure on the right bank;
- Demolition of one grain tower and construction of two new towers and a single extended aerial conveyor to be installed on the left bank in the Port of Boston (PoB) Estate;
- Demolition of the buoy shed on the PoB Estate;
- Extension of the existing loading platform on the PoB Estate;
- Capital dredging;
- Maintenance works to the existing PoB access road;
- Diversion of 3 no. 11kv electricity cable;
- Scour protection;
- Permanent security fencing on the right bank surrounding the barrier structure;
- Landscaping and lighting; and
- Temporary slipway, mooring pontoon, storage and welfare facilities for the Witham Sailing Club and recreational river users.

Project components are described in the paragraphs below. A full description of all components can be found in the ES (Volume 1); Chapter 2.
**Barrier structure**

The tidal barrier is the main aspect of the Project. It comprises a U-shaped structure which provides a 25m navigable channel and is 35m in length, with a gate approximately 10m high. The tidal barrier would be located in the Haven adjacent to the Starch Berth within the PoB Estate on the left bank and adjacent to residential properties along Wyberton Low Road on the right bank.

The tidal barrier would house a gate which would be raised during ‘extreme’ tidal conditions. When the gate is raised the top of the barrier would be approximately 5m above mean (average) high water. Typically the tidal gate would sit flat against the river bed of the Haven (see Plate 3).

A 1.8m high security fence would be provided on the right bank around the barrier to restrict access.

The gate would be raised/lowered from a control building.

*Plate 3: Tidal barrier structure*

Source: Mott MacDonald 2016
**Barrier control building**

To meet the Environment Agency's operational requirements, a two-storey control building with associated car parking and HGV layby area would be constructed on the PoB Estate, close to the tidal barrier (see Plate 2). The site is currently occupied by a structure, PoB’s buoy repair shed, which would be demolished.

**Wet dock entrance gate and related works**

The wet dock provides berths for vessels at the PoB site (see Plate 2). A single gate would be installed at the location of the existing lock gates in the Wet Dock Entrance (WDE) to provide continuity of the line of defence to the Maud Foster Sluice. In addition, the width of the WDE channel would be widened from 15.3m to 18m to allow for broader vessels to enter the Wet Dock to moor up rather than use the Haven riverside quays.

A small building, with associated parking, would be constructed adjacent to the WDE to control the new gate.

**Right bank flood defences**

A flood wall is proposed on the right bank, between the Boston Public Footpath No.14 (Macmillan Way) and the Haven. The flood wall would extend approximately 430m downstream towards the Western Power Distribution substation (see Plate 2 and Plate 4).

Plate 4: Visualisation showing the proposed right bank flood wall downstream of the tidal barrier viewed from the left bank

Source: Mott MacDonald 2016
The flood wall downstream of the tidal barrier to the Western Power Distribution substation would be approximately 1.2m above the footpath (see Plate 5). Steps have been taken to reduce the impact of the proposed flood walls though design improvements, and thus the proposed façade could be ornamented with riverside scenes, pending agreement with Boston Borough Council.

As part of the Project the Boston Public Footpath No.14 (Macmillan Way) would be improved (see Plate 6) and would be accessible for persons with restricted mobility. There would also be provision for vehicular access to allow maintenance of the barrier and flood defence during operation.

Plate 5: Visualisation of right bank flood wall and footpath looking east on right bank

Plate 6: Visualisation of footpath looking west on right bank

Source: Mott MacDonald 2016
Source: Mott MacDonald 2016

**Left bank flood defences**

The left bank flood wall has two distinct elements; a flood risk management structure (flood wall) and sheet piling (retaining wall) installed in front of the existing PoB quay wall to improve stability of the quayside. The proposed flood wall (see Plate 2, Plate 7 and Plate 8) on the left bank begins at the tidal barrier and then follows (approximately) the line of the existing quay wall until it reaches the WDE. It then continues, deviating away from the existing quay wall, until tying into Maud Foster Sluice (Grade II listed), approximately 830m from the tidal barrier (see Plate 2).
The flood wall ranges in height from 1.5 to 2.4m above ground level (see Plate 8). Access gates would be provided within the flood wall to allow access to the PoB quayside.
Enabling works

Overview

To deliver the works there would be a need to divert three underground 11kV power cables from the right bank embankment along Wyberton Low Road (see Plate 9), undertake localised dredging of the channel bed to clear away material, improve access roads for construction within PoB and demolish a disused grain tower on the right bank.

Plate 9: Project elements including power cable diversion route and construction site compounds

Source: Mott MacDonald 2016

Facilities for Witham Sailing Club and other recreational users

- During construction temporary facilities would be provided for Witham Sailing Club and other small boat users would be constructed approximately 1.5km downstream (see Plate 9) of the proposed barrier structure. The following would be provided:
  - Construction of a temporary slipway to allow members of the Witham Sailing Club safe access to the river during construction of the barrier;
- A single clubhouse with welfare facilities (anticipated to be a porta cabin type structure);
- A safety boat storage container (anticipated to be a porta cabin type structure);
- A fenced compound with storage for 4 dinghies; and
- Parking facilities.
- A permanent mooring pontoon upstream (adjacent to Black Sluice) and a temporary mooring pontoon downstream (1.5km downstream of the barrier) would be provided for recreational users who are unable to navigate the tidal barrier location during construction (see Plate 9).

**Relocation of fishing fleet**
- Subject to agreement with the PoB, which has been provided in principle, the fishing fleet would be provided with an alternative mooring location for the duration of the construction of the barrier. It is envisaged that Lairage Quay (see Plate 9) would be available to the fishing fleet for the duration of the construction of the barrier.

**Dredging requirement**
- The Environment Agency would carry out capital dredging to facilitate the construction of the Project. Approximately 38,300m$^3$ of material (worst case scenario) would be removed across four phases.
- Phase 1 and 2 would be undertaken as part of the enabling works and comprise 31,000m$^3$. Phase 3 and 4 are undertaken towards the end of the construction phase and comprise 7,300m$^3$ (see indicative construction programme).
- The Project would not change the current maintenance dredging regime carried out by the PoB.

**Works to PoB access roads**
- The internal PoB roads required for construction access would be improved to provide the required turning circles, safety aids and sight lines for the additional construction traffic.

**Scour protection works**
- Temporary scour protection would be installed following the first dredging phase to reduce the potential for erosion during construction.
- The temporary scour protection used during construction would be relocated and reused as permanent scour protection for the barrier structure after the completion of the barrier works.

**Wooden quay structure (disused hoist) and grain tower**
- A disused hoist on the right bank would be deconstructed and removed potentially via barge. Material would be recycled where possible.
- The existing grain tower conveyor (operated by Frontier) along the left bank of the PoB Estate would be permanently relocated further downstream (approximately 100m). Two
new towers would be erected to enable a single extended aerial conveyor to be installed from Frontier building to the quay.

**Extending loading platform**
- The load relieving platform is intended to reinforce the quay side to support the additional loading expected while moored boats transfer goods to and from land. During the next design phase consideration would be given to extending the existing loading platform on the PoB Estate.

**Landscaping and lighting**

**Hard and soft landscaping**

Hard and soft landscaping would be provided along the right bank landscaping to retain its semi-natural character.

**Lighting**

External permanent lighting would be installed at key locations within the Project area, including control buildings, the barrier structure and WDE gate.

**Water level management**

The Boston Combined Strategy proposed that water level management (WLM) would be implemented alongside the tidal barrier in order to provide safer passage for pleasure craft onto the South Forty Foot, the first stage of the Fens Waterways Link.

However, in January 2015, the Executive Committee of the County Council and the Environment Agency Boston Barrier Project Board confirmed removal of WLM from the scope of the Project. In making the decision, the Environment Agency, Lincolnshire County Council and Boston Borough Council confirmed that it remains the vision to provide WLM at a later date through a standalone project and consenting process. The Project has been designed not to compromise the introduction of WLM in the future.

**Construction programme and compounds**

Construction of the Project is planned to start in late 2017 and be completed by December 2019. Table 2 provides the indicative sequence of construction activities.
Table 2: Indicative sequence of construction activities

<table>
<thead>
<tr>
<th>Construction works activity</th>
<th>Indicative programme and duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabling works</td>
<td>Pre November 2017</td>
</tr>
<tr>
<td>Enabling dredging works Phase 1 and Phase 2</td>
<td>November 2017 - January 2018</td>
</tr>
<tr>
<td>Establishment of site</td>
<td>January 2018 – March 2018</td>
</tr>
<tr>
<td>Wet Dock closure</td>
<td>January 2018 – September 2018</td>
</tr>
<tr>
<td>Wet Dock opening</td>
<td>End September 2018</td>
</tr>
<tr>
<td>Left bank quayside works. Tie into Wet Dock and barrier structure</td>
<td>October 2018 - November 2019</td>
</tr>
<tr>
<td>Installation of temporary scour protection along by-pass channel</td>
<td>September 2018 – October 2018</td>
</tr>
<tr>
<td>Place cofferdam</td>
<td>October 2018 – December 2018</td>
</tr>
<tr>
<td>Right bank works</td>
<td>April 2018 – Dec 2019</td>
</tr>
<tr>
<td>Construction of barrier structure</td>
<td>January 2019 – July 2019</td>
</tr>
<tr>
<td>Barrier completion: removal of the cofferdam/testing and commissioning</td>
<td>August 2019 – November 2019</td>
</tr>
<tr>
<td>Dredging Phase 3</td>
<td>November 2019</td>
</tr>
<tr>
<td>Installation of permanent scour protection</td>
<td>September 2019 – October 2019</td>
</tr>
<tr>
<td>Dredging Phase 4</td>
<td>November/Early December 2019</td>
</tr>
<tr>
<td>Project completion</td>
<td>December 2019</td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016

Construction works would generally take place between the hours of 07:30 and 18:30, Monday to Friday. Key potential exceptions to this timing include capital dredging works and works to construct WDE. Works to the WDE would be done on a 24 hour per day, 7 days a week (24/7) basis which is in line with the current operational hours for the PoB Estate.

There are three proposed construction compounds, one located on right bank of the Haven and two located on the left (see Plate 9).
Boston Barrier Tidal Project
Non-Technical Summary

This page has been left intentionally blank.
Consideration of alternatives

The proposals for the Boston Barrier Project were developed following a detailed assessment process, both as part of the development of the Boston Combined Strategy and the subsequent development of the Project following the identification of a preferred strategic option as part of that Strategy.

As outlined within the Boston Combined Strategy, seven strategic options were individually appraised in terms of technical, environmental and economic opportunities created. The seven options, including beneficial and adverse effects and costs relative to the other options, are provided in Table 3.
<table>
<thead>
<tr>
<th>Protection standard</th>
<th>Option</th>
<th>Description</th>
<th>Key Beneficial Effects</th>
<th>Key Adverse Effects</th>
<th>Cost (relative to the other options)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do Nothing</td>
<td>Do Nothing</td>
<td>With the Do Nothing Option no works are undertaken and all existing maintenance and operation of structures would stop. This is the baseline against which other options are considered</td>
<td>None</td>
<td>Increase in magnitude and frequency of flooding. Loss of land based infrastructure, high grade agricultural land and reduction in historic character. Would not provide any future opportunities for investment and employment. Would not make provision for recreation and infrastructure improvements.</td>
<td>No cost as no works proposed</td>
</tr>
<tr>
<td>Do minimum</td>
<td>Option I - Maintain defences and western waterway.</td>
<td>Pro-active maintenance of flood risk management assets and a channel linking the River Witham (via North Forty Foot Drain) to South Forty Foot Drain.</td>
<td>Least environmentally intrusive flood risk management option in the short term Provision of new recreational facilities. Improved access to wider waterway network</td>
<td>Option is not sustainable against climate change. Provides little opportunity for securing the future of and improving recreational facilities, infrastructure and agricultural land. Significant land acquisition required. Channel bypasses the town centre therefore opportunities would be missed to encourage visitors to Boston. Disturbance of North Forty Foot Drain which is a designated site.</td>
<td>Fourth most expensive (same cost as Option II and Option IV)</td>
</tr>
<tr>
<td>Do minimum</td>
<td>Option II - Maintain defences, new barrage and navigation link.</td>
<td>Pro-active maintenance of FRM assets, a partial exclusion barrage to control the tidal range within Boston, and a new lock through, or adjacent to, Black Sluice.</td>
<td>Least environmentally intrusive flood risk management option in the short term. Encourages long term investment opportunities. Approach would provide an important recreational resource. Would allow safe navigation of The Haven and wider waterway network.</td>
<td>Option is not sustainable against climate change. Limited opportunity for securing the future of and improving recreational facilities, infrastructure and agricultural land. A barrage to control the tidal range would result in some loss of mudflat habitat and mitigation would be required.</td>
<td>Fourth most expensive (same cost as Option I and Option IV)</td>
</tr>
<tr>
<td>Sustain Standard of Protection</td>
<td>Option III - Maintain defences and</td>
<td>Sustain the current standard of protection (1 in 50 years) into the future by raising the levels of</td>
<td>Provides a contribution to reduction in frequency and severity of flood risk within Boston. Provisions of future investment opportunities due to management of flood risk however, this would</td>
<td>Provides little opportunity for securing the future of and improving recreational facilities, infrastructure and agricultural land. Adverse effects on heritage, landscape and biodiversity</td>
<td>Third most expensive</td>
</tr>
<tr>
<td>Protection standard</td>
<td>Option</td>
<td>Description</td>
<td>Key Beneficial Effects</td>
<td>Key Adverse Effects</td>
<td>Cost (relative to the other options)</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------</td>
<td>-------------</td>
<td>------------------------</td>
<td>--------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>western waterway</td>
<td>Option IV - Sustain Standard of Protection</td>
<td>Maintain defences, new barrage and navigation link</td>
<td>Sustain the current standard of protection (1 in 50 years) by raising the levels of existing FRM assets to cater for the effect of climate change, and create a new partial exclusion barrage to control the tidal range within Boston and a new lock through or adjacent to Black Sluice.</td>
<td>Provides a contribution to reduction in frequency and severity of flood risk within Boston. Provisions of future investment opportunities due to management of flood risk however, this would be limited to the short term. Minimises environmental intrusion in the short term. Encourages long term investment opportunities. Approach would provide an important recreational resource. Would allow safe navigation of The Haven and wider waterway network.</td>
<td>Second most expensive</td>
</tr>
<tr>
<td></td>
<td>Option V - Increase Standard of Protection (1 in 300)</td>
<td>Flood barrier and western waterway</td>
<td>Provide a flood tide barrier (advancing the line of defence) to increase the standard of protection to a minimum of 1 in 300 years and a channel linking the River Witham (via North Forty Foot Drain) to South Forty Foot Drain to the west of the town centre.</td>
<td>Provides a significant contribution to reduction in frequency and severity of flood risk within Boston. Provides long term security of existing and future investments. Encourages long term investment opportunities. Provision of new recreational facilities. Improved access to wider waterway network.</td>
<td>Most expensive option</td>
</tr>
<tr>
<td></td>
<td>Option VI - Increase Standard of Protection</td>
<td>Multi-barrier</td>
<td>Provide a flood tide barrier (advancing the line of defence)</td>
<td>Provides a significant contribution to reduction in frequency and severity of flood risk within Boston.</td>
<td>Fourth most expensive (same)</td>
</tr>
<tr>
<td>Protection standard</td>
<td>Option</td>
<td>Description</td>
<td>Key Beneficial Effects</td>
<td>Key Adverse Effects</td>
<td>Cost (relative to the other options)</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------</td>
<td>-------------</td>
<td>------------------------</td>
<td>---------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Protection (1 in 300) purpose barrier and navigation link</td>
<td>of defence) to increase the standard of protection to a minimum of 1 in 300 years, combined with a partial exclusion barrage to control the tidal range within Boston, and a new lock through or adjacent to Black Sluice.</td>
<td>Boston. Provides long term security of existing and future investments. Encourages long term investment opportunities. Approach would provide an important recreational resource. Would allow safe navigation of The Haven and wider waterway network.</td>
<td>although mitigation through good design is possible. A barrier to control the tidal range would result in some loss of mudflat habitat and mitigation would be required.</td>
<td>cost as Option I and Option II)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016 based on information from the Boston Combined Strategy 2008
The preferred BCS strategic option was Option VI, namely a multi-functional barrier and navigation link. This option demonstrated the highest cost benefit ratio while achieving the required standard of protection which would reduce the severity of flood risk in Boston and encourage long term investment opportunities. Although potential environmental impacts were identified, it was considered that these could be mitigated.

**Boston Project Appraisal Report (PAR)**

Following the identification of the preferred strategic option, the Environment Agency appraised nine potential locations for the proposed barrier. Four of these options were discounted by the Environment Agency due to being costs being prohibitive or requiring additional work that was not actually required to deliver the Project objectives.

Five options were shortlisted for further detailed assessment. The five locations taken forward are shown on Plate 10.

Plate 10: Location of the five shortlist options

Source: Project Appraisal Report 2013

Following selection of the five shortlisted location options, a Public Open Forum was held in Boston in January 2010 to canvass the views of the local community. Members of the public indicated an overall preference for options further downstream, as they perceived that this
would keep flood water furthest away from their homes. In fact, all options would provide the same level of protection from flood risk.

A key stakeholder workshop was then held on 4 March 2010 and wider consultation was also undertaken. The consultation resulted in options A and D being removed from the short list following identification of their unacceptability to key stakeholders and statutory consultees.

- Option A was considered not to meet the navigation objectives of the Project, namely the provision of a safe navigation link between the Lower Witham and South Forty Foot Drain.
- Option D was identified as having significant impacts on the operations of the PoB during and after construction.

Option E gave rise to similar concerns as Option D in terms of the effects it would have on the day to day business operations of the PoB. However, feedback received from the local community demonstrated a strong preference for Option E due to the perceived (but nonetheless misplaced) view that this would offer improved flood protection over other options. In view of this feedback, Option E was not discounted at this stage but instead it was taken forward for further appraisal alongside Options B and C.

**Cost Benefit Analysis of B, C and E Options**

A cost benefit appraisal was undertaken in respect of Options B, C, and E. All three options would provide the same flood risk benefits and therefore the appraisal focused on which option offered the most cost effective means of delivering those benefits.

Option B was identified as the most cost effective solution and was also identified as the option that minimised impacts on key stakeholders and facilitated the accommodation of the required mitigation measures. The appraisal took into account extensive consultation in reaching its conclusion.

The appraisal confirmed that Option E should be discounted on the same grounds as Option D, namely that it would give rise to significant impacts on the day to day business operations of the PoB. Further engagement with local residents was undertaken in order to address their misplaced perception that the location of the barrier affected their residual flood risk.

Option C, being further upstream, did not give rise to the same level of impact on the operations of PoB. However, it would have reduced quay space within the Port, thereby reducing or removing the availability of moorings that could otherwise have been made available to relocate smaller fishing vessels comprised of the Boston fishing fleet who currently operate from an existing quay located upstream from the proposed barrier. The construction of the barrier at the location identified as Option C and its regular operation to regulate water levels, as part of WLM as was originally proposed, would have obstructed their
sailing routes and preclude opportunities to relocate them downstream of the barrier. A viable alternative relocation location was not identified in the Haven. As a result, Option C would have resulted in significant impacts to the Boston fishing fleet.

In contrast, it was identified that Option B would enable the Boston fishing fleet to be relocated immediately downstream of the Barrier and upstream of commercial port operations in the PoB. Option B was therefore selected as the preferred option for delivery of the Project.

WLM was subsequently removed from the scope of the Project and it is no longer necessary to relocate the Boston fishing fleet downstream of the barrier. However, aspirations remain to utilise the barrier to deliver WLM in the future. Accordingly, scheme options which were not progressed on the grounds that they would not facilitate WLM would preclude the delivery of WLM in the future. Accordingly, the removal of WLM has not changed the Agency’s preferred option for delivering the Project.
This page has been left intentionally blank.
Throughout the development of the Project design and during the EIA process, regular consultation with both key stakeholders and the wider community has been undertaken. Table 4 provides a summary of the key organisations consulted.

Table 4: List of organisations involved in the consultation process

<table>
<thead>
<tr>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anglian Water Services Ltd.</td>
</tr>
<tr>
<td>Black Sluice Internal Drainage Board</td>
</tr>
<tr>
<td>Boston and District Fishermen’s Association</td>
</tr>
<tr>
<td>Boston Borough Council</td>
</tr>
<tr>
<td>British Waterways</td>
</tr>
<tr>
<td>Canal and Rivers Trust</td>
</tr>
<tr>
<td>Crown Estate</td>
</tr>
<tr>
<td>Department of Environment, Food and Rural Affairs</td>
</tr>
<tr>
<td>Eastern Inshore Fisheries and Conservation Authority (EIFCA)</td>
</tr>
<tr>
<td>Harbour Master</td>
</tr>
<tr>
<td>Heritage Trust for Lincolnshire</td>
</tr>
<tr>
<td>Historic England</td>
</tr>
<tr>
<td>Lincolnshire County Council</td>
</tr>
<tr>
<td>Lincolnshire Rivers Trust</td>
</tr>
<tr>
<td>Lincolnshire Wildlife Trust</td>
</tr>
<tr>
<td>Marine Management Organisation</td>
</tr>
<tr>
<td>Maritime and Coastguard Agency</td>
</tr>
<tr>
<td>Natural England</td>
</tr>
<tr>
<td>Port of Boston</td>
</tr>
<tr>
<td>Sports England</td>
</tr>
<tr>
<td>The Inland Waterways Association</td>
</tr>
<tr>
<td>The Royal Society for the Protection of Birds (RSPB)</td>
</tr>
<tr>
<td>Trinity House</td>
</tr>
<tr>
<td>Western Power Distribution</td>
</tr>
<tr>
<td>Witham Fourth Internal Drainage Board</td>
</tr>
<tr>
<td>Witham Sailing Club</td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016

The main purpose of the consultations was to understand the views and opinions of the statutory consultees and interested parties on the Project and to discuss what they consider to be key issues and priorities.
The Environment Agency would continue its engagement programme and maintain working partnerships with stakeholders to address community concerns and suggestions throughout the next design and construction phases.
Environmental Impact Assessment process

**EIA process**

The EIA process enables the early identification of potential environmental impacts while the project is still in the design phase, and enables those impacts to be avoided where possible through alternative design or construction methodologies. The EIA process has the following four principal stages:

- **Screening** – determines the need for an EIA and level of environmental assessment required.
- **Scoping** – identifies all potential environmental issues and those likely to result in significant impacts, therefore requiring further assessment. The Boston Barrier Tidal Project obtained a ‘Scoping Opinion’ from the Secretary of State to confirm what should be assessed further.
- **Impact assessment** – a detailed assessment of all impacts considered significant from the construction and operation of the project are predicted, assessed and reported within the ES.
- **Implementation** – the final stage of the EIA is the monitoring of committed mitigation which in the case of this Project is documented within Environmental Action Plan (EAP) to reduce the impacts identified in the ES. The EAP includes mitigation measures and the required management plans which are to be agreed with Boston Borough Council prior to the start of construction.

---

1 A Scoping Opinion is the authority’s (in this case the Secretary of State) formal view on what issues an Environmental Statement should contain.
This page has been left intentionally blank.
Existing environment

Wider surrounding environmental conditions

The Project is located to the south of Boston town, approximately 1.4km from the centre. Boston is an historic market town with an important maritime history. It is set in the low-lying, flat landscape of the Lincolnshire fens and has a rich history with a number of listed buildings and archaeological sites (for example see Plate 11).

Plate 11: Maud Foster Sluice (Grade II listed building)

Source: Mott MacDonald 2016

The area surrounding the Project comprises a mix of residential, commercial and industrial use (see Plate 12).
Residential areas are located to the south on Wyberton Low Road and Marsh Lane (see Plate 12), and to the northeast on Rectory Road and Alfred Street. There are also residential areas to the south-west and north-east of the Project area.

Industrial developments are located on both sides of the Haven with the PoB (see Plate 13) to the north and the Western Power Distribution site to the south-east. A large-scale commercial development, Riverside Industrial Estate, is located directly south of the Project area on the right bank.
The Havenside Local Nature Reserve is located approximately 0.3km downstream of the main Project site and 0.06km from the WSC area on the left bank and there are nine non-statutory designated sites within 2km of the Project. The closest (SFFD Local Wildlife Site) is approximately 0.3km upstream of the Project on the right bank.

**Local environmental conditions**

The Project area itself is predominantly industrial in nature. The PoB Estate is a privately owned enterprise that occupies the majority of land on the left bank within the works area. Plate 14 shows the access to the PoB Estate from St Johns Road. This land is used by the port in its day to day activities. Buildings not utilised for PoB operations are leased out to local businesses for commercial and industrial activities.
On the right bank, there are a number of residential properties along Wyberton Low Road within the Project area (see Plate 12 and Plate 16).

The Haven runs through the Project area and is characterised as a typical flat urban river (see Plate 15), with tidal mudflats exposed at low tide. The banks of the river are sparsely vegetated, with amenity grassland on the flood embankments and scattered shrubs. The key habitats associated with the Haven are: riverine, mudflats, saltmarsh, saline lagoons and reedbeds.
The Boston Public Footpath No.14 (Macmillan Way) follows the right embankment. This footpath follows the top of the embankment, downstream of Black Sluice to the mouth of The Wash then turns south west towards Stamford.

The route of National Cycle Route 1 provides a long distance connection between Dover and the Shetland Islands, but more locally to this development provides a connection for cyclists along Marsh Lane, Wyberton Low Road and London Road (see Plate 16).

Plate 16: View of Wyberton Low Road – part of the National Cycle Route 1

Source: Mott MacDonald 2016
This page has been left intentionally blank.
Significant environmental effects and proposed mitigation measures

This chapter summarises the findings of the ES (see the ES (Volume 1)). It documents the significant environmental effects likely to be associated with the construction and operation phases of the Project and the mitigation required to reduce the identified effects.

**Cultural heritage**

During construction, dredging and excavation activities within the Haven may result in the permanent removal or destruction of archaeological features that may be buried within the tidal mudflats, which is considered to be an adverse significant effect. Prior to construction, archaeological investigations would be agreed in discussion with the Lincolnshire County Archaeology Services and Lincolnshire Heritage. This would detail all archaeological surveys to be undertaken pre- and during construction. If archaeological remains are found, steps would be taken to make the discoveries available to the local community.

Construction activities would result in a temporary adverse significant effect on the setting of both St Nicholas Church (Grade II*) and the Skirbeck Conservation Area (see Plate 17 for the current view) within the landscape. The construction activities would also potentially reduce the quiet character of St Nicholas Church and its churchyard.

Plate 17: Skirbeck Conservation Area from the right bank of the Haven

Source: Mott MacDonald 2016

To maintain the setting of St Nicholas Church and the Skirbeck Conservation Area, the new flood defence on the right bank would be placed directly into the embankment. This results in the flood defence only being visible where it emerges from the embankment rather than being placed in front of the embankment which would have resulted in the flood defence forming the river bank. This would keep the majority of the existing grass embankment and would reduce the industrial appearance of the flood defence. Works on the left bank, including the temporary works associated with the Witham Sailing Club, has been assessed and would not have a significant adverse effect on the setting.
To reduce the effect of the left bank flood wall on the setting of the Maud Foster Sluice (Grade II listed), in-design mitigation has been incorporated, and the flood wall tapers down where it joins the sluice. With this in-design mitigation, the impact is not considered significant.

Once in operation, the Project would have a permanent beneficial significant effect as the historic features and structures within Boston would benefit from improved flood protection. It would also encourage opportunities for investment in the historic buildings due to reduced flood risk, and reduce spending related to flood damage repairs.

**Landscape and visual amenity**

The construction activities would be visible from a number of locations surrounding the Project area. There would be clear views of the works from the upper back windows of properties on Wyberton Low Road, Marsh Avenue and Marsh Lane, and from the Boston Public Footpath No.14 (Macmillan Way) (see Plate 18) and the river (boat users). The construction works would negatively affect the existing view of the river from these locations, resulting in a temporary adverse significant effect.

Plate 18: Proposed view for users of Boston Public Footpath No.14 (Macmillan Way)

The presence of construction works and associated plant and machinery would potentially alter the landscape character within the Project area, resulting in a temporary adverse significant effect.
Any visual changes during the construction period would be localised and temporary. The Project would adopt industry best practices and the landscape scheme which would be agreed with Boston Borough Council, such as controlling excessive artificial lighting, and retaining trees and vegetation, where possible.

Once the tidal barrier has been constructed, there are no significant impacts anticipated on landscape. However, the tidal barrier support structures, above water level, and the flood walls would be visible from the first floor of residential properties on Wyberton Low Road, Marsh Avenue and Marsh Lane, and from the southern sections of London Road. This would result in a negative change to their current views, which is considered to be a permanent adverse significant effect.

The view of the tidal barrier (elements above the water level) and the flood walls would be most noticeable for users of the Boston Public Footpath No.14 (Macmillan Way) along the right bank and for river users. It is anticipated that this would result in a permanent change in the views for these people, which is considered to be an adverse significant effect.

To mitigate the operational effects, the tidal barrier would have a grey/black colour scheme and therefore, it should blend with the tall buildings, cranes and other structures required for the operation of PoB. In addition, lighting would be localised, new street furniture (benches) and art work could be included following consultation with Boston Borough Council, and saline resistant wild flowers would be planted. Following the implementation of the mitigation measures, the residual effect is considered to be significant adverse for users of Boston Public Footpath No.14 (Macmillan Way), river users and residential properties on Wyberton Low Road.

**Land use**

During the construction phase, there would be a temporary diversion of the existing Boston Public Footpath No.14 (Macmillan Way) for the entire construction period which is not considered as a significant effect as an alternative route would be provided. The footpath would be re-instated following construction and would be improved making it more attractive for walkers and accessible for persons of restricted mobility.

Cyclist access would be maintained on Wyberton Low Road during the diversion of the three 11kV electrical cables to reduce disruption to users of the National Cycle Network Route 1. However, restrictions may be applied for the safety of the cyclists but it is not anticipated to result in a significant effect.

There would be a change in land use within the PoB’s site area due to construction activities, including site compounds, demolition of the Buoy Shed, increase in width of the WDE, storage of dredge material, and construction of the tidal barrier, flood walls and sheet piling (retaining
wall for the quayside). These would result in a small loss of land within the PoB Estate which is not considered to be a significant effect.

The existing grain tower conveyor (operated by Frontier) along the left bank of the PoB Estate would be permanently relocated further downstream (approximately 100m). Two new towers would be erected to enable a single extended aerial conveyor to be installed from the Frontier building to the quay. The provision of the two new towers and extended aerial conveyor are assessed to result in a beneficial effect.

As a result of the Project, there would be a permanent change in land use within PoB’s site area due to the control buildings required for the tidal barrier and WDE gates. In addition, when the tidal barrier and flood gates within the flood wall are closed during extreme tidal events it would result in a temporary restriction in the use by the PoB Estate and their commercial operators, in front/riverward of the flood defence. These are not considered adverse significant effects.

### Noise and vibration

Construction works would primarily take place between the hours of 07:30 and 18:30, Monday to Friday. Any noisy work undertaken outside of normal working hours (i.e. 07:30 and 18:30, Monday to Friday) would be controlled through a noise and vibration management plan, details of which would be agreed with Boston Borough Council prior to the start of construction.

Threshold levels are considered to result in significant adverse effect where a construction activity takes longer than a month and the total noise level (pre-construction noise plus construction noise) at a sensitive receptor exceeds $65 \text{dB L}_{\text{Aeq}}$ during the day-time, $55 \text{dB L}_{\text{Aeq}}$ during the evening and $45 \text{dB L}_{\text{Aeq}}$ at night.

Phase 1 dredging works are predicted to last for up to 4 weeks. Worst case predicted noise levels resulting during Phase 1 works are anticipated to result in a temporary adverse significant effect during the day, evening and night time at Wyberton Low Road ($69 \text{ dB L}_{\text{Aeq}}$) and a temporary significant adverse effect during the evening and night time for the following receptors closest to the works:

- Marsh Lane – 53 dB $L_{\text{Aeq}}$;
- Victoria House – 50 dB $L_{\text{Aeq}}$; and
- London Road – 52 dB $L_{\text{Aeq}}$.

Phase 2 dredging works are predicted to last for up to 8 weeks. Worst case predicted noise levels resulting during Phase 2 works are anticipated to result in a temporary adverse

---

2 $L_{\text{Aeq}}$ is the value of the A-weighted sound pressure level that represents the average noise level.
significant effect during the evening and night time for the following receptors closest to the works:

- Wyberton Low Road – 56 dB $L_{Aeq}$;
- Marsh Lane – 53 dB $L_{Aeq}$;
- Victoria House – 51 dB $L_{Aeq}$;
- The Featherworks – 59 dB $L_{Aeq}$;
- Windsor Bank – 57 dB $L_{Aeq}$;
- Alfred Street – 52 dB $L_{Aeq}$;
- Skirbeck Road – 49 dB $L_{Aeq}$; and
- London Road – 46 dB $L_{Aeq}$.

Due to the duration of Phase 3 and 4 dredging works, being less than 1 month, it is not anticipated that these works would result in a significant effect.

The construction of the WDE has the potential to result in a temporary significant adverse effect at residential properties on the left bank. Worst case noise levels are expected be to 63 dB $L_{Aeq}$ for The Featherworks, 50 dB $L_{Aeq}$ for Windsor Bank, 51 dB $L_{Aeq}$ for Alfred Street and 48 dB $L_{Aeq}$ for Skirbeck Road, which exceeds the night time threshold level.

The strategy for sheet piling from the Environment Agency is that works would take place during the day time only and not during the evening or night time. Therefore, there would be no significant effects related to piling during the evening and night time period.

Noise levels from the left bank piling works required for the construction of the barrier and flood wall is not anticipated to exceed the noise threshold levels.

In terms of absolute noise levels (worst case) sheet piling on the right bank required for the construction of the barrier and flood wall would result in noise levels of 75 dB $L_{Aeq}$ at residential properties along Wyberton Low Road. The predicted noise levels on the right bank would exceed the daytime noise threshold. However, in addition to total noise level, in defining significance British Standard 5228 advises that durations of work in excess of 1 month are necessary. The progress of sheet piling is estimated to move 10m per day during the construction works. Therefore, it is unlikely that noise sensitive receptors would be exposed to significant impacts for extended periods of time thus not resulting in significant adverse effects.

There is the potential for temporary significant noise effects along Wyberton Low Road due to the diversion of electrical cables as part of the enabling works. Worst-case noise levels along Wyberton Low Road are predicted to reach 95 dB $L_{Aeq}$ which exceeds the noise threshold levels.
Table 5 shows the predicted worse-case noise levels as a result of construction traffic.

Table 5: Summary of predicted construction noise impacts from construction traffic

<table>
<thead>
<tr>
<th>Location</th>
<th>Predicted existing noise level, $L_{Aeq,16h}$</th>
<th>Predicted worst case noise levels during construction $L_{Aeq,16h}$</th>
<th>Predicted worst case change $L_{Aeq,16h}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wyberton Low Road</td>
<td>44.3</td>
<td>79.1</td>
<td>34.8</td>
</tr>
<tr>
<td>Wyberton Low Road and Marsh Lane</td>
<td>44.3</td>
<td>68.8</td>
<td>24.5</td>
</tr>
<tr>
<td>Marsh Lane and Marsh Avenue</td>
<td>44.3</td>
<td>66.6</td>
<td>22.3</td>
</tr>
<tr>
<td>Wyberton West Road and London Road</td>
<td>44.3</td>
<td>61.9</td>
<td>17.6</td>
</tr>
<tr>
<td>Bath Gardens</td>
<td>50.3</td>
<td>55.4</td>
<td>5.1</td>
</tr>
<tr>
<td>Tower Gardens</td>
<td>50.3</td>
<td>54.9</td>
<td>4.6</td>
</tr>
<tr>
<td>Alfred Street</td>
<td>49.3</td>
<td>66.4</td>
<td>17.1</td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016

Impacts due to road traffic are predicted when there is an increase by 5dB or more from the predicted baseline. Based on the predicted noise levels given in Table 5 there is the potential for significant temporary effects from construction traffic noise at all front-line\(^3\) receptors assessed with the exception of Tower Gardens based on the worst case predicted noise levels change. However, this traffic would not be experienced throughout the construction phase as is highlighted in Plate 19.

The potential construction noise impacts are to be managed and reduced to non-significant by implementing measures such as erection of noise barriers, appropriate equipment selection, traffic management, appropriate scheduling of works and effective and timely stakeholder consultation. These measures aim to reduce noise, wherever possible, to a level that is closer to levels normally heard by people in the Project area and therefore would be less noticeable. These measures would be implemented through the noise and vibration management plan.

The operation of the tidal barrier is not predicted to result in an increase in noise levels.

Increased vibration levels are expected to be perceptible as a result of piling and the diversion of the electricity cables. Prior warning and explanation would be provided to the properties likely to be affected and as the works would be temporary it is not expected to disturb the residents and therefore, not significant.

---

\(^3\) Residential properties nearest the road
Technologies such as silent sheet piling which produces less vibration than conventional piling methods and very low noise levels would be investigated to limit impacts. In addition, the use of softer alternatives (to hammering) of piling techniques would be used where ground conditions allow.

There is no indication of significant effects in terms of potential cosmetic (such as paint works and plastering) or structural damage in residential buildings. However, as a precautionary measure the Environment Agency is committed to undertaking pre-construction structural condition surveys of properties along Wyberton Low Road and implement protective measures where necessary.

The operation of the tidal barrier is not predicted to result in an increase in vibration.

**Ecology and nature conservation**

During construction, fish populations may be temporarily affected by the narrowing of the Haven, and an increase in local noise and vibration from construction activities, which would result in a temporary adverse significant effect.

During construction mitigation measures to reduce the impact on fish would be implemented through the ecological management plan which would be agreed with Boston Borough Council. These would include: training of construction staff by an ecologist, minimising noise and vibration, minimising sediment release, dredging to be undertaken during cooler months, and dredging to avoid smelt spawning season (generally mid-February to end of March). Works would be done in line with Environment Agency best practice such as pollution control, and refuge areas would be provided. In addition, fish movements would be monitored to check for changes in numbers and migration patterns. The above would reduce the potential impacts to non-significant.

Technologies such as silent sheet piling which produces less vibration than conventional piling methods and very low noise levels would be investigated to limit impacts on fish populations. In addition, the use of softer alternatives (to hammering) of piling techniques would be used where ground conditions allow. Where this is not possible, soft start piling procedures would be utilised.

Piling activities would avoid fish migratory periods, where possible, where piling is required during these times “downtime” periods would be provided between piling days to allow times for fish recovery and provision of windows of opportunities for undisturbed migration. The actual periods of downtime would be determined during the next design phase when the precise pilling methods are known and would be documented in the ecological management plan.
The above measures are anticipated to reduce the potential impact on fish to non-significant.

No other animals or plant life (land or marine) are expected to experience significant adverse effects from the construction works. However good practice measures would be provided in the ecological management plan to ensure that these effects remain non-significant and include measures, such as biosecurity measures to avoid, or failing which, prevent the spread of invasive species, training, pollution prevention, reducing dust, noise and lighting, hand searches of suitable habitat prior to vegetation clearance and vegetation clearance to avoid bird nesting season.

The operation of the tidal barrier is not expected to negatively affect animals or plant life. However, general measures such as the timing of maintenance during operation to avoid migration seasons and fish monitoring would be implemented.

As an enhancement measure and as part of the landscaping works to restore the right bank post-construction, Boston Horsetail could be established in areas which surveys deem to be suitable for potential growth. Boston Horsetail is native to the local area, is a protected species, and has been in decline in recent years. Therefore, the re-introduction of this to the area is considered an improvement on existing conditions and is beneficial.

**Surface water**

The potential surface water impacts considered within the assessment were:

- An increase in turbidity due to dredging;
- Mobilisation of sediment bound contaminants;
- Pollution incident/oil spillage; and
- Pollution from silt laden runoff.

Construction activities would be carried out in line with best practice and normal tidal activity would continue in the Haven for the duration of the construction period. The assessment concluded that the surface water would experience no significant effects, either temporarily or permanently from Project construction.

Construction best practice measures would be used to reduce the chance of a decrease in water quality. Such measures would include contaminant control and appropriate management of the dredging activities to prevent an excess build-up of small particles of silt within the Haven.

A preliminary Water Framework Directive (WFD) assessment has been undertaken for the Project. The Project components have the potential to impact upon elements relevant to WFD. The principal risk identified in the assessment was degrading the structure of the river. However, the Project components are an integral part of managing flood risk, and the water
body is already classified as heavily modified. The Project components are unlikely to significantly alter the hydromorphological (physical characteristic) of the water body. Similarly, it has been determined that the risk of decreasing water quality is minimal. Therefore, the Project components would not result in a significant effect in terms of WFD.

Water quality monitoring would be carried out prior to, during and post construction. If any changes in water quality are detected, measures would be put in place to return the water quality to an acceptable level which would be outlined in the ecological management plan. Such measures could include stopping dredging activities to reduce the amount of excess silt in the water in construction.

The assessment has shown that there would be no significant effects on water quality within the Haven as a result of the operation of the tidal barrier.

**Estuarine processes and geomorphology**

There would be a slight increase in the speed of water flowing through the Haven at the location of the tidal barrier due to the narrowing of the channel. However, the modelling carried out has shown that the overall changes in velocity remain low and would not substantially increase the rate of erosion or sediment removal within the Haven. Therefore, this is not considered to be a significant effect. However, erosion control would be provided during construction and surveys would be carried out during the construction period, to determine the rate of erosion and deposition to ensure the control measures are effective.

There are no significant effects anticipated once the barrier is operational. However, it is possible that there may be an increase in the rate of erosion to the channel bed. Surveys to map the bed of the Haven are carried out regularly by PoB to identify the need for channel maintenance during operation, and additional protection against erosion would be installed, if needed.

In addition, although the sheet piles are not anticipated to result in a significant effect, enhancement measures would be investigated in the next design phase; this could include willow spilling and green bank reinforcement.

**Contaminated land and ground conditions**

During construction there is a potential risk to workers who may come into direct contact with contaminated land and associated ground gas. This is considered to be a temporary significant adverse effect. Best practice measures would be employed to reduce the risk of exposure. These would include: regular training, preparation of method statements to establish ways of working, appropriate use of Protective Personal Equipment (PPE) (such as
dust masks), dust suppression, and collection of drainage water and management of surface water. These measures would reduce the effect to non-significant.

Once the tidal barrier is operational, there is a small risk to operators in the control building due to the potential accumulation of ground gas in the building, resulting in a permanent adverse effect. However, the control building would be designed to include ground gas protection measures which would eliminate the risk and therefore be non-significant effect.

**Waste and resources**

With the implementation of best practice waste management practices, which would follow the UK Waste Hierarchy of Re-use → Recycle → Recover → Dispose, the County’s waste infrastructure would be able to support the likely waste products including dredged material associated with the Project without substantial alteration to their routine work and working practices. As such, no significant effects are anticipated on waste and resources.

The waste management procedures do be adopted during construction would be documented in the site waste management plan which would be approved by Boston Borough Council prior to the start of construction.

**Navigational impact**

During construction the assessment has shown that there would be significant effects to navigation or boat users as a result of:

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

The works would include construction activities and new structures within the navigable river channel. There would also be a large increase in river traffic as construction plant may comprise barges or safety craft and it is assumed that 90% of construction material for the Project would be brought to site by barge. 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.

Due to the increase in the number of vessels in the channel during construction there are increased risks of collision with construction plant and between users and with moored ships on the river berths. Smaller, less manoeuvrable craft may be more susceptible to that hazard. In addition, while the WDE works are ongoing all PoB commercial vessels would be turned outside the wet dock. This increase in the number of cargo ships turned outside the WDE
increases the risk of collision with other users. Divers are likely to be required during construction which would pose additional safety risk to divers themselves and river users.

During construction the PoB’s available quay length would be reduced in order to upgrade the quay walls and the WDE. This would impact commercial vessel activities both inside and outside the Wet Dock and would lead to an associated reduction in port capacity. In addition, relocation of all PoB traffic to riverside berth during the closure of the WDE would impact PoB’s operation and in particular their berthing/unberthing operations.

It is anticipated that the installation of the barrier gate would be the only activity that would require the river to be closed to maritime traffic. It is currently estimated that the closure would be for up to two days; however, this would be confirmed during the next design phase. Activities such as dredging and installation of scour protection would require navigation restrictions to be put in place for short periods of time, up to one hour at a time. Outside of these specific elements of work there may also be isolated restrictions on navigation where deemed appropriate by the works contractor and the Harbour Master.

The construction effects would be managed through an appropriate programming of the works, installation of aids to navigation, collision protection measures appropriate to the range of river users, and implementation of effective communication between the Harbour Authority, Canal River Trust, Environment Agency, the works contractor and river users. In addition, there would be a provision of moorings within the PoB Estate and upstream and downstream of the tidal barrier for use by those affected by river closures during construction. Additionally, the Witham Sailing Club and fishing fleet would be re-located as part of the enabling works.

With the implementation of the mitigation measures it has been assessed that all the significant effects would be reduced to non-significant apart from:

- Increased collision risk – risk of collision with moored ships on river berths by vessels utilising the bypass as a result of increased in-channel activities; and
- Reduction in available quay length – progressive closure of riverside berths and relocation of all PoB traffic to riverside berth during the closure of the WDE would impact PoB’s operation and require all commercial vessels to be turned outside the WDE.

Once built and operational, the assessment has shown that the tidal barrier would result in significant effects as a result of:

- Reduced manoeuvrability and river width;
- Increased collision risk;
- River restrictions/closures;
- Reduction in available quay length; and
- Underkeel clearance restriction.
The barrier installation would reduce the channel width at the location of the barrier. This would result in a reduction in the available navigable channel width at high tide. This would lead to reduced manoeuvrability of all vessels in the vicinity of the barrier and potential requirement for one way traffic larger vessels. In addition, any local increase in bed height as a result of sediment deposition could reduce manoeuvrability and increase the risk of collision and grounding.

The barrier may reduce visibility and have an impact on sight lines of all vessels navigating this part of the Haven. A reduction in visibility of the structure would increase risks of collision with the river users and structures. When navigating through the barrier at night or when it is closed at night as a result of an extreme tide warning there is a risk of collision with the barrier, other ships or ships moored on the riverside berths. Changes in velocity and risks of vortex’s forming just south of the barrier tie-in may increase the risk of collisions. In addition, the new barrier has the potential to attract new river users who would be unaware of the risks associated with the new barrier and new navigation conditions.

During periods when the barrier is closed, river traffic is at risk of being trapped upstream or downstream of the barrier.

The barrier is located at one of PoB’s berths thereby removing it from use for PoB vessels.

Any local increase in bed height as a result of increased sediment deposition could reduce the manoeuvrability of larger ships and increase the risk for collision and grounding. In addition, the bed level would be maintained at its current depth at the barrier location. However, the effect on a vessel impacting with a hard structure (if this is to occur) is likely to be more severe than an impact with the existing bed conditions.

The effects during operation would be managed through a river traffic management system managed by the PoB / Harbour Master, provision of suitable upstream and downstream waiting areas when the barrier is closed, lighting and navigation aids and collision measures. PoB would undertake surveys of the Haven channel bed and maintenance dredging would be undertaken regularly to reduce the potential of sediment building up which may affect navigation. These measures, once implemented, would reduce the majority of significant effect to non-significant.

The only remaining significant impact would be the impact to PoB’s quay length and operations. Once the barrier is in place a section of quay wall would not be useable to moor and offload vessels although the landside areas would remain useable. Alongside this, the widening and other improvements to the WDE would have long term positive effects on PoB’s operations.
Road traffic and transport

Construction is expected to increase road traffic levels during construction on both the left and right banks of the Haven. Traffic from the left bank compound is expected to follow St John's Road onto the A16 and A52, and traffic from the right bank construction compound would follow Marsh Lane onto the A16.

During the first full year of construction in 2018 a total of approximately 34,800 total two way vehicle movements are estimated, and broken down as follows:
- 53% cars;
- 31% HGVs;
- 8% crew bus; and
- 8% delivery vans.

The profile of monthly vehicle movements across the construction period, including pre-construction capital dredging (Phase 1) has been estimated and is summarised in Plate 19.
Plate 19: Predicted monthly vehicle movements to the Project during construction

Source: Mott MacDonald 2016
The increase in traffic could lead to an increase in delays on the local roads which is considered a significant adverse effect. Any road-based construction impacts would be temporary and would be managed effectively by a construction traffic management plan (CTMP) which would reduce the effects to non-significant. This plan would be agreed with Boston Borough Council prior to the start of construction.

Cyclist access would be maintained on Wyberton Low Road during the diversion of the three 11kv electrical cables to reduce disruption to users of the National Cycle Network Route 1. This is not considered a significant effect.

The Boston Public Footpath No.14 (Macmillan Way), would be diverted throughout the entirety of construction phase of the Project, and would result in a temporary adverse significant effect. The CTMP would provide information on the diversion which would be distributed to local residents and businesses. In addition, appropriate signage would be provided and specified in the CTMP. This is anticipated to reduce the effect to non-significant.

There are no effects anticipated to result during the operation of the tidal barrier.

**Air quality**

The assessment has shown that local air quality, including within the Boston Air Quality Management Area (AQMA), would not be affected and therefore, the reported effect is not significant, as a result of the additional construction traffic required by the Project.

Construction activities on site would not result in significant effects but on site activities do have the potential to increase dust levels. This would be managed and controlled through good site practice such as damping down of spoil material and limiting stockpiles on site. The mitigation measures would be documented in the construction method statement which would be submitted to Boston Borough Council for approval prior to the start of construction.

The operation of the tidal barrier would not reduce air quality in the vicinity of the Project.

**Community**

During construction, the appointed contractor would develop a local recruitment policy and local business register to assess and maximise local employment and business opportunities for local companies. This would be captured and delivered through the construction method statement.

The diversion of Boston Public Footpath No.14 (Macmillan Way) and the disruption to cyclists as a result of the Project are not anticipated to result in significant community effects.
However, the removal of the disused hoist is anticipated to result in a permanent beneficial effect, in terms of safety, for users of Boston Public Footpath No.14 (Macmillan Way). In addition, following construction, the Boston Public Footpath No.14 (Macmillan Way) would be improved making it more attractive for walkers and accessible for persons of restricted mobility.

There is the potential for odour as a result of drying of the dredged materials across the four dredging phases. However, this is not anticipated to result in a significant effect.

Once operational, the Project would result in long term benefits for the community and local buildings by reducing the risk of flooding and the resulting damage to houses, streets and community stress.
Cumulative assessment

The Project considered two types of cumulative effects inter-project and in-combination effects.

Inter-project effects arise due to interactions between the Project and past, present and future (reasonably foreseeable) developments in the locality of the Project which have not been included in the baseline. In-combination effects result due to interactions between different elements (i.e. noise and landscape affecting the same receptor) within the Project.

Eleven developments (five residential developments and six Environment Agency schemes) were identified within the vicinity of the Project which had the potential to result in inter-project cumulative effects (see Table 6). Three of the Environment Agency schemes were scoped out of the assessment. One was scoped out due to the type of work being undertaken and two were scoped out as they were still in the inception stage.

Table 6: Developments and schemes in the vicinity of the Project

<table>
<thead>
<tr>
<th>ID</th>
<th>Brief description</th>
<th>Location</th>
<th>Scoped in/out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Erection of 75 dwellings</td>
<td>Broadfield Lane; Approx. 500m west of site boundary</td>
<td>Scoped in to assessment.</td>
</tr>
<tr>
<td>2</td>
<td>Erection of 60 dwellings</td>
<td>London Road; Approx. 250m south west of site boundary</td>
<td>Scoped in to assessment.</td>
</tr>
<tr>
<td>3</td>
<td>Erection of 108 dwellings and associated infrastructure</td>
<td>Boston College De Montfort Campus, Mill Road, approx. 450m north east of site boundary</td>
<td>Scoped in to assessment.</td>
</tr>
<tr>
<td>4</td>
<td>Erection of 32 detached, semi-detached and terraced dwellings</td>
<td>Sir Isaac Newton Drive approx. 250m north of site boundary</td>
<td>Scoped in to assessment.</td>
</tr>
<tr>
<td>5</td>
<td>Erection of 26 dwellings</td>
<td>St Thomas Drive, approx. 250m south west of site boundary</td>
<td>Scoped in to assessment.</td>
</tr>
<tr>
<td>6</td>
<td>Installation of a piled toe revetment</td>
<td>Downstream Grand Sluice approx. 150m north west of site boundary</td>
<td>Scoped in to assessment.</td>
</tr>
<tr>
<td>7</td>
<td>Routine maintenance</td>
<td>Black Sluice and Lower Witham within the site boundary</td>
<td>Scoped out of assessment due to type of work.</td>
</tr>
<tr>
<td>8</td>
<td>Armouring of low spots in the catchment embankments.</td>
<td>Black sluice; and SFFD at various locations up to several km’s from the site boundary</td>
<td>Scoped out of assessment due to still being in inception stage.</td>
</tr>
<tr>
<td>9</td>
<td>Maintaining Standard of</td>
<td>Both sides of Haven, immediately</td>
<td>Scoped in to assessment.</td>
</tr>
</tbody>
</table>
An assessment of the remaining eight developments determined that there would be no inter-project cumulative effects with any of the residential developments during either construction or operation. In addition, it was determined that with the implementation of mitigation and construction best practice measures by the Environment Agency schemes it would be unlikely that the schemes would result in significant cumulative effects during construction or operation.

The potential for in-combination cumulative effects within the Project has also been assessed. It determined that there was the potential for in-combination effects during construction as a result of a decrease in visual amenity, increase in noise and a loss of community assets. However, the assessment determined that it was unlikely that significant in-combination cumulative effects would result during construction.

During operation it was determined that there was the potential for in-combination cumulative effects as a result of increased protection from flood risk for community and heritage assets and reduction in visual amenity as a result of the Project. However, the assessment showed that significant in-combination cumulative effects during operation were unlikely.
Conclusion

This Report has summarised the findings presented in the ES from the work carried out within the EIA to support the Boston Barrier Project. The potential significant positive and adverse effects have been identified and measures have been provided to mitigate the significant adverse effects. The identified mitigation would reduce all significant permanent adverse effects to non-significant apart for effects on cultural heritage assets that could be buried in the mud flats within the Haven, reduced quay length within the PoB Estate and visual amenity for receptors along Wyberton Low Road, users of the Boston Public Footpath No.14 (Macmillan Way) and river users.

There are also a number of temporary significant adverse effects that would only be experienced during the construction phase. To ensure that the significant adverse effects during construction are managed appropriately management plans would be developed and agreed with Boston Borough Council prior to the start of construction, these include:

- Construction Method Statement;
- Construction Traffic Management Plan;
- Noise and Vibration Management Plan;
- Ecological Management Plan; and
- Site Waste Management Plan.

The Project would be constructed in accordance with the approved statement and plans.

Boston and the Haven have a long history of flooding which is affecting the potential for redevelopment and investment within the town of Boston. The construction of the tidal barrier and flood defences would improve this situation whilst at the same time contributing to the feeling of well-being associated with improved flood protection in the wider community. The Project is seen as an important piece of infrastructure in terms of flood protection works and improving community resilience.

In addition, the Project would result in a number of permanent positive effects, including, reducing the potential for permanent damage to historic buildings and streetscapes, increasing the potential investment in historical building stock, improving the Boston Public Footpath No. 14 (Macmillan Way) making it more attractive for walkers and accessible for persons of restricted mobility, reducing the immediate aftermath of flood events (such as mud and debris left by the flood water), and building activities related to the repair of buildings and streetscapes.

This ES satisfies all requisite statutory requirements relevant to the Project and it is considered that the construction and operation of the Project is justified, taking into account environmental and economic considerations and is in accordance with the principles of sustainability.
This page has been left intentionally blank.
1 Introduction

1.1 Overview

1.1.1 The Environment Agency is seeking to manage the flood risk from the tidal River Witham (known as the Haven in this location) in Boston, Lincolnshire. The Environment Agency is proposing to provide protection against a 0.33% (1 in 300) annual probability of flooding over the 100 year project life in this location.

1.1.2 The works required to achieve this are outlined in the Boston Combined Strategy (BCS) (2008), and comprise of a tidal barrier, to be closed during extreme tidal conditions, to reduce the risk of flooding upstream, along with flood defences along the banks of the Haven.

1.1.3 The Project works comprise the construction of a tidal barrier which can be raised when extreme high tides are predicted within the Haven, along with land-based flood risk management structures that tie into the barrier structure and existing flood management structures (known as ‘the Project’). The barrier has a large moveable flood gate which, when not in use, would lie flat on the river bed, to be raised occasionally to prevent flooding in Boston during extreme tides (by acting as a tidal barrier). The gate and concrete side walls would sit on a reinforced concrete base slab, supported by deep steel piled foundations.

1.1.4 The Project area is located within and adjacent to the Haven, approximately 100m downstream of Black Sluice (see Appendix A of this Report: Figure 1.1). The barrier structure is located adjacent to the Starch Berth (on the Port of Boston (PoB) Estate - left bank) and existing residential properties (along Wyberton Low Road - right bank) (National Grid Reference TF 32836 42826). The flood defences extend from Black Sluice to the Western Power Distribution (WPD) site on the right bank, and from the barrier structure to Maud Foster Sluice on the left bank.

1.1.5 It should be noted that, references to left and right bank of the Haven are described in a downstream facing direction. Therefore, the left bank (north side) is on the left side when facing downstream and the right bank (south side) is on the right side when facing downstream.

1.2 Background and Project justification

1.2.1 Boston is a historic market town with an important maritime history. It is set in the low-lying, flat landscape of the Lincolnshire fens, much of which is below the level of the mean high water spring tides of the Haven (the tidal River Witham). The tidal river presents a potential flood risk to Boston, particularly during extreme tides, such as those which occurred in December 2010 and 2013. The Haven also restricts the type and volume of vessels able to navigate through the town.

1.2.2 As stated in the BCS (2008), Boston is particularly vulnerable to extreme tides and subsequent flooding. Extensive damage was caused in the last serious flood incident in
December 2013, causing extensive flooding to 800 properties and 100 businesses, when an extreme tide breached the town’s flood defences at a recorded level of 6.08m AOD (Above Ordnance Datum).

1.2.3 The existing flood risk management measures along the Haven are maintained by the Environment Agency. The existing standard of protection through the town of Boston itself is for a 2% (1 in 50 years) annual probability of flooding. The existing flood risk management structures consist of flood gates and flood walls within Boston town centre; along with a raised embankment on the right bank of the Haven from Black Sluice down to WPD (see Plate 2.1). However, these flood risk management assets are subject to overtopping during spring tides or high storm tides.

1.2.4 The BCS (2008) is a major strategy being delivered by Environment Agency, Lincolnshire County Council (LCC) and Boston Borough Council (BBC) to manage the risk from tidal flooding in Boston, whilst facilitating opportunities for regeneration of the town’s waterways.

1.2.5 The BCS (2008) sets out 5 stages to reduce the risk to people and the environment from tidal flooding. The BCS also aims to deliver a safe and attractive navigation connection to the proposed Fens Waterways Link\(^1\). The 5 stages are:
- Stage 1: A new navigation link between the Haven and South Forty Foot Drain at Black Sluice (this was completed in March 2009)
- Stage 2: Refurbishment of the Haven river walls upstream of the proposed barrier;
- Stage 3: The provision of a new multi-functional barrier; and
- Stages 4 and 5: Waterways facility improvements and raising of the embankments downstream of the barrier respectively.

1.2.6 Stage 3 of the BCS (2008) outlines the delivery of a tidal barrier. This would be implemented through the Project, the aim of which is to improve the standard of protection in Boston from tidal flooding without affecting the existing fluvial flood protection provided upstream within the River Witham and South Forty Foot Drain (SFFD).

1.2.7 The Project has been designed to achieve this improved standard of protection, through the proposed barrier and associated flood walls on the right and left banks and gate in the Wet Dock Entrance (WDE). The BCS (2008) proposed that water level management (WLM) be implemented alongside the tidal barrier in order to provide safer passage for pleasure craft onto the South Forty Foot, the first stage of the Fens Waterways Link.

1.2.8 However, in January 2015, the Executive Committee of the County Council and the Environment Agency Boston Barrier Project Board confirmed removal of WLM from the scope

\(^1\) The Fens Waterways Link would, when finished, provide a route running through the cathedral cities of Lincoln, Peterborough and Ely. Only the first stage has so far been completed. Lincolnshire County Council and Boston Borough Council also aim to improve the aesthetic appeal of Boston town centre to enable an increase in tourism and to promote regeneration of the town by implementing WLM.
of the Project. In making the decision, the Environment Agency, LCC and BBC confirmed that it remains the vision to provide WLM at a later date through a standalone project and consenting process. The Project has been designed not to compromise the introduction of WLM in the future.

1.3 Objectives

1.3.1 The objectives of the Project are to:
- Flood Risk Management: To reduce the risk to people and the developed and natural environment from flooding;
- Economics: To maximise amenity, social and economic opportunities; and
- Environment: To minimise the adverse impacts on the natural and built environment of the area and to maximise opportunities for environmental enhancement.

1.4 Purpose of environmental statement

1.4.1 The Environment Agency is making an application to the Secretary of State for Environment, Food and Rural Affairs for an Order under the Transport and Works Act, 1992 (TWAO) and an associated request for a direction deeming planning permission pursuant to Section 90(2A) of the Town and Country Planning Act 1990.

1.4.2 In addition to the above:
- A separate application for a Listed Building Consent is being made to Boston Borough Council in relation to works proposed within the vicinity of the Maud Foster Sluice, a Grade II listed building; and
- A separate application for a Marine Licence pursuant to the Marine and Coastal Access Act 2009 will be submitted to the Marine Management Organisation for works in the marine environment.

1.4.3 The purpose of these applications is to authorise the construction, operation and maintenance of a new tidal protection barrier across the Haven in Boston, Lincolnshire together with associated flood defence walls and other works. The purpose of this Environmental Statement is to support these applications.

1.4.4 The Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 (Rules) require that the applicant carries out an Environmental Impact Assessment (EIA) for the Project and presents its findings in an Environmental Statement (ES) (referred to in the Rules as the ‘applicant's statement of Environmental Information’). This ES is one of a number of documents to support the TWAO application which would be submitted to the Secretary of State for Environment and Rural Affairs.

1.4.5 The EIA process is a systematic and iterative procedure, using the best practicable techniques and best practice sources of information, to determine the potential environmental
effects of a proposed development (both beneficial and adverse) and their significance. It provides an opportunity for public input to the proposals and public scrutiny of the proposed development. It enables the importance of predicted effects to be assessed and taken into account by appropriate bodies before a decision on whether to grant an Order is taken. The EIA approach adopted by the Project is discussed in Chapter 3 of this Report.

1.4.6 The purpose of this ES is to:

- Describe the Project, including an appraisal of the main alternatives considered;
- Document how the EIA process has influenced the design and construction methods proposed for the Project and enabled potential significant impacts to be avoided;
- Report the potentially significant impacts and effects likely to result from the construction and operation of the Project;
- Report mitigation and management measures required to avoid, reduce or remedy significant adverse impacts identified through the assessment process;
- Predict the residual effects of the identified impacts after the proposed mitigation and management measures have been implemented;
- Identify any in-combination or inter-project cumulative effects;
- Provide an Environmental Action Plan (EAP) setting out how the proposed mitigation, management and monitoring measures would be implemented; and
- To assist the decision maker in reaching a conclusion as to whether the proposed development is environmentally acceptable and sustainable.

1.5 Structure of environmental statement

1.5.1 The ES has been prepared to meet the requirements of the Rules, relevant European Directives, UK legislation (see Chapter 4 of this Report for further detail), and the Environment Agency's EIA Agency Management Systems (AMS) procedures.

1.5.2 The Rules highlight that where the Secretary of State for Environment and Rural Affairs has given a Scoping Opinion on an application, the EIA for that application needs to include the information specified in the Scoping Opinion only (see Appendix D of this Report). This ES has addressed the potentially significant issues identified through the scoping process, including those within the Original Scoping Consultation (2011), and any changes to the Project since the Updated Scoping Opinion was received (December 2014). The information is presented within this ES.

1.5.3 This Report presents the key baseline information, impact assessment and mitigation measures for the likely significant effects associated with the construction and operation phases of the Project. Non-significant effects associated with the Project are therefore not detailed this Report but contained in the Technical Reports located in Volumes 2a – 2d.
1.5.4 Volumes 2a – 2d Technical Reports contain the comprehensive environmental impact assessments for the Project. These Technical Reports detail both the significant and non-significant effects.

1.5.5 This Report comprises of the following:

- The NTS - presents the findings of the ES in plain language and can be found at the front of the ES document. The NTS would also be made available as a separate document and would be submitted as part of the TWAO application process;
- Chapter 1: Introduction - provides the historical background and the need for the Project and explains the purpose, content and format of the ES;
- Chapter 2: Project description - describes the location and the character of the application site; provides a detailed description of the Project, the anticipated construction programme, the proposed construction, waste materials, dredging, utilities and operational activities; and describes the main alternatives considered;
- Chapter 3: Assessment methodology - provides a detailed description of the EIA process including the screening, scoping, impact assessment and implementation stages;
- Chapter 4: Legislation and planning policy - summarises the main legislation and planning policies relevant to the Project. Legislation and local policies specific to the topics scoped in the assessment have been included in each of the relevant Technical Reports (see Volume 2a – 2d);
- Chapter 5: Consultation overview - summarises the consultation process, including activities carried out, matters raised and where they are addressed in the ES;
- Chapters 6 - 17: Technical Chapters\(^2\) - provide the environmental assessment associated with the likely significant effects for the following environmental topics:
  - Chapter 6: Cultural heritage
  - Chapter 7: Landscape and visual amenity
  - Chapter 8: Land use
  - Chapter 9: Noise and vibration
  - Chapter 10: Ecology and nature conservation
  - Chapter 11: Surface water and flood risk
  - Chapter 12: Estuarine and geomorphology processes
  - Chapter 13: Contaminated land
  - Chapter 14: Navigation impact assessment
  - Chapter 15: Road traffic and transport
  - Chapter 16: Air quality
  - Chapter 17: Community
- Chapter 18: Summary of significant residual effects - a summary of the significant residual effects of the Project, as identified within the Technical Chapters;
- Chapter 19: Cumulative effects - provides an assessment of the potential cumulative and in combination effects of the Project with other ongoing or proposed developments in the area and between the technical topics. This Chapter includes effects from climate change;

\(^2\) Technical Chapters within this Report are the summary of the Technical Reports provided within Volumes 2a – 2d.
Chapter 20: EAP - summarises the actions required to implement the Project in accordance with the mitigation, management and monitoring measures identified within the ES; and,
Chapter 21: Conclusion - summarises the findings of this EIA for the Project.

1.5.6 Volumes 2a – 2d Technical Reports contain the comprehensive environmental impact assessments for the Project and can be found in the following locations:
- ES (Volume 2a) Cultural Heritage Technical Report;
- ES (Volume 2a): Land Use Technical Report;
- ES (Volume 2a) Noise and Vibration Technical Report;
- ES (Volume 2b): Ecology and Nature Conservation Technical Report (including the test of likely significance undertake under the Habitats Regulation Assessment (HRA) in Appendix D);
- ES (Volume 2c): Flood Risk Assessment;
- ES (Volume 2c): Ground Investigation Report;
- ES (Volume 2d) Air Quality Technical Note; and
- ES (Volume 2d) Outline Site Waste Management Plan.

1.5.7 A separate and integrated Non-Technical Summary (NTS) Report is located both at the beginning of this Report, as well as a separate standalone document.

1.6 Availability of the Environmental Statement

During the six week period for representations as part of the TWAO application and determination process the ES would be made available to the public for viewing. The ES would also be made available on the Environment Agency website: https://consult.environment-agency.gov.uk/lcnnth-flood-risk/bostonbarriertwao

1.6.1 The ES will be available at the following locations (see Table 1.1):

Table 1.1: Locations for a hard copy of the ES during the six week consultation period

<table>
<thead>
<tr>
<th>Location</th>
<th>Address</th>
<th>Opening Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boston Barrier Community Hub</td>
<td>Boston Barrier Community Hub, Riverside Industrial Estate, Marsh Lane, Boston,</td>
<td>Wednesday 12:00 – 19:00</td>
</tr>
<tr>
<td>Location</td>
<td>Address</td>
<td>Opening Hours</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Environment Agency – Peterborough</td>
<td>Environment Agency, Goldhay Way, Orton Goldhay, Peterborough, Cambridgeshire, PE2 5ZR</td>
<td>Monday to Friday, excluding all bank holidays and weekends 09:00 – 16:30 Viewing by appointment on 020 847 47371</td>
</tr>
<tr>
<td>Boston Borough Council</td>
<td>Municipal Buildings, West Street, Boston, Lincolnshire, PE21 8QR</td>
<td>Monday to Thursday 08:45 – 17:15 Friday 08:45 – 16:45</td>
</tr>
</tbody>
</table>
This page has been left intentionally blank.
2

Project description

2.1 Project location

2.1.1 The Project area (‘the site boundary’) is to the south of central Boston, Lincolnshire at National Grid Reference (NGR) TF 533 343. It includes a stretch of the Haven between Black Sluice and the Maud Foster Sluice (Grade II listed). This area encompasses the majority of the PoB Estate (left bank) and part of the Boston Public Footpath No. 14 (Macmillan Way) from London Road eastwards tying in with the embankment of the WPD site (right bank). The total area including land and water is approximately 34ha. The site boundary is shown Plate 2.1 below. Please also see Figure 1.1 in Appendix A of this Report.

Plate 2.1: Site boundary

![Site boundary map]

Source: Mott MacDonald, 2016

2.1.2 The land use adjacent to the Project contains a mixture of commercial, industrial and residential uses on the left and right banks of the Haven (see Appendix A: Maps and Figures; Figure 1.2).

2.1.3 The PoB Estate occupies approximately 19ha of land within the Project area.

2.1.4 The land on the right bank is generally occupied by light industrial units within the Riverside Industrial Estate. The Environment Agency’s Community Hub for the Project currently
occupies a leasehold site within the industrial complex. Two storey terraced houses (along Wyberton Low Road) back onto the embankment.

2.1.5 A Public Right of Way, (Boston Public Footpath No.14, also known as the Macmillan Way long distance footpath), follows the right bank of the Haven, downstream of Black Sluice to the mouth of The Wash then turns south west towards Stamford, see Plate 2.1.

2.1.6 National Cycle Network Route Number 1 is a long distance route connecting Dover and the Shetland Islands. It passes through Boston along both Wyberton Low Road and London Road. The route follows Wyberton Low Road on the south side of the Haven before turning onto Marsh Lane and then London Road, see ES (Volume 2d): Traffic and Transport Technical Report; Section 4.7 for further information.

2.1.7 A WPD electricity substation is located further downstream of the proposed barrier location along the right bank, see Plate 2.1. An area of grazing land is adjacent to the substation.

2.1.8 Pasture and arable fields along both sides of the Haven can be found further downstream.

2.2 Project components

2.2.1 The Project would consist of a barrier structure within the Haven, along with land-based flood risk management structures that tie into the barrier structure and into existing flood management structures. These are shown in Appendix A: Maps and Figures; Figure 2.1 and described below.

2.2.2 Project components are:

- Barrier structure;
- Barrier control building;
- Control building for the WDE gate;
- Sheet piled flood walls on the right bank, upstream and downstream of the river;
- Sheet piled and concrete flood wall on the left bank, including vehicle access gates;
- WDE widening and installation of a gate;
- Demolition of the wooden quay structure on the right bank;
- Demolition of one grain tower and construction of two new towers and a single extended aerial conveyor to be installed on the left bank in the PoB Estate;
- Demolition of the buoy shed on the PoB Estate;
- Extension of the existing loading platform on the PoB Estate;
- Capital dredging;
- Maintenance works to the existing PoB access road;
- Diversion of 3 no. 11kv electricity cable;
- Scour protection;
- Permanent security fencing on the right bank surrounding the barrier structure;
- Landscaping and lighting; and
2.2.3 Capital dredging\(^3\) would be required to facilitate the construction of the Project components (see Section 2.2.27 of this Report).

**Barrier structure**

2.2.4 The barrier structure would be constructed in the Haven, approximately 100m downstream of Black Sluice. It would be situated between Berth 21 and the Silo berth on the PoB Estate on the left bank and existing residential properties along Wyberton Low Road on the right bank (see Plate 2.1). It comprises a U-shaped structure which provides a 25m navigable channel and is 35m in length with a gate approximately 10m high, spanning the channel (see Appendix A: Maps and Figures; Figure 2.2).

2.2.5 The top of the rising sector gate would stand approximately 5m above mean high water mark (MHWM) between two vertical supporting reinforced concrete side walls when fully raised. When not in use, this rising gate would lie level with the bed of the river at -3.0m AOD. The gate and concrete side walls would sit on a reinforced concrete base slab supported by deep steel piled foundations.

2.2.6 The rising sector gate of the barrier structure would be in operation when tidal levels are expected to exceed a level of 5.3m AOD\(^4\) in the Wash. As the High Astronomical Tide (HAT) is 4.73m AOD the gate would only be operational during extreme high tides.

2.2.7 The presence of the barrier structure would reduce the existing channel width from 55m to approximately 25m, similar to the existing channel width at the Swing Bridge 300m upstream of the barrier structure. The position of the barrier would be slightly offset from the centre of the channel to the right side to ensure an adequate width is provided for a temporary navigation by-pass channel during the construction period.

2.2.8 Warning signs, automatic signals and lighting for navigation would be installed and used to inform navigation traffic of the presence of the barrier structure, manage the movement of boats through the narrowed channel and provide advance warning of the gate’s operation. Detailed proposals would developed during the detailed design stage of the Project and be submitted to the Port of Boston Harbour Authority and Trinity House (who are responsible for shipping safety in British waters) for approval and implementation.

---

3 Capital dredging can be considered as dredging carried out to increase depths in the area, usually, but not always, for the first time. Maintenance dredging can be considered dredging that occurs on a reasonably regular basis, to maintain depths

4 The 5.3m AOD would be the operating level. Should a 5.1m AOD rise be forecast, this would ‘trigger’ the barrier structure to operate (that is, raise the gate). This would ensure that upstream flood risk management measures through the town centre are capable of withstanding 5.3m AOD whilst accounting for a 200mm forecast error.
2.2.9 Foundations would be installed on the left bank of the barrier structure to support a 1,000 tonne mobile crane, which would be used to lift the barrier gate into position during construction. These crane foundations would provide a permanent facility for any future gate removal, or maintenance operations, which would be approximately once every 20 to 25 years.

2.2.10 A 1.8m high security fence would be provided on the right bank around the barrier to restrict access.

**Barrier control building, buoy shed and Wet Dock Entrance control building**

2.2.11 A control building with associated car parking (4 spaces) and HGV layby area (4 spaces) would be constructed on the left bank adjacent to the barrier structure (see Appendix A: Maps and Figures; Figure 2.3). The site is currently occupied by a structure, the PoB’s buoy shed. This buoy shed would be permanently removed.

2.2.12 It is envisaged the barrier control building would be a two storey structure. The ground floor would accommodate plant and equipment required to operate the barrier structure. The first floor would have the control room office, welfare facilities and an outdoor observation area.

2.2.13 It is currently envisaged that the barrier control building footprint would be approximately 21m by 7m (147m²) and 6m high. It is likely to be of a pre-fabricated glass reinforced plastic (GRP) construction set on a concrete base, with a green ‘living’ roof, grey water systems and photovoltaic (PV) solar panels. The façade would be painted in a colour amenable to the surrounding environment.

2.2.14 The barrier control building has been sited to meet the operational needs of the Environment Agency. Its position aligns with the barrier structure to provide the required sight-lines to the barrier structure and across the channel.

2.2.15 A control building is proposed adjacent to the WDE to allow for operation of the gate. It is envisaged that the building would be a single storey and would accommodate a plant room, electrical room, control room and lobby.

2.2.16 The WDE control building footprint would be approximately 12m by 6m (72m²) and 4m high. The building is likely to be of a pre-fabricated GRP construction set on a concrete base. The façade would be painted in a colour amenable to the surrounding environment.

2.2.17 The final scale, siting and external appearance of the barrier and WDE control buildings would be subject to approval by BBC pursuant to the proposed planning conditions.
Left bank flood wall

2.2.18 The left bank flood wall has two distinct elements; a flood risk management structure and sheet piling installed in front of the existing PoB quay wall to improve stability of the quayside, see Plate 2.1 and Appendix A: Maps and Figures; Figure 1.1).

2.2.19 The flood risk management structure is 7.55mAOD and provides protection to 7.12mAOD with a freeboard\(^5\) of 0.43m. The structure ranges in height from 1.5 to 2.4m above final ground level depending on existing topography. The approximate length of the flood risk management structures is 820m.

2.2.20 The wall would comprise of two elements, the first is an extended sheet piled wall with concrete capping which starts at the barrier and extends downstream to the end of the existing load relieving platform. The second is a reinforced concrete wall, which provides the required flood protection from this point tying into Maud Foster Sluice beyond the WDE (see Appendix A: Maps and Figures; Figures 2.4a to 2.4d). The concrete wall set back varies between 9 and 15m from the quayside to facilitate access.

2.2.21 In addition a new sheet piled stabilisation wall would be installed in front of the existing PoB quay wall (see Appendix A: Maps and Figures; Figures 2.4a to 2.4d) with associated anchorage sheet piling. Sheet piling would extend from the barrier structure downstream along the waterfront of the PoB (except along the existing load relieving platform and knuckle (see 2.7)) and up to the Wet Dock. A section of sheet piled wall with anchorage sheet piling would also be provided along the northern face of the WDE.

Right bank flood wall

2.2.22 A new sheet piled flood wall would be installed along the right bank, adjacent to the scour protection (approximately 100m upstream of the barrier structure). From this point, the sheet piling would be impact driven directly into the embankment to an embedment level of -8.0mAOD to provide a flood protection level of 7.55mAOD and would continue along to tie in with the flood protection at the WPD substation, approximately 470m from the barrier (see Appendix A: Maps and Figures; Figure 2.5).

2.2.23 The flood protection level would be achieved with the sheet pile extending 1.2m above the crest of the embankment downstream from the barrier to the WPD site; this would result in a 1.2m high wall when viewed from the land side of the path and visible sheet pile between 2 and 3m in height when viewed from the riverside of the embankment. The embedded sheet piling would allow the bank to retain the existing sweeping vegetated profile. In front of the piles, the deposited mud and silt would be able to recolonise post construction.

---

\(^5\) Freeboard is a factor of safety between the required level of protection and the provided level of protection.
2.2.24 A 6m wide vehicle access route would run alongside the flood wall on the crest of the embankment to allow for routine maintenance by light vehicles such as mowing machines. The access route would be shared with pedestrians and users of Boston Public Footpath No. 14 (Macmillan Way).

**Wet Dock Entrance**

2.2.25 The width of the WDE channel would be widened from 15.3m to 18m to allow for broader vessels to enter the Wet Dock to moor up rather than use the Haven riverside quays.

**Wet Dock Gate**

2.2.26 A single gate would be installed at the location of the existing lock gates and would be selected to improve the management of flood risk and operational requirements of the PoB.

**Port of Boston access gates**

2.2.27 Access gates would be installed within the left bank flood wall from the Barrier to the Maud Foster Sluice to allow the passage of the PoB’s road vehicles during normal operation. These manually operated gates would be double leafed, each 3m to 5m wide (6-10m total gate width). Eight gates at different junctures along the left bank wall are currently envisaged.

**Dredging requirement**

2.2.28 The Environment Agency would carry out capital dredging to facilitate the construction of the Project. Approximately 38,300m³ of material (worst case scenario) would be removed across four phases:

- Phase 1 – To enable berthing facilities to be provided along the left bank (including PoB Berth 21), create by-pass channel and install temporary scour protection. Dredging would also occur approximately 1.5km downstream of the barrier location to enable to construction of the Witham Sailing Club and recreational river users temporary mooring facility. This dredging phase would remove approximately 11,000m³ of material over a 3-4 week period;

- Phase 2 – To dredge along the remainder of the left bank quay wall and turning circle prior to the closure of the Wet Dock. It would remove approximately 20,000m³ of material over a 6-8 week period;

- Phase 3 – To allow installation of permanent scour protection. It would remove approximately 7,000m³ of material over a 2-3 week period; and

- Phase 4 – To sweep off any remaining built up material near the barrier structure at the end of the construction period. It would remove approximately 300m³ of material over a 1-2 week period.
2.2.29 Contractors would be made aware of the potential for encountering contaminated land during dredging works. Protocols would be put in place should they encounter such material, see ES (Volume 2b): Contaminated Land Technical Report.

Scour protection works

2.2.30 Temporary scour protection would be installed on the bed of the by-pass channel adjacent to the temporary cofferdam (within which the barrier would be constructed) following the first dredging phase. It is anticipated that the placement would be done by barge and two-way traffic would change to one-way through the bypass channel as a result.

2.2.31 It is envisaged the majority of the temporary scour protection would be relocated and reused as permanent scour protection for the barrier structure after the completion of the barrier works. It is anticipated that the placement would be done by barge. It is possible that vessel traffic within this stretch of the Haven would be temporarily stopped whilst the works are carried out for health and safety reasons. The length of time that navigation traffic in the Haven is to be stopped would be determined by the final size and type of scour protection to be used. This would be determined during detailed design; however, as a worst case it is anticipated that the Haven would only be closed for a few hours to a few days at a time.

Landscaping and lighting

Hard and soft landscaping

2.2.32 Landscaping is proposed along the right bank as shown in the landscape plan (see the Environmental Statement (Volume 2a): Landscape and Visual Impact Assessment: Appendix A). Materials to be used in the landscape design would be subject to approval by BBC pursuant to the proposed planning conditions. It is proposed that the landscape mitigation would allow for transition between the urban character in the area of the Black Sluice and the barrier structure and the semi-natural character downstream, towards the WPD site. The crest of the right bank would be grass seeded and reinforced to allow light vehicle movements on top of the embankment for maintenance purposes and to cater for the needs of pedestrians, cyclists and persons of restricted mobility. There would be a footpath with seating areas with occasional low shrub planting to soften the view from the Boston Public Footpath No. 14 (Macmillan Way). The retention of the existing grass embankment and introduction of various grasses (that are saline tolerant) to the side of the new flood wall facing the water, would retain the semi-natural character of the right bank.

Lighting

2.2.33 External permanent lighting would be installed in the following locations:

- Control building – entrance and surrounding perimeter, including the proposed HGV layby and car park areas;
- WDE control building;
2.2.34 The light fixtures proposed are column mounted floodlights for the HGV layby areas, control buildings and the access gates within the flood wall, while street lighting columns are proposed for access roads and car parking areas. All columns would be hinged so they can be folded down for maintenance.

Fish pass (future provision)

2.2.35 Following the removal of WLM from the scope of the Project, the requirement for a fish pass was no longer present. As the possibility of WLM remains at a later date, the current design could deliver a fish pass structure in the future.

Enabling works

Cable diversion

2.2.36 The Project would require the diversion of existing (3No.) 11kV electricity cables. The proposed route would divert the cables from the right embankment, turn south along Wyberton Low Road for 200m, before heading back north onto the right embankment and tying into the existing services adjacent to Black Sluice.

Wooden quay structure (disused hoist) and grain tower

2.2.37 A disused hoist and associated piling on the right bank would be deconstructed and removed potentially via barge. Material would be recycled where possible. This is likely to occur during the 3rd Quarter of 2017.

2.2.38 The existing grain tower conveyor (operated by Frontier) along the left bank of the PoB Estate would be permanently relocated further downstream (approximately 100m). Two new towers would be erected to enable an extended aerial conveyor to be installed from Frontier building to the quay. This is likely to occur during the 4th Quarter of 2017.

Extending loading platform

2.2.39 The load relieving platform is intended to reinforce the quay side to support the additional loading expected while moored boats transfer goods to and from land. During detailed design consideration would be given to extending the existing loading platform on the PoB Estate.
2.2.40 As part of the consultation process (See Chapter 5 of this Report), the Witham Sailing Club raised concerns regarding the temporary works situation for the construction phase of the barrier, see Plate 2.2. To mitigate the impact upon the Witham Sailing Club, particularly from a safety aspect of navigating past the cofferdam and in-channel construction traffic when towing the dinghies out the Wash, the Environment Agency agreed to relocate the organisation during the construction phase of the Project.

2.2.41 The temporary relocation of the Witham Sailing Club would be approximately 1.5km downstream from the proposed barrier. The mitigation would consist of (see Appendix A of this Report: Figures 2.7a to 2.7c):

- Construction of a temporary slipway to allow members of the Witham Sailing Club safe access to the river during construction of the barrier;
- A single clubhouse with welfare facilities (anticipated to be a porta cabin type structure);
- A safety boat storage container (anticipated to be a porta cabin type structure);
- A fenced compound with storage for 4 dinghies; and
- Parking facilities.

Plate 2.2: Witham Sailing Club relocation

Source: Mott MacDonald 2016
2.2.42 Following the construction phase Witham Sailing Club would return to its current position upstream of Grand Sluice.

Alternative moorings

2.2.43 Mooring pontoons would be provided in two locations and would be available for recreational users during construction. There is an existing pontoon adjacent to the Black Sluice which has been provided by the Environment Agency for a previous project and a second pontoon would be provided approximately 1.5km downstream of the barrier. These have been provided for recreational users when they do not feel that it is safe to navigate the area during construction.

Boston and District Fisherman’s Association – temporary relocation

2.2.44 As part of the consultation process with the Boston and District Fisherman’s Association (BDFA) (See Chapter 5 of this Report), concerns were raised regarding navigating the temporary works associated with the construction of the barrier.

2.2.45 Subject to agreement with the PoB, which has been provided in principle, the fishing fleet would be provided with an alternative mooring location for the duration of the construction of the barrier. It is envisaged that Lairage Quay would be available to the fishing fleet for the duration of the construction of the barrier.

Works to access roads

2.2.46 The internal PoB roads required for construction access would be improved to provide the required turning circles, safety aids and sight lines for the additional construction traffic.

2.3 Project construction

Construction programme and indicative sequence

2.3.1 Project construction is anticipated to commence in the 4th Quarter 2017 (October 2017) and be completed by the 4th Quarter 2019 (December 2019). The assessments presented in this ES are based on the indicative programme provided in Table 2.1.

2.3.2 The construction period is predominantly based on a five day week, with working hours from 07:30 to 18:30. Potential exceptions to this as outline in the draft planning conditions include:
- Capital dredging works;
- Works to construct WDE would be on a 24 hour per day 7 days a week (24/7) basis in line with the current operational hours for the PoB Estate;
- Completion of operations commenced during the Core Working Hours which cannot safely be stopped;
- Completion of works delayed or held up by severe weather conditions which disrupted or interrupted normal construction activities;
- Highway works which the local highway authority requests be undertaken on a Saturday or a Sunday or outside the Core Working Hours; and
- Works required to be undertaken in the case of an emergency (provided that BBC is notified in writing within 24 hours of such works taking place).
Table 2.1: Indicative sequence of construction activities

<table>
<thead>
<tr>
<th>Construction works activity</th>
<th>Indicative programme and duration</th>
<th>Comment/assumption</th>
</tr>
</thead>
</table>
| Enabling works                                      | Pre November 2017 10 weeks              | Cable diversions  
Grain silo jetty on the right bank to be demolished before dredging starts      |
| Enabling dredging works Phase 1 and Phase 2         | November 2017 - January 2018 9-12 weeks | Phase 1 dredging to produce a sufficient area to allow for a navigable by-pass channel (18m) and installation of temporary scour protection  
Phase 2 dredging to level the area in front of the PoB  
Dredging works would be carried out prior to the closure of the Wet Dock |
| Establishment of site                               | January 2018 – March 2018 6-8 Weeks    | Left and right bank                                                             |
| Wet Dock closure                                    | January 2018 – September 2018 9 Months | Wet Dock to close on completion of Phase 2 Dredging  
Works carried out on Wet Dock would be undertaken on a 24/7 basis  
PoB Riverside quays to remain operational |
| Wet Dock opening                                    | End September 2018 -                    | -                                                                                 |
| Left bank quayside works, Tie into Wet Dock and barrier structure | October 2018 - November 2019 13 Months | Concrete flood wall works to be land based                                   |
| Installation of temporary scour protection along by-pass channel | September 2018 – October 2018 3-4 Weeks | Following completion of enabling dredging works                                     |
| Place cofferdam                                     | October 2018 – December 2018 3 Months  | Minimum by-pass channel at all times would be 18m                                |
| Right bank works                                    | April 2018 – Dec 2019 21 Months         | All works to be land based                                                       |
| Construction of barrier structure                   | January 2019 – July 2019 7 Months      | Minimum by-pass channel width at all time would be 18m  
By-pass would still be opened when the Wet Dock is closed and ships are relocated to riverside berths  
By-pass channel would be closed to place the barrier gate  
Barrier in operation when the tie-in to left bank works occurs |
<p>| Barrier completion: removal of the cofferdam/testing and commissioning | August 2019 – November 2019 - | Once the barrier works are completed, the by-pass would be closed and navigation traffic redirected. |</p>
<table>
<thead>
<tr>
<th>Construction works activity</th>
<th>Indicative programme and duration</th>
<th>Comment/assumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dredging Phase 3</td>
<td>November 2019 2-3 weeks</td>
<td>Dredging of the remaining volumes of areas Phase 3 Navigation is likely to be closed for safety reasons</td>
</tr>
<tr>
<td>Installation of permanent scour protection</td>
<td>September 2019 – October 2019 6-8 Weeks</td>
<td>Installed upon completion of Phase 3 dredging Navigation is likely to be closed for safety reasons</td>
</tr>
<tr>
<td>Dredging Phase 4</td>
<td>November/Early December 2019 1-2 Weeks</td>
<td>Final sweep dredging to remove any material from area Phase 4</td>
</tr>
</tbody>
</table>

Project completion
December 2019

Source: Mott MacDonald and Independent Contractor 2016
Construction compounds

2.3.3 Three temporary construction compounds would be required to deliver the Project. Two would be located on the left bank within the PoB Estate. One compound would be on the site of the future control building. The site would be approximately 21m by 50m and would contain office and welfare facilities, equipment storage areas, working area and car parking. A satellite compound is proposed to the north of the WDE adjacent to the northern access route. This compound would principally store and stockpile deliveries from barges. Both compounds would be accessed via St John’s Road, the northern entrance point into PoB.

2.3.4 In addition on the right bank, the Environment Agency currently leases a parcel of land adjacent to Marsh Lane, a part of which contains the Boston Barrier Project Community Hub ('community hub'). This site would be reconfigured to accommodate a further construction compound site office. The internal PoB roads would be improved to provide the required turning circles, safety aids and sight lines. The construction compound would be approximately 21m by 25m and would be able to store larger equipment, notably cranes and lorries, with access to the barrier structure.

2.3.5 During the winter months, all compounds would be lit during site working hours. Security lighting would be maintained throughout the night, year round, in line with current practice on the PoB Estate. All construction compounds would be secured from public access. Compounds within the PoB estate would have Harras fencing only, as these are within the PoB security area. It is anticipated that the right bank compound would utilise the existing fencing. These compounds would remain in-situ for the duration of the construction works.

Dredging

2.3.6 Capital dredging operations would be initiated by the Environment Agency to:
- Remove sediment for future berthing along the left bank;
- Create a by-pass channel; and
- Install scour protection to generally reduce the level of bed silts in the area of the barrier structure (both for the permanent and temporary works).

2.3.7 Four phases of dredging are anticipated for the removal of approximately 38,300m$^3$ of silt to a depth of approximately -3mAOD (the top of the sands and gravel layers underlying the silt). It is anticipated that in the area of the cofferdam the silt would be removed to a depth of approximately -8.5mAOD below the barrier structure to minimise the potential for future settlement.

2.3.8 The dredging operation would be conducted at times which allow for the majority of material to be excavated under 'dry' conditions; however, it is still likely to require some dewatering. It is possible that some material may be removed when submerged. Possible locations for
2.3.9 It is anticipated that all dredging operations would be carried out using a jack leg pontoon with a mounted backhoe excavator combined with one hopper transport barge with a tug. This would allow work to continue unaffected by tidal cycles. The dredged material would then be deposited within the Project area for drying before being transported to a licenced landfill site (as a worst case scenario).

2.3.10 Dredged material is proposed to be reused within the works as fill material (if suitable), or disposed of at a licensed disposal site within Lincolnshire.

### Drying, storage and disposal of dredged materials

2.3.11 Dredging of the channel is required to allow for construction and to ensure PoB has the ability to use the riverside quays while the Wet Dock is temporarily closed as part of the works. Options for the disposal of the dredged material include:
- Reuse dredged material on land where possible; and
- Dispose dredged material at landfill (as the last resort).

2.3.12 Disposal of dredged material out to sea, as defined by and in accordance with an appropriate MMO marine licence, would not be considered as an option.

2.3.13 Specialists have carried out assessments to identify the most suitable locations and techniques to be used for the treatment and disposal of dredged material. The technical assessments have considered disposal at landfill as a worst-case scenario.

2.3.14 Treatment options include:
- Mechanical dewatering;
- Dewatering using geotextile bags;
- Possible reuse as flood defence materials; and
- Settlement and dewatering using traditional lagoons.

2.3.15 Possible locations for treatment plant include vacant warehouse properties within PoB and nearby sites within the Project area with room for lagoons. Suitably treated and tested effluent from dewatering is expected to be discharged to the local sewer system, subject to discussions, approvals and monitoring requirements from the local utility provider.

2.3.16 Temporary stockpiles of treated materials may be required at the treatment location, depending on generation rates of material and demands for reuse.


Cofferdam

2.3.17 A cofferdam would be constructed within the river channel in order to create a temporary dry working area for construction of the barrier structure and to divert flow around the working area via a temporary by-pass channel. The by-pass channel, although narrowed to 18m, would allow for continued navigation through the Haven during the construction phase.

2.3.18 Dewatering would be carried out to lower and control the water level within the cofferdam prior to dredging. Water within the cofferdam would be pumped out and discharged into the Haven to create a dry working area.

2.3.19 The cofferdam would be approximately 35m by 35m in size and would require lateral support due to the -7.0m AOD excavation depth which would facilitate the construction of the barrier structure. Once the barrier has been completed, the flow would be diverted through the barrier structure using permanent sheet piles that would be constructed on the left side of the channel. These sheet piles would be braced and in-filled with appropriate material and used as a landing platform and access to the barrier.

2.3.20 Once the barrier construction has been completed, the piles which make up the cofferdam would be cut to the appropriate level and form part of the permanent barrier structure.

2.3.21 A second sheet piled cofferdam would be situated adjacent to the Wet Dock ‘knuckle’ area to provide stabilisation during construction activities related to the widening of the WDE. After use, the cofferdam would be connected directly into the new sheet pile wall.

Barrier structure construction

2.3.22 Following the dewatering of the cofferdam, an initial concrete layer would be installed in the base of the cofferdam area to provide a firm and clean working area. The tubular steel foundation piles installed earlier would then be capped off and the concrete base would be poured in one operation, ensuring a monolithic slab. The structure's walls would be constructed in two concrete pours onto the slab; these would house the gate. The concrete elements of the stilling basin, such as the baffle piers, would be cast at the same time.

2.3.23 On completion of the concrete structures, mechanical and electrical fixings would be installed before installing the gate. A foundation area would be prepared for the mobile crane from which the barrier gate would be lifted into place; the foundation area would remain as a permanent facility for any future gate removal or maintenance. The barrier gate is proposed to be manufactured off site and would be delivered to site on a barge.

2.3.24 Installation of the barrier gate is anticipated to be followed by a period of dry commissioning and working checks. When this has been completed, the dewatering system would be decommissioned and the area within the cofferdam would be allowed to flood. A period of wet commissioning would then be carried out. On completion of the final checks, the temporary
navigation channel at the west side of the cofferdam would be closed, and river traffic would be diverted through the permanent channel/barrier structure.

**By-pass channel**

2.3.25 It is proposed that the temporary by-pass channel would run between the left bank and the cofferdam. The by-pass channel would be approximately 18m wide. This would allow the passage of vessels during the construction of the barrier structure. It would be formed by a polygon of sheet piles and comprise the existing left bank anchored sheet pile wall along one edge and the barrier cofferdam along the other. It would be back filled following the completion of the barrier structure.

**Scour protection**

2.3.26 The by-pass channel would require temporary scour protection which is envisaged to be grout mattresses, asphalt mats, gabions or concrete (subject to detailed design and PoB approval). This would be installed in the by-pass area adjacent to the temporary cofferdam following the first dredging phase and would be reused for permanent scour protection requirements.

2.3.27 The section immediately surrounding the barrier structure (upstream and downstream) would have permanent scour protection. It is envisaged, following construction of the barrier structure, a further phase of dredging (Phase 4) would be carried out to clear the area to install the permanent scour protection.

**Construction of flood walls and retaining walls**

2.3.28 The left bank would consist of a sheet piled wall (piled from in-channel) which would be placed along the entire PoB quayside, except in the vicinity of the load relieving platform, in front of the existing piled frontage in order to effectively stabilise the current quay wall which is in poor condition. Sheet piles would embedded to approximately -9mAOD and would require a setback sheet piled anchorage wall (piled from land) due to the high retained height, that is, the height of the piles above ground level compared to that below ground level.

2.3.29 The first half of the left bank, from the barrier downstream would have a sheet piled wall raised to the 7.55mAOD defence level. For the remainder of the left bank, a 1.5 to 2.4m high concrete flood wall (above ground level) would be set back between 9-15m from the quay edge, within the PoB frontage. This would provide adequate protection against flooding while retaining separation between infrastructure, which would eventually be maintained either by the PoB or the Environment Agency pending agreement between the two parties. The flood wall would follow the line of the existing quay wall for 830m downstream of the barrier before it deviates from it in order to cross the knuckle and tie into the vertical sector gates which span the WDE.
2.3.30 From the barrier structure the right bank anchored sheet pile wall would extend approximately 430m in the downstream direction and 110m long in the upstream direction (toward Black Sluice). It would consist of continuous sheet piling embedded to a maximum depth of -9.0m AOD. A concrete capping beam would be used and the wall would require a setback sheet piled anchorage wall due to the high retained height.

2.3.31 The sheet pile anchorage wall proposed for the right bank anchored wall is similar to that for the left bank although the offset distance is greater due to constraints caused by reduced space and its position in relation to the existing embankment. This would be piled from on-land. The length of sheet pile walls forming the anchorage pile is 5m, less than the left bank due to the beneficial contribution of the embankment and the greater distance involved. If it is found at the detail design stage that these two contributes cannot be relied upon the pile length would need to be increased.

Wet Dock Entrance widening and Wet Dock gate

2.3.32 The WDE would be widened by 2.7m across the northern face. Sheet piling, consistent with the left bank flood wall would be installed and embedded to a maximum depth of -9.0m AOD such that the existing northern face can be removed. A mini coffer dam (Wet Dock cofferdam) would be required to create a dry working area. There would be no access to the PoB Wet Dock during this period. Vessels would instead dock on additional berths along the riverside provided on a temporary basis on the left bank of the Haven, adjacent to the PoB quay.

2.3.33 The gate would be prefabricated and installed by crane.

Construction of barrier control building and Wet Dock control building

2.3.34 The barrier control building would be completed and operational before the commissioning of the barrier structure. It is planned that construction would commence by 4th Quarter 2018. It is anticipated to be of a pre-fabricated GRP construction set on a concrete base (see Appendix A: Maps and Figures; Figures 2.3 and 2.6). Traditional construction and building methods would be used to construct the structure.

2.3.35 The Wet Dock gate control building is likely to be a pre-constructed GRP building set on a concrete base (see Appendix A: Maps and Figures; Figures 2.3 and 2.6).

2.3.36 The final scale, siting and external appearance of the barrier and WDE control buildings would be subject to approval by BBC pursuant to the proposed planning conditions.

Hard and soft landscaping

2.3.37 Hard and soft Landscaping would be delivered through a landscape scheme which would be subject to approval by BBC pursuant to the proposed planning conditions. Landscaping is proposed along the right bank as shown in the landscape plans submitted with the ES.
Materials to be used in the landscape design would be subject to approval by BBC pursuant to the proposed planning conditions. It is proposed that the landscape mitigation would allow for transition between the urban character in the area of the Black Sluice and the barrier structure and the semi-natural character downstream, towards the WPD site.

2.3.38 The crest of the right bank would be grass seeded and reinforced to allow the light vehicle movement onto the top of the embankment for maintenance purposes. The existing Boston Public Footpath No.14 would be reinstated, along with addition of seating areas and occasional low shrub planting to soften the view from the land side. The retention of the existing grass embankment and introduction of various grasses that are saline tolerant to the Have side of the new flood wall would retain the semi-natural character of the right bank.

Flood risk management during construction

2.3.39 The Contractor would ensure that construction workers are made aware of the flood risk on site and that an evacuation plan is in place to ensure the safety of workers in the event of a flood. A detailed risk register and evacuation plan would be developed as part of the detailed design and build phase.

2.3.40 The presence of the cofferdam within the Haven during construction has been shown to slightly reduce water levels upstream (<-0.1m) during tidal flood events. However, it would be necessary to maintain the current flood warning for Boston during the construction period as the upper Haven remains at risk from overtopping during tidal flood event until the barrier structure is operational. No impacts are expected downstream due to the presence of the cofferdam.

2.3.41 During construction the current standard of protection would not be compromised. The appointed contractor would monitor and manage the potential risk of flooding.

Plant and machinery to be used

2.3.42 The major items of plant and equipment anticipated to be used during the construction activities and on which the impact assessment is based, are detailed in Table 2.2.

<table>
<thead>
<tr>
<th>Phase of works</th>
<th>Proposed plant and equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dredging</td>
<td>1x jack leg pontoon dredging unit 1x attendant/safety boat 2-3 barges</td>
</tr>
<tr>
<td>Sheet piling (in-channel)</td>
<td>1x Jack leg pontoon unit 1x support tug 2 x Uniflote pontoon platforms 1 x vibratory hammer (2300Kn) 1 x hydraulic impact hammer 1 x attendant/safety boat 2 x mobile access platforms</td>
</tr>
</tbody>
</table>
### Phase of works

<table>
<thead>
<tr>
<th>Proposed plant and equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>(4500Kn)</td>
</tr>
<tr>
<td>2 x crane (60-70t)</td>
</tr>
<tr>
<td>1 x noise shroud</td>
</tr>
<tr>
<td>2 x welding plants</td>
</tr>
<tr>
<td>2 x oxy-propane cutting equipment</td>
</tr>
</tbody>
</table>

**Sheet piling (land-based)**
- 1 x telescopic leader rig
- 1 x hydraulic impact hammer (2500Kn)
- 2 x crane
- 1 x noise shroud

**Bored piling**
- 1 x coring rig
- 1 x mini bored piling rig
- 1 x attendant crane
- 1 x compressor
- 1 x concrete skips/pumps

**Dewatering system including groundwater control**
- 304 S/S submersible borehole pumps
- 40kVa-80kVa super silenced generators
- V notched settlement tanks
- Tanker suction unit

**Concrete works**
- 1 x 100/120t crawler crane
- Concrete pumps (32m-52m range)
- Large fabricated metal shutters with timber facing
- 50-100kVa super silenced generators

**Installation of mechanical and electrical equipment**
- 1 x 1000t mobile crane
- 1 x attendant crane
- 4-6 attendant articulated lorries for associated and super lift equipment
- Delivery barge
- 25-50kVa super silence generators

**Infilling between the barrier structure and the east and west banks**
- Barge delivery of fill and rock materials
- 360° tracked excavators (between 14t and 25t)
- 6t-10t dump trucks
- Rollers and compaction units

Source: Mott MacDonald and independent contractor 2015

### Construction waste

**2.3.43** The construction of the Project would require a substantial amount of movement of construction waste and spoils, a proportion of which may be contaminated. During construction, most of the waste would be generated within the immediate environment; from a range of waste streams and different construction activities.

**2.3.44** When waste is generated, the next stages of its handling would follow the UK Waste Hierarchy (Defra, 2011): Re-use → Recycle → Recover → Dispose.

**2.3.45** The re-use, recycling or treatment of waste would take place on site, where reasonably practicable, or elsewhere off site. Adequate recycling and landfill sites have been identified within 2 to 35 miles of the site.
2.3.46 Table 2.3 summarises the anticipated type of waste that would be produced and the proposed reuse, recycling or disposal strategy.

<table>
<thead>
<tr>
<th>Main bulk materials</th>
<th>Quantity required</th>
<th>Expected waste quantity and percentage of total</th>
<th>Recycling strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fenders:</td>
<td>1560m</td>
<td>16m (1.0)</td>
<td>Via local recycling centre</td>
</tr>
<tr>
<td>Concrete 32/40 XS1</td>
<td>15600m³</td>
<td>312m³ (2.0)</td>
<td>Stockpile and crush on site; Use as refill</td>
</tr>
<tr>
<td>Concrete 40/20 AEA</td>
<td>4300m³</td>
<td>86m³ (2.0)</td>
<td>Stockpile and crush on site; Use as refill</td>
</tr>
<tr>
<td>Concrete ST1</td>
<td>1100m³</td>
<td>22m³ (2.0)</td>
<td>Stockpile and crush on site; Use as refill</td>
</tr>
<tr>
<td>Reinforcement</td>
<td>1300t</td>
<td>13t (1.0)</td>
<td>Via local recycling centre</td>
</tr>
<tr>
<td>Steel sheet piles</td>
<td>7300t</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Topsoil (imported)</td>
<td>1600t</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Armour stone 1</td>
<td>8200t</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Class 1A granular fill</td>
<td>5000t</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Class 6A granular fill</td>
<td>17000t</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Class 6F/6F2 capping layer</td>
<td>12000t</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Class 6N structural fill – well graded</td>
<td>19000t</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Type 1 sub base</td>
<td>19000t</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Facing bricks</td>
<td>33000</td>
<td>1500 (5.0)</td>
<td>Stockpile and crush on site; Use as refill</td>
</tr>
<tr>
<td>Precast concrete kerb</td>
<td>3000m</td>
<td>75m (2.5)</td>
<td>Stockpile and crush on site; Use as refill</td>
</tr>
<tr>
<td>300mm HDPE⁶ duct</td>
<td>1400m</td>
<td>14 (1.0)</td>
<td>Via local recycling centre</td>
</tr>
<tr>
<td>Plywood for formwork</td>
<td>4000m²</td>
<td>4000m² (100)</td>
<td>Recycle via local timber recycling centre; use proprietary formwork systems where possible to reduce usage of plywood</td>
</tr>
<tr>
<td>Softwood for formwork</td>
<td>50m²</td>
<td>50m² (100)</td>
<td>Recycle via local timber recycling centre; use proprietary formwork systems where possible to reduce usage of plywood</td>
</tr>
<tr>
<td>Off-site disposal of inert subsoil</td>
<td>-</td>
<td>-</td>
<td>Potentially recycle as daily cover material at local landfill site; re-use as fill on local construction project.</td>
</tr>
<tr>
<td>Off-site disposal of concrete</td>
<td>-</td>
<td>-</td>
<td>Stockpile &amp; crush on site, re-use as fill or sell as crushed concrete for use on other projects</td>
</tr>
</tbody>
</table>

⁶ High density polyethylene
### Main bulk materials

<table>
<thead>
<tr>
<th></th>
<th>Quantity required</th>
<th>Expected waste quantity and percentage of total</th>
<th>Recycling strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off-site disposal of contaminated soil</td>
<td>-</td>
<td>-</td>
<td>Disposal at licenced landfill or on-site treatment / processing to reduce contamination levels and then potentially recycle as daily cover material at local landfill site; re-use as fill on local construction project.</td>
</tr>
<tr>
<td>Deconstructed hoist (right bank)</td>
<td>-</td>
<td>0</td>
<td>Recycled at local recycling centre.</td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016

#### 2.3.47

The Environment Agency has the following aspirational construction waste targets:

- Send no more than 20% of construction waste to landfill;
- At least 80% of aggregates used on Environment Agency construction projects to come from secondary/recycled sources; and
- These targets to be incorporated into future design and build contract for contractors bidding to build the Project.

#### 2.3.48

A Site Waste Management Plan (SWMP) using the Waste Reduction Action Plan (WRAP) template is proposed to be prepared prior to construction in order to manage environmental impacts resulting from the production and management of waste. The SWMP would also ensure all waste management activities occurring on site are in accordance with all relevant waste legislation and would take into account the requirements of the EIA process, as set out in the EAP.

#### 2.3.49

To aid the production of the SWMP, an Outline Site Waste Management Plan (OSWMP) has been produced (see ES (Volume 2d): OSWMP). The goal of the OSWMP is to suggest the best methodology to enable the waste generation to be dealt with in a structured and auditable manner, from the commencement of the Project through construction and operation.

#### 2.3.50

Administration waste such as paper and cardboard from office use or packaging would be segregated and recycled. Consumables from office machinery would also be returned to appropriate supply companies for recycling.

#### 2.3.51

For the purposes of this ES it is assumed that the 38,300m³ of dredged material would be removed. An assessment of the potential reuse of dredged material, in particular silts and clays that would otherwise need to be disposed of at landfill, is currently in progress. In particular, there is the possibility for the reuse of this material. However, further chemical testing would be carried out to ascertain whether the material is suitable for re-use.

#### 2.3.52

If the material is found to be unsuitable for re-use within the Project, for example, as embankment raising or backfilling sheet piling walls, it is proposed that the remainder would
be dewatered and disposed of at a licenced landfill site within Lincolnshire (see ES (Volume 2d): OSWMP).

**Construction traffic**

2.3.53 It is anticipated that the appointed contractor would make provisions for a crew bus to bring workers (local and regional) to the Project area and return at a designated pick-up point. In addition to this it is estimated that the travel requirements of up to 30 staff, plus delivery vans (up to 5 per day), would be the daily trips associated with the Project.

2.3.54 It is anticipated that approximately 90% of construction materials can be delivered via barge which would avoid significant impacts on the local road network. However, this would increase the number and frequency of vessel movements through the Haven.

2.3.55 River traffic is likely to be reduced to one-way traffic through the by-pass channel due to the reduced channel width (approximately 18m) and to avoid the risk of collisions. To ensure this is suitably carried out, a traffic management system, managed by the Port of Boston Harbour Authority, would be introduced prior to the installation of the by-pass channel. Appropriate lighting and navigational aids would be installed to aid navigation during periods of poor light and/or night time navigation. A detailed description of proposed navigation management measures can be found in Section 14.4 of this Report and the ES (Volume 2d): Navigational Impact Assessment Technical Report.

2.3.56 The Boston Public Footpath No.14 (Macmillan Way) would be temporarily closed and an alternative diversion route would be put in place. The proposed alternative route would re-direct pedestrian traffic onto Marsh Lane (until enabling works along Wyberton Low Road have been completed), then back onto the original route along Lealand Way. An indicative plan is shown in Figure 5.1 of ES (Volume 2d) Traffic and Transport.

**Construction workforce**

2.3.57 It is estimated that the Project would require up to 150 workers, with a peak period envisaged to be between 2nd Quarter 2018 and 3rd Quarter 2019.

2.3.58 It is estimated that 30% of workers would be sourced locally, 20% of workers would come from regions just outside of Boston (but commutable) and the remaining 50% of workers (highly skilled trades and managers) would be sourced beyond local regions. It is anticipated that these workers would be housed locally.

**Environmental management during construction**

2.3.59 The Environment Agency’s Water and Environmental Management Framework (WEMF) stipulates that environmental management best practice must be implemented by all contractors carrying out the construction of their flood risk management schemes. These
would then be implemented through the EAP (see Chapter 20 of this Report) identified from the EIA process.

2.3.60 The Project would incorporate best practice in construction design and implementation adhering to the following guidelines. Please note this list is not exhaustive:

- Pollution Prevention Guidance (Environment Agency, 2014a);
- British Standard (Various) (BSI, 2015) and Eurocodes (2015);
- Construction, Design and Management (CDM) Regulations (2015);
- Construction Industry Research and Information Association: Environmental Good Practice on Site Guidelines (CIRIA, 2010);
- Construction Excellence guidelines (OGC, 2011); and
- All appropriate Environment Agency guidelines, specifications and standard details.

Related construction experience

2.3.61 The Environment Agency would deliver the project from the grant aided flood risk management budget. The Environment Agency has selected a number of experienced and competent contractors to construct these schemes, which are procured through the WEM. In constructing these flood risk management schemes, these selected contractors are required to meet stringent environmental targets for sustainable construction. The Environment Agency and their appointed contractor, to be procured through the WEMF, would apply this experience and knowledge to the construction of the Project.

2.4 Project operation

2.4.1 The barrier gate would operate in response to:

- Tidal flooding events (5.3mAOD or greater);
- Operational maintenance (monthly, yearly and 5-yearly);
- To train staff on or to test the barrier operation; and
- For construction, maintenance for re-laying of any works in or beside the Haven.

2.4.2 The barrier gate would lie flat against the river bed during the remaining periods.

2.4.3 The flood gates within the flood wall on the left bank would be closed for the purpose of preventing or managing flooding. The Environment Agency would provide notice to the PoB to close the gates and would specify when the gates must be closed.

2.4.4 The gate would take approximately 20 minutes to open and 20 minutes to close fully (that is, lifting it off the river bed to its fully closed position). This would be completed on the rising tide at an optimum point of forecast tidal level against fluvial flow. It is anticipated that during an extreme tide, the barrier is likely to remain closed for eight to nine hours (estimated as the time span between two consecutive low tides and taking into consideration potential extreme tide duration). The majority of closures would be carried out as a precaution and hence the
duration of closures would be less than nine hours. It is anticipated that the barrier would be re-opened in stages dependant on the downstream tidal level.

2.4.5 A review of existing data on predicted extreme tides has been carried out to determine how frequently closure is likely to be required in response to a predicted extreme tidal event over the 100 year design life of the barrier.

2.4.6 The modelling has shown that the expected likelihood of closure for an extreme tidal event would initially be once every 2-5 years, increasing to approximately once a month by 2115 (the frequency of closure is likely to increase over time given the predicted increases in sea level as a consequence of climate change).

**Barrier structure maintenance**

**Monthly**

2.4.7 The monthly maintenance of the barrier would take approximately 50 minutes (20 minutes to raise, 10 minutes for a visual inspection and 20 minutes to lower). The barrier would be raised every month to prevent the build-up of silt on the barrier itself and to ensure that there are no problems with the mechanisms.

**Yearly**

2.4.8 Yearly maintenance of the barrier would take approximately 50 minutes (25 minutes to raise and 25 minutes to lower). The barrier takes longer to raise and lower than the monthly inspections as it would be raised to its inspection position which is clear of water level and would not impede water flow during inspection. The visual inspection would take approximately 1 hour, after which the gate would be returned to its normal resting position. Therefore, yearly checks would take approximately 1 hour and 50 minutes.

2.4.9 Advanced warning would be issued to river users via the Harbour Master through the use of radio channels and visual posters.

**Major**

2.4.10 Every 5 years the gate would be raised for 1-2 days. The barrier would be manoeuvred into its inspection position which is clear of the water level at all times during inspection. The barrier would then be lowered back to its resting position during low tide.

2.4.11 Advanced warning would be issued to river users via the Harbour Master through the use of radio channels and visual posters.
Maintenance dredging

2.4.12 Specific additional maintenance dredging is not required for this Project. As is the current situation, in order to ensure that vessels can continue to safely navigate the Haven, dredging would continue to be carried out by the PoB under its existing dredging license.

2.4.13 The PoB is currently licenced to dredge 33,300 (wet) tonnes of sediment per year from various locations within the Port and the Haven to maintain access for shipping. This is undertaken using the port's grab hopper dredger.

Operational waste

2.4.14 The volumes of waste generated during operations would be minimal due to no full time staff operating the facility. The main generators are going to be the occasional site staff and contractors who, when required, would carry out equipment maintenance and parts replacement as shown in Table 2.4.

Table 2.4: Waste arising from barrier operation

<table>
<thead>
<tr>
<th>Waste / Material</th>
<th>Classification</th>
<th>Potential sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metals</td>
<td>Non-hazardous</td>
<td>Machinery parts, pipe replacements, frames, nails, gas cylinders, cans, PPE</td>
</tr>
<tr>
<td>Wood</td>
<td>Non-hazardous</td>
<td>Refurbishment</td>
</tr>
<tr>
<td>Plastic</td>
<td>Non-hazardous</td>
<td>Containers, packaging, site facilities, PPE</td>
</tr>
<tr>
<td>Glass</td>
<td>Non-hazardous</td>
<td>Containers, packaging, bulbs</td>
</tr>
<tr>
<td>Vegetation</td>
<td>Green</td>
<td>Vegetation maintenance</td>
</tr>
<tr>
<td>Fabric</td>
<td>Non-hazardous</td>
<td>Refurbishment, PPE</td>
</tr>
<tr>
<td>Organic / Food</td>
<td>Organic</td>
<td>Workers on-site</td>
</tr>
<tr>
<td>Oils / Lubricants</td>
<td>Hazardous</td>
<td>Machinery, equipment, moving parts</td>
</tr>
<tr>
<td>Paper and Card</td>
<td>Non-hazardous</td>
<td>Containers, packaging, administration</td>
</tr>
<tr>
<td>Fuel</td>
<td>Hazardous</td>
<td>Machinery, on-site powered equipment</td>
</tr>
<tr>
<td>Batteries</td>
<td>Hazardous</td>
<td>Machinery, on-site powered equipment</td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016

2.4.15 These small volumes of waste are expected to be generated throughout the lifetime of the Project. However, increased volumes could be generated during scheduled and unscheduled (break-down) maintenance of the barrier. Some waste materials may be hazardous or contaminated and would be disposed of in accordance with the relevant legislation at the time of disposal.

---

7 MMO Marine Licence. Licence number: L/2015/00382/1
Operational river traffic

2.4.16 Historic trends of the river traffic show a decline (PoB, 2015). Once the barrier structure is completed, it is possible there may be an increase in the number of vessels using the River Witham for access. This may be due to increased use of the PoB facilities or a greater number of tourists wishing to view the barrier. Fishing activities are likely to stay at current levels.

2.4.17 To reduce the increased risk caused by the potential for greater numbers of vessels, mariners would be informed through a wide manner of networks to navigate the channel safely. Additional navigational lighting would be introduced as would Racons to aid mariners through the barrier.

Operational road traffic

2.4.18 Once the construction and commissioning phases are complete the site would begin routine operations. Operational traffic would be very low and would only include vehicles required to transport staff to site when the tide is predicted to be 5.1mAOD and for routine maintenance checks on the barrier.

Operational workforce

2.4.19 Barrier operation and maintenance is likely to require a small part-time workforce, the precise number would vary depending on the activities undertaken. Operation of the barrier is likely to require 2-3 staff at any one time, however during maintenance this may increase to around 10 depending on work being carried out. This is likely to result in no change to traffic in the local vicinity.

Adopting best practice

2.4.20 Industry best practice would be adopted throughout the life span of the project, and would be outlined with the EAP (see Chapter 20 of this Report for more detail).

2.4.21 A Civil Engineering Environmental Quality Assessment and Award Scheme (CEEQUAL) would be carried out as a part of the Project. CEEQUAL is the evidence-based sustainability assessment, rating and awards scheme for civil engineering, infrastructure, landscaping and the public realm, and celebrates the achievement of high environmental and social performance.\(^8\)

---

\(^8\) CEEQUAL 2015, [http://www.ceequal.com/about.html](http://www.ceequal.com/about.html)
2.5 Project alternatives

Strategic Options

2.5.1 The Environment Agency considered a range of options to deliver the combined objectives of Flood and Coastal Risk Management (FCRM) and waterways during the development of the BCS (2008).

2.5.2 A number of strategic options were developed and the means to deliver these options considered. Seven strategic options (1 baseline and 6 viable) were identified to be technically feasible and were taken forward for environmental and economic appraisal. These options are summarised in Table 2.5 below.

<table>
<thead>
<tr>
<th>Protection standard</th>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do Nothing</td>
<td>Do Nothing</td>
<td>With the Do Nothing Option no works are undertaken and all existing maintenance and operation of structures would stop. This is the baseline against which other options are considered</td>
</tr>
<tr>
<td>Do minimum</td>
<td>Option I - Maintain defences and western waterway.</td>
<td>Pro-active maintenance of FRM assets and a channel linking the River Witham (via North Forty Foot Drain) to South Forty Foot Drain.</td>
</tr>
<tr>
<td>Do minimum</td>
<td>Option II - Maintain defences, new barrage and navigation link</td>
<td>Pro-active maintenance of FRM assets, a partial exclusion barrage to control the tidal range within Boston, and a new lock through, or adjacent to, Black Sluice.</td>
</tr>
<tr>
<td>Sustain Standard of Protection</td>
<td>Option III - Maintain defences and western waterway</td>
<td>Sustain the current standard of protection (1 in 50 years) into the future by raising the levels of existing FRM assets to cater for the effect of climate change and a create a new channel linking the River Witham (via North Forty Foot Drain) to South Forty Foot Drain.</td>
</tr>
<tr>
<td>Sustain Standard of Protection</td>
<td>Option IV - Maintain defences, new barrage and navigation link</td>
<td>Sustain the current standard of protection (1 in 50 years) by raising the levels of existing FRM assets to cater for the effect of climate change, and create a new partial exclusion barrage to control the tidal range within Boston and a new lock through or adjacent to Black Sluice.</td>
</tr>
<tr>
<td>Increase Standard of Protection (1 in 300)</td>
<td>Option V - Flood barrier and western waterway.</td>
<td>Provide a flood tide barrier (advancing the line of defence) to increase the standard of protection to a minimum of 1 in 300 years and a channel linking the River Witham (via North Forty Foot Drain) to South Forty Foot Drain to the west of the town centre.</td>
</tr>
<tr>
<td>Increase Standard of Protection (1 in 300)</td>
<td>Option VI – Multi-purpose barrier and navigation link</td>
<td>Provide a flood tide barrier (advancing the line of defence) to increase the standard of protection to a minimum of 1 in 300 years, combined with a partial exclusion barrage to control the tidal range within Boston, and a new lock through or adjacent to Black Sluice.</td>
</tr>
</tbody>
</table>

Source: Boston Combined Strategy 2008
Appraisal of alternatives

2.5.3 Each option in Table 2.5 was individually appraised against the priorities for the BCS in terms of technical, environmental and economic opportunities created. A summary of the key beneficial and adverse effects and estimated costs of each option is provided in Table 2.6 below.
Table 2.6: Summary of key beneficial and adverse effects and costs comparison of identified options as taken from the BCS

<table>
<thead>
<tr>
<th>Number</th>
<th>Standard of Protection</th>
<th>Option</th>
<th>Key Beneficial Effects</th>
<th>Key Adverse Effects</th>
<th>Cost (relative to the different options)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do Nothing</td>
<td>No active intervention</td>
<td>None</td>
<td></td>
<td>Increase in magnitude and frequency of flooding.</td>
<td>No cost as no works proposed</td>
</tr>
<tr>
<td>I</td>
<td>The standard of flood protection will decrease over time from a current standard of 1 in 50 years to approximately 1 in 10 years</td>
<td>Maintain defences and western waterways</td>
<td>Least environmentally intrusive flood risk management option in the short term. Provision of new recreational facilities. Improved access to wider waterway network.</td>
<td>Option is not sustainable against climate change. Provides little opportunity for securing the future of and improving recreational facilities, infrastructure and agricultural land. Significant land acquisition required. Channel bypasses the town centre therefore opportunities would be missed to encourage visitors to Boston. Disturbance of North Forty Foot Drain which is a designated site.</td>
<td>Fourth most expensive (same cost as Option II and Option IV)</td>
</tr>
<tr>
<td>II</td>
<td>Maintain defences, new barrage and navigation link.</td>
<td>Least environmentally intrusive flood risk management option in the short term. Encourages long term investment opportunities. Approach would provide an important recreational resource. Would allow safe navigation of The Haven and wider waterway network.</td>
<td>Option is not sustainable against climate change. Limited opportunity for securing the future of and improving recreational facilities, infrastructure and agricultural land. A barrage to control the tidal range would result in some loss of mudflat habitat and mitigation would be required.</td>
<td>Fourth most expensive (same cost as Option I and Option IV)</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Sustain the current standard of change and western</td>
<td>Maintain defences for climate change and western</td>
<td>Provides a contribution to reduction in frequency and severity of flood risk within.</td>
<td>Provides little opportunity for securing the future of and improving recreational facilities,</td>
<td>Third most expensive</td>
</tr>
<tr>
<td>Number</td>
<td>Standard of Protection</td>
<td>Option</td>
<td>Key Beneficial Effects</td>
<td>Key Adverse Effects</td>
<td>Cost (relative to the different options)</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------</td>
<td>--------</td>
<td>------------------------</td>
<td>---------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>protection (1 in 50 years)</td>
<td>waterways</td>
<td>Boston. Provisions of future investment opportunities due to management of flood risk however, this would be limited to the short term. Minimises environmental intrusion in the short term. Provision of new recreational facilities. Improved access to wider waterway network.</td>
<td>infrastructure and agricultural land. Adverse effects on heritage, landscape and biodiversity with higher defences, although mitigation possible in places. Significant land acquisition required. Channel bypasses the town centre therefore opportunities would be missed to encourage visitors to Boston. Disturbance of North Forty Foot Drain which is a designated site.</td>
<td>Provisions of future investment opportunities due to management of flood risk however, this would be limited to the short term. Minimises environmental intrusion in the short term.</td>
</tr>
<tr>
<td>IV</td>
<td>Maintain defences, new barrage and navigation link</td>
<td>Provides a contribution to reduction in frequency and severity of flood risk within Boston. Provisions of future investment opportunities due to management of flood risk however, this would be limited to the short term. Minimises environmental intrusion in the short term. Encourages long term investment opportunities. Approach would provide an important recreational resource. Would allow safe navigation of The Haven and wider waterway network.</td>
<td>Provides limited opportunity for securing the future of and improving recreational facilities, infrastructure and agricultural land. Adverse effects on heritage, landscape and biodiversity, although mitigation possible in places. A barrage to control the tidal range would result in some loss of mudflat habitat and mitigation would be required.</td>
<td>Second most expensive</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Increase the standard of protection to a minimum of 1 in 300 years</td>
<td>Flood barrier to increase standard of protection and western waterway</td>
<td>Provides a significant contribution to reduction in frequency and severity of flood risk within Boston. Provides long term security of existing and future investments. Encourages long term investment opportunities. Provision of new recreational facilities.</td>
<td>Barrier may have some adverse effects on heritage or landscape, although mitigation possible through design. Significant land acquisition required. Channel bypasses the town centre therefore opportunities would be missed to encourage visitors to Boston. Disturbance of North Forty Foot Drain which is a designated site.</td>
<td>Most expensive option</td>
</tr>
</tbody>
</table>
### Table: Key Beneficial and Adverse Effects of Option VI

<table>
<thead>
<tr>
<th>Number</th>
<th>Standard of Protection</th>
<th>Option</th>
<th>Key Beneficial Effects</th>
<th>Key Adverse Effects</th>
<th>Cost (relative to the different options)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VI</td>
<td>Flood barrier to increase standard of protection and navigation link</td>
<td>Provides a significant contribution to reduction in frequency and severity of flood risk within Boston.</td>
<td>The barrier may have adverse effects on the landscape character and historic character of the study area, although mitigation through good design is possible.</td>
<td>Fourth most expensive (same cost as Option I and Option II)</td>
<td></td>
</tr>
</tbody>
</table>

- Provides long term security of existing and future investments.
- Encourages long term investment opportunities.
- Approach would provide an important recreational resource.
- Would allow safe navigation of The Haven and wider waterway network.

*Source: Mott MacDonald 2016 based on information from the Boston Combined Strategy 2008*
2.5.4 The preferred BCS strategic option was Option VI, namely a multi-functional barrier and navigation link. This option demonstrated the highest cost benefit ratio while achieving the required standard of protection which would reduce the severity of flood risk in Boston and encourage long term investment opportunities. Although potential environmental impacts were identified, it was considered that these could be mitigated.

**Boston Project Appraisal Report (PAR)**

2.5.5 The BCS recommended a multi-functional barrier within a defined length of The Haven and associated works to tie the barrier into the higher defences downstream of the town of Boston. A Project Appraisal Report (PAR) appraised nine potential locations for the proposed barrier. These nine options were initially appraised, with five options being shortlisted for further detailed assessment. Table 2.7. lists the options and explains which were shortlisted for further detailed assessment, providing reasons for discounting, where relevant.

<table>
<thead>
<tr>
<th>Long list</th>
<th>Short listing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Multi-functional Barrier Upstream of London Road Quay</td>
<td>Taken forward as Option A</td>
</tr>
<tr>
<td>1A Multi-functional Barrier Upstream of London Road Quay with new road bypass tie-in</td>
<td>This option was identified as a means of combining flood defence and new highway infrastructure. However, it was discounted due to the highway authority’s decision not to progress new highway infrastructure.</td>
</tr>
<tr>
<td>2 Multi-functional Barrier Upstream of Port Entrance</td>
<td>Taken forward as Option C</td>
</tr>
<tr>
<td>2A Multi-functional Barrier Upstream of Port Entrance incorporating new Port Entrance</td>
<td>This option was rejected on grounds that it was a relatively high cost option that would entail additional works that were not required to deliver the projects objectives.</td>
</tr>
<tr>
<td>2B Multi-functional Barrier Upstream of Port Entrance incorporating Upstream Lock at Town Bridge</td>
<td>The option was rejected because of the additional impacts of constructing and maintaining a second structure in the river. These impacts included: additional construction costs; additional operational and maintenance costs; and increased disruption to navigation during construction.</td>
</tr>
<tr>
<td>2C Multi-functional Barrier Downstream of Black Sluice</td>
<td>Taken forward as Option B</td>
</tr>
<tr>
<td>3 Multi-functional Barrier Downstream of Port Entrance</td>
<td>Taken forward as Option D</td>
</tr>
<tr>
<td>3A Multi-functional Barrier Downstream of Port Entrance incorporating Upstream Lock at Town Bridge</td>
<td>Rejected on the same grounds as 2B.</td>
</tr>
<tr>
<td>4 Multi-functional Barrier Downstream of the Maud Foster Sluice</td>
<td>Taken forward as Option E</td>
</tr>
</tbody>
</table>

Source: Project Appraisal Report 2013
2.5.6 Following selection of the five shortlisted location options (Option A to E as shown on Plate 2.3) for further detailed assessment, a Public Open Forum was held in Boston in January 2010 to canvass the views of the local community.

Plate 2.3: Location of the five shortlist options

Members of the public indicated an overall preference for options further downstream, as they perceived that this would keep flood water furthest away from their homes. In fact, all options would provide the same level of protection from flood risk.

2.5.8 A key stakeholder workshop was then held on 4 March 2010. Attendees included representatives from Natural England, Lincolnshire Wildlife Trust, LCC, Witham Fourth IDB, Black Sluice IDB, BDFA and BBC. At the key stakeholder workshop the main features of any proposal that the attendees identified as being important and which helped them to express preferences, were as follows:

- The fluvial regime must be maintained and there must be no increase in fluvial flood risk;
- The fishing fleet is seen as a viable industry and integral to the town character and as such needs to be fully accommodated;
- Nothing less than the provision of a full navigation link would be acceptable; and
- Commercial shipping should not be disrupted either during construction or operation of the new barrier.

2.5.9 Wider consultation was also undertaken with Inland Waterways Association, PoB, Victoria Group and BDFA. The consultation resulted in options A and D being removed from the short list following identification of their unacceptability to key stakeholders and statutory consultees as follows:
Option A was identified as not meeting the navigation objectives of the Project; provision of a safe navigation link between the Lower Witham and South Forty Foot Drain. The resulting short tidal length between the barrier and Black Sluice Lock was identified as being unsafe for inexperienced inland boaters; particularly the right angle turn into the Black Sluice Lock under tidal flows. LCC and the Environment Agency's Waterways team objected to the option on these grounds, with LCC further identifying that the option would not attract their waterways contribution.

Option D was identified as having significant impacts on the day to day business operations of PoB during and after construction. In consultation with the PoB it was identified that these impacts could not be mitigated.

2.5.10 Option E gave rise to similar concerns as Option D in terms of the effects it would have on the day to day business operations of the PoB. However, feedback received from the local community demonstrated a strong preference for Option E due to the perceived (but nonetheless misplaced) view that this would offer improved flood protection over other options. In view of this feedback, Option E was not discounted at this stage but instead it was taken forward for further appraisal alongside Options B and C.

Cost Benefit Analysis of B, C and E Options

2.5.11 A cost benefit appraisal was then undertaken in respect of Options B, C, and E. All three options would provide the same flood risk benefits and therefore the appraisal focused on which option offered the most cost effective means of delivering those benefits.

2.5.12 Option B was identified as the most cost effective solution and was also identified as the option that minimised impacts on key stakeholders and facilitated the accommodation of mitigation measures. The appraisal took into account extensive consultation in reaching its conclusion.

2.5.13 The appraisal confirmed that Option E should be discounted on the same grounds as Option D, namely that it would give rise to significant impacts on the day to day business operations of the PoB. Further engagement with local residents was undertaken in order to address their misplaced perception that the location of the barrier affected their residual flood risk.

2.5.14 Option C, being further upstream, did not give rise to the same level of impact on the operations of PoB. However, it would have reduced quay space within the Port, thereby reducing or removing the availability of moorings that could otherwise have been made available to relocate smaller fishing vessels comprised of the Boston fishing fleet who currently operate from an existing quay located upstream from the proposed barrier. The construction of the barrier at the location identified as Option C and its regular operation to regulate water levels, as part of WLM as was originally proposed, would have obstructed their sailing routes and preclude opportunities to relocate them downstream of the barrier. A viable alternative relocation location was not identified in the Haven. As a result, Option C would have resulted in significant impacts to the Boston fishing fleet.
In contrast, it was identified that Option B would enable the Boston fishing fleet to be relocated immediately downstream of the barrier and upstream of commercial port operations in the PoB thereby mitigating the impacts of WLM on the Boston fishing fleet. Option B was therefore selected as the preferred option for delivery of the Project.

As outlined in Section 1.2, WLM was subsequently removed from the scope of the Project and it is no longer necessary to relocate the Boston fishing fleet downstream of the barrier. However, aspirations remain to utilise the barrier to deliver WLM in the future. Accordingly, scheme options which were not progressed on the grounds that they would not facilitate WLM would preclude the delivery of WLM in the future. Accordingly, the removal of WLM has not changed the Environment Agency’s preferred option for delivering the Project.

**Design alterations after confirmation of preferred approach at scoping**

In the period of time between the selection of the preferred location and the Updated Scoping Report (2014), Project design has undergone several changes (see Table 2.8). Importantly, until the Project reaches the completion of detailed design stage further changes may occur.

<p>| Table 2.8: Design changes post selection of preferred approach |
|-----------------------------------------------|-----------------------------------------------|
| <strong>Element</strong>                                        | <strong>Changes made</strong>                        |
| Water Level Management                             | The Executive Committee of the County Council and the Environment Agency Boston Barrier Project Board confirmed removal of WLM from the scope of the Project. In making the decision, the Environment Agency, LCC and BBC confirmed that it remains the vision to provide WLM at a later date through a standalone project and consenting process. The Project has been designed not to compromise the introduction of WLM in the future. |
| Sheet piled provisions for a future Fish Pass       | Following the removal of WLM from the scope of the Project, the requirement for a fish pass was no longer present. As the possibility of WLM remains at a later date, the construction plans will include an unanchored sheet pile structure to facilitate the future provision of a fish pass once anchorage has been installed (See Section 2.12). |
| Right bank – embedded sheet piling design          | On the right bank, from the scour protection downstream towards the location adjacent to the WPD site, the right bank sheet piling design has been altered to retain the original sweeping bank morphology. Previously sheet piling was to be embedded into the front of the embankment, backfilled and a stepped aquatic margin emplaced; however, the new option is both preferential in terms of reduced environmental impact and cost to the Project. The piling will still require anchorage (see Section 2.6). This will reduce the impact of the construction on the townscape, heritage, visual amenity and ecology receptors. |
| Tie-in with Maud Foster Sluice                      | The concrete flood wall, which runs through the PoB at a height of 2m, has been designed to taper down into the sluice parapet. The height of the flood wall would be reduced by 1.4m over a 5m section so that it is the same height as the parapet, and by 0.63m, at the junction between the new wall and the parapet. |
| Sustainable infrastructure                         | The design will also incorporate LED lighting, a green ‘living’ roof, grey water reuse, solar panels and green car parking |
| Temporary relocation of the BDFA                   | During construction of the barrier, the BDFA would be temporarily relocated to the PoB quay side. |</p>
<table>
<thead>
<tr>
<th>Element</th>
<th>Changes made</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporary relocation of the Witham Sailing Club</td>
<td>During construction of the barrier, the Witham Sailing Club would be temporarily relocated downstream of the Project area.</td>
</tr>
</tbody>
</table>
This page has been left intentionally blank.
3 Environmental assessment methodology

3.1 EIA requirements

3.1.1 The EIA of the Project has been carried out to meet the requirements of the Rules; Rule 11, together with the Annex I to the Rules, requires the provision of the following information within the ES:

- A description of the Project, including in particular:
  - A description of the physical characteristics of the all of the works covered by the application and the land-use requirements during construction and operational phases;
  - A description of the main characteristics of the production processes, for instance, the nature and quantities of the materials used; and
  - An estimate by type and quantity, of expected residues and emissions resulting from operations of the Project (for example, water, air and soil pollution, noise, vibration, light, heat and radiation).
- An outline of the main alternatives considered and an indication of the main reasons for the choice made, taking into account environmental effects;
- A description of the aspects of the environment likely to be significantly affected by the Project, including, in particular, population, fauna, flora, soil, water, air climatic factors and material assets, including the architectural and archaeological heritage, landscape and the relationship between the above factors;
- A description of the likely significant effects of the Project on the environment, covering direct effects as well as any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the Project resulting from;
  - The existence of the Project;
  - The use of natural resources;
  - The emission of pollutants, the creation of nuisances and elimination of waste; and
  - The description by the applicant of the forecasting methods used to assess the effects on the environment.
- A description of the measures proposed to be taken in order to prevent, reduce, and if possible, remedy any significant adverse effects on the environment;
- Data required to identify and assess the main effects which the Project is likely to have on the environment; and
- A Non-Technical Summary of the information provided under those sub-paragraphs.

3.1.2 Rule 11 (3) highlights that where the Secretary of State for Environment and Rural Affairs has given a Scoping Opinion in relation to an application, the ES for that application need only to include the information specified in the Scoping Opinion. This ES reports the assessments which have been undertaken in relation to potentially significant issues identified through the scoping process, including those within the Scoping Opinion, and any changes to the Project since the Updated Scoping Opinion was received in December 2014 and is detailing in Appendix D of this Report.
3.2 EIA process

3.2.1 The EIA process enables the early identification of potential environmental impacts during the design development process, and enables those impacts to be avoided where possible through alternative design or construction methodologies. The EIA is a systematic process, including the following four principal stages:

- Screening;
- Scoping;
- Impact assessment; and
- Implementation.

3.2.2 The stages of EIA are described below.

Screening

3.2.3 Screening is the optional first stage of the EIA process. It is used to determine whether a project should be the subject of an EIA under Rule 11, together with Annex I and II of the Rules. This Project could fall under the following Annex I and II project descriptions contained within the EIA Directive (European Parliament, 2014):

- Annex I – 15. Dams and other installations designed for the holding back or permanent storage of water, where a new or additional amount of water held back or stored exceeds 10 million cubic metres;
- Annex II – 10. (f) – Inland-waterway construction not included in Annex I, canalisation and flood-relief works; and
- Annex II – 10. (g) – Dams and other installations designed to hold water or store it on a long-term basis (projects not included in Annex I)

3.2.4 Therefore, the Environmental Agency determined that an EIA would be undertaken for the Project.

Scoping

3.2.5 Scoping is the second stage in the EIA process. It is carried out to identify all potential environmental issues, and to determine those that are likely to result in significant effects and therefore require further detailed assessment. As part of the scoping process, an applicant has the option of seeking a “Scoping Opinion” from the Secretary of State to identify the information to be provided in the environmental statement.

3.2.6 The scoping process for the Project took into account the findings of the BCS (2008). It focused on the improvement of FRM in Boston together with navigation through the Haven and onto the SFFD. The scoping process for the Project was carried out in two stages (topics scoped into the ES can be found in Appendix B):
Stage 1 – A scoping consultation letter (Environment Agency, 2011) was sent out to statutory consultees. The letter was accompanied by a key issues table, which set out the issues that were planned to be scoped in and out of the EIA; and

Stage 2 – An Original Scoping Report (2011) and an Update Scoping Report (2014) were prepared to address the responses to the consultation, to reflect the status of the project design and detail the EIA process (Environment Agency, 2014). Potential significant environmental effects likely to result from the implementation of the Project were identified in the Scoping Report.

3.2.7 The Scoping Report was updated in October 2014, as there was a potential for WLM to be removed from the scope of works and considered at a later date. As a result of the update, a request for an Updated Scoping Opinion was submitted in November 2014 to the Secretary of State for Defra under the Transport and Works (Applications and Objections Procedure) (England and Wales) Rule 8 of the Rules, 2006.

3.2.8 The formal Updated Scoping Opinion was received from the Secretary of State in December 2014 together with the specific responses provided by statutory consultees (see Appendix F of this Report) to the Secretary of State during the statutory consultation that was undertaken before providing the scoping opinion. The EIA undertaken and this ES comply with the Scoping Opinion. Details of the responses to the consultation for both the Original and Updated Scoping Report can be found in Appendix D of this Report.

3.2.9 Findings from each environmental topic during the scoping stage of the EIA were summarised (see Appendix D of this Report). The findings identified the issues to be “scoped in” and which required further assessment through the EIA process. These have been presented in this ES and supporting documentation.

3.2.10 As described in Section 1.2, WLM no longer forms part of the Project and as a result topics identified in the updated Scoping Report as relating only to WLM have been removed from the list of “scoped in” topics and therefore, this ES.

3.2.11 Other Technical Topics which were not considered likely to result in a significant effect were “scoped out” by the Scoping Opinion from the Secretary of State (December 2014). These issues were not subject to further assessment and are not therefore reported in this ES. The reasons for these decisions are described in full in the Updated Scoping Report (Environment Agency, 2014).

3.2.12 After the completion of the Updated Scoping Report, the scope of the assessment was extended to include road traffic and transport issues as it was considered that traffic effects might arise during the construction period.
Impact assessment

3.2.13 The detailed impact assessment is the third stage of the EIA, during which the likely significant effects of the construction and operation of the Project are predicted, the significance of those affects is assessed and reported within this ES. The EIA undertaken addressed the changes to the Project since the Update Scoping Opinion was given, which have either eliminated or added new issues from those identified at the scoping stage.

3.2.14 The significance of the predicted effects is determined from:
- The measure of magnitude and nature of predicted impacts; and
- Sensitivity of the resource or receptor affected.

3.2.15 The significance of effect has initially been assessed prior to the application of any proposed mitigation. It was then assessed again taking into account the effect of mitigation measures on the initial assessment.

3.2.16 The reporting of effects within the ES, for those technical disciplines scoped in by the Scoping Opinion from the Secretary of State (December 2014), is structured as follows:
- Volume 1 (comprised of this Report) documents those likely environmental impacts of the Project which have been assessed to have significant; effects; however, in some cases non-significant effects are reported; and
- Volumes 2a – 2d (the Technical Reports) document all likely environmental effects of the Project for the technical discipline (scoped into the assessment by the Secretary of State), irrespective of their significance.

3.2.17 The Technical Reports of the EIA conducted for the Project contain descriptions of all the predicted effects from the Project, irrespective of their significance. Whereas the Technical Chapters contained within this Report discuss only those which are deemed to have significant effects under EIA regulations, in so far as those which are of moderate or major effect. However, in some Technical Chapters, non-significant effects which require further explanation are also reported within this Report.

3.2.18 Technical Chapters in this Report (Chapters 6 – 17) and the ES (Volumes 2a – 2d): Technical Reports explain the impact assessment methodology used for each environmental topic scoped in and describe how the level of significance has been determined. Where definitive guidelines are not available, and it is not possible to predict impacts quantitatively, qualitative assessments have been carried out based on available information and professional judgement.

3.2.19 Methodology limitations and assumptions for each of the Technical Reports are detailed in the Volumes 2a – 2d.
3.2.20 The following six stage framework approach, as identified in the Updated Scoping Report (Environment Agency 2014) has been used to predict significant effects, incorporating industry accepted impact assessment methodologies where available:

3.2.21 Stage 1: Determine the values and/or sensitivity of the receptor/environmental resource:
- Identify baseline conditions within a defined study area. The baseline would be the conditions expected to be present in the study area immediately prior to the proposed construction of the Project;
- List receptors and environmental resources within a defined study area (each Technical Chapter would identify a ‘study area’ relevant to the environmental topic under consideration), likely to be affected by the Project. This process has been guided through consultation with stakeholders (Chapter 5 of this Report); and
- Assess the value and sensitivity of each environmental resource according to a five-point scale (that is, very high, high, medium, low, and negligible). Criteria defining these values differ with respect to each topic area and are defined, as appropriate, in each of the Technical Chapters in this Report (Chapters 6 to 17) and within the respective Technical Report in Volumes 2a – 2d.

3.2.22 Stage 2: Determine the magnitude and attributes of impacts:
- Identify the known or likely impacts (for instance, physical changes) of the works on receptors or environmental resources at the construction and operational phases, relative to the baseline conditions;
- Characterise impacts in terms of the nature (negative or positive) and type of the impact (that is, whether it is direct or indirect, secondary, cumulative, short or long-term, permanent or temporary, reversible or irreversible); and
- Consider the characteristics of each impact to determine its magnitude. Classify the magnitude of the impacts as minor, moderate or major.

3.2.23 Criteria defining the magnitude of impacts differ with respect to each topic and are defined, as appropriate, in each Technical Chapter of this Report (Chapters 6 to 17) and within the respective Technical Reports in ES (Volumes 2a – 2d).

3.2.24 Stage 3: Determine the significance of the effect:
- Evaluate the significance of the environmental effect based on the value and/or sensitivity of the receptor and/or environmental resource and the nature and magnitude of the impact using professional judgement and the matrices set out in Table 3.1, or according to the preferred method of the specialists as set out in each of the Technical Chapters of this Report (Chapters 6 to 17) and within the respective Technical Reports in Volumes 2a – 2d; and
- For the purposes of this ES, ‘significant’ effects are classified as those identified as moderate or major impact, whether adverse or beneficial.

3.2.25 The majority of the Technical Reports used the significance matrix (Table 3.1) to categorise their impact assessment, unless industry best practice stipulates other guidelines where
appropriate. Therefore, this table has not been reproduced within each Technical Chapter in this Report (unless otherwise outlined).

Table 3.1: Significance matrix for potential effects (adverse or beneficial)

<table>
<thead>
<tr>
<th>Magnitude of impact (adverse or beneficial)</th>
<th>Sensitivity of receptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>High</td>
<td>Major*</td>
</tr>
<tr>
<td>Medium</td>
<td>Major/<em>moderate</em></td>
</tr>
<tr>
<td>Low</td>
<td>Moderate*/minor</td>
</tr>
<tr>
<td>Negligible</td>
<td>Minor/negligible</td>
</tr>
</tbody>
</table>

Note: * represents impacts considered significant.
Source: Mott MacDonald 2016

3.2.26 Stage 4: Identify mitigation measures:
- Where adverse effects are predicted, recommend measures to avoid (for example, via changes to the design of the Project), mitigate (for example, reduce the impacts on site) or remedy (which could include compensation), those effects. This focuses, in particular, on those adverse effects identified as ‘significant’.

3.2.27 Stage 5: Residual effects:
- Determine the significance of residual effects after the proposed mitigation measures have taken effect. For the purpose of this Report, residual effects considered to have a moderate or major adverse/beneficial effect have been classified ‘significant,’ and reported. However, in some cases non-significant effects which require further explanation are also reported.

3.2.28 Stage 6: Cumulative effects:
- The potential effects of the Project are initially identified in isolation for each of the environmental topics. In reality, environmental impacts cannot be considered in isolation as changes resulting from one impact may have secondary implications. These are referred to as in-combination effects in this ES. These impacts result where one receptor may be affected by more than one environmental topic i.e. noise and landscape impacts impacting on one receptor thereby increasing the significance of effect on the identified receptor.
- In addition, the Project may result in cumulative effects where multiple effects on the same environmental topic arise from the Project, together with those from other developments that are operational, currently under construction, with planning permission, or at the planning application stage which have not been included within the Projects baseline. These are referred to as inter-project effects in this ES.

3.2.29 Chapter 19 of this Report describes cumulative effect from the Project. The methodology used to identify these effects comprises three key stages:
3.2.30 Stage 1: Establish the scope of the assessment
- Define the residual effects of the Project as identified through the EIA and highlight affected receptors; and
- Identify other developments within the study area.

3.2.31 Stage 2: Assess and evaluate effects
- Identify the potential environmental effects during the construction and operation of the developments;
- Assess any cumulative effects between topics and receptors to identify effects; and
- Assess any changes in the significance of the identified residual effects of the Project, in combination with the developments.

3.2.32 Stage 3: Identification of mitigation measures
- Recommend mitigation, where appropriate, for sensitive receptors where additional adverse effects are identified as a result of cumulative effects.

3.3 Implementation

3.3.1 The final implementation stage of the EIA would be the monitoring of the mitigation included within the EAP (see Chapter 20 of this Report) before, during and after construction of the Project.

3.3.2 The EAP would be updated as needed throughout each subsequent stages of the Project implementation (detailed design stage) to ensure that it reflects the most up-to-date mitigation and monitoring requirements and records how these measures have been implemented.
4 Legislation and planning policy

4.1 Legislation and planning policy

4.1.1 Planning policy relevant to the Project has been reviewed as part of the EIA process. This Chapter provides a summary of relevant national and local planning policy to give the context as assessment of the Project.

4.1.2 The ES (Volumes 2a – 2d): Technical Reports provide information on legislation, policy and guidance relevant to each of the Technical Topics.

4.2 National Planning Policy Framework

4.2.1 The National Planning Policy Framework (NPPF) provides planning policy guidance at a national level.

4.2.2 The NPPF promotes a 'presumption in favour of sustainable development'. This presumption requires that economic, social and environmental considerations should be assessed in the determination of development proposals. Paragraph 15 of the NPPF states that policies in Local Plans should “…follow the approach of the presumption in favour of sustainable development so that it is clear that development which is sustainable can be approved without delay”.

Delivering a Strong Economy

4.2.3 Paragraph 19 of the NPPF states: "significant weight should be placed on the need to support economic growth through the planning system". Paragraph 21 states that Local Planning Authorities should identify priority areas for economic regeneration, infrastructure provision and environmental enhancement

Good Design

4.2.4 The NPPF places emphasis on the need for appropriate design in any proposal for development.

4.2.5 Paragraph 65 states: "local planning authorities should not refuse planning permission for buildings or infrastructure which promote high levels of sustainability because of concerns about incompatibility with an existing townscape, if those concerns have been mitigated by good design".

4.2.6 Paragraph 66 advises that applicants should work closely with those affected by their proposals to evolve designs that take account of the community. The paragraph states: "proposals that can demonstrate this in developing the design of any proposed development should be looked on more favourably". Consultation with the local community and other stakeholders was undertaken throughout the development of the Project, to ensure views...
could be taken into account in developing the Project design. Ongoing consultation will continue throughout the detailed design phase and construction of the Project. Consultations with the community and other stakeholders were integrated into the design phase of the project (see Chapter 5 of this Report).

Flooding and Climate Change

4.2.7 Paragraph 99 of the NPPF states that “when new development is brought forward in areas which are vulnerable to flood risk, care should be taken to ensure that risks can be managed through suitable adaptation measures”.

4.2.8 Paragraph 103 states that “when determining planning applications, local planning authorities should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where it can be demonstrated that development is appropriately flood resilient and resistant”.

Natural Environment

4.2.9 Paragraph 109 of the NPPF requires that the planning system should contribute to and enhance the natural and local environment by:
- Protecting and enhancing valued landscapes, geological conservation interests and soils;
- Recognising the wider benefits of ecosystem services;
- Minimising impacts on biodiversity and providing net gains in biodiversity where possible;
- Preventing both new and existing development from contributing to or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and
- Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

4.2.10 The NPPF supports the intention of the Project, to protect against flood risk and therefore, protect the natural and local environment. Mitigation measures incorporated into the design will reduce the potential impact of the construction and operation of the Project to the local environment.

4.2.11 Paragraph 111 ensures planning policies and decisions should encourage the effective use of land by re-using land that has been previously developed.

Historic Environment

4.2.12 Paragraph 131 of the NPPF requires that the following should be taken into account when assessing development proposals:
- Desirability of sustaining and enhancing the significance of heritage assets; and
- Positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality.
4.3 East inshore and offshore marine plans

4.3.1 The East Inshore and Offshore Marine Plans inform and guide regulation, management, use and protection of the marine plan areas and covers the area of the Project. The Marine and Coastal Access Act (S58 (1)) requires that all public authorities taking authorisation or enforcement decisions must do so in accordance with the appropriate marine policy documents. Marine plans work within the framework of the Marine Policy Statement and other national policy, they do not establish new requirements, but apply or clarify the intent of national policy in the East Inshore and Offshore areas, taking into account the specific characteristics of the plan areas. The below outlines the policies within the document which could be applied to the project.

Policy SOC2 and SOC3

4.3.2 Policies SOC2 and SOC3 have been developed to support Objective 5 of the document, ‘To conserve heritage assets, nationally protected landscapes and ensure that decisions consider the seascape of the local area.’

4.3.3 In accordance with SOC2, proposals that may affect heritage assets should demonstrate, in order of preference:
- That they will not compromise or harm elements which contribute to the significance of the heritage asset;
- How, if there is compromise or harm to a heritage asset, this will be minimised;
- How, where compromise or harm to a heritage asset cannot be minimised it will be mitigated against; or
- The public benefits for proceeding with the proposal if it is not possible.

4.3.4 The aim of this policy is to ensure that existing marine and coastal heritage assets are protected from proposals that may have a detrimental impact upon them. It ensures that all heritage assets (whether formally designated or not), are considered in the decision-making process, and that decisions aim to minimise or mitigate possible detrimental effects.

4.3.5 In accordance with SOC3, proposals that may affect the terrestrial and marine character of an area should demonstrate, in order of preference:
- That they will not adversely impact the terrestrial and marine character of an area;
- How, if there are adverse impacts on the terrestrial and marine character of an area, they will minimise them;
- How, where these adverse impacts on the terrestrial and marine character of an area cannot be minimised they will be mitigated against, and
- The case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts.
4.3.6 This policy adds clarity to existing national policy by identifying where character areas and key elements exist within the East Inshore and East Offshore Plan areas.

**Policy ECO1 and ECO2**

4.3.7 Policies ECO1 and ECO2 were developed to support Objective 6 of the document, ‘To have a healthy, resilient and adaptable marine ecosystem in the East Marine Plan area’.

4.3.8 In accordance with ECO1, cumulative impacts affecting the ecosystem of the East marine plans and adjacent areas (marine, terrestrial) should be addressed in decision-making and plan implementation.

4.3.9 This policy highlights that those public authorities, predominantly those determining applications, and the marine planning authority need to consider the cumulative impacts affecting the ecosystem of the East marine plans and adjacent areas (marine, terrestrial) during the determination process.

4.3.10 In accordance with ECO2, the risk of release of hazardous substances as a secondary effect due to any increased collision risk should be taken account of in proposals that require an authorisation.

4.3.11 This policy expands upon policy ECO1, with consideration given to the impact that increased infrastructure within the water body has on collision risk and the release of hazardous substances. It reflects the need to link between different considerations in the Marine Policy Statement and the importance placed on the issue by stakeholders in the East marine plan areas.

**Policy BIO1**

4.3.12 Appropriate weight should be attached to biodiversity, reflecting the need to protect biodiversity as a whole, taking account of the best available evidence including on habitats and species that are protected or of conservation concern in the East marine plans and adjacent areas (marine, terrestrial).

4.3.13 Policy BIO1 has been included to promote Objective 7 of the plan, ‘To protect, conserve and, where appropriate, recover biodiversity that is in or dependent upon the East marine plan areas’.

**Policy CC1 and CC2**

4.3.14 Policies CC1 and CC2 have been developed to support Objective 9 ‘To facilitate action on climate change adaptations and mitigation in the East Marine Plan areas’. Policies set out to ensure approved developments are supporting a transition to a low carbon future, incorporating both specific and general measures.
4.3.15 In accordance with CC1, proposals should take account of:
- How they may be impacted upon by, and respond to, climate change over their lifetime; and
- How they may impact upon any climate change adaptation measures elsewhere during their lifetime.

4.3.16 Where detrimental impacts on climate change adaptation measures are identified, evidence should be provided as to how the proposal will reduce such impacts.

4.3.17 This policy gives effect to high level principles for decisions-making related to the need to account for the potential impacts of climate change adaption. It is consistent with the NPPF, adding marine context to the need to ensure new development is planned to avoid increased vulnerability to the range of impacts.

4.3.18 In accordance with CC2, proposals for development should minimise emissions of greenhouse gases as far as is appropriate. Mitigation measures will also be encouraged where emissions remain following minimising steps. Consideration should also be given to emissions from other activities or users affected by the proposal.

4.3.19 This policy gives effect to high level principles for decision-making related to the need to consider the potential impacts of climate change mitigation. It supports, and adds marine context to the NPPF section 95, supporting local planning authorities need to plan for new development in locations and ways which reduce greenhouse gas emissions.

Policy PS3

4.3.20 Proposals should demonstrate, in order of preference:
- That they will not interfere with current activity and future opportunity for expansion of ports and harbours;
- How, if the proposal may interfere with current activity and future opportunities for expansion, they will minimise this;
- How, if the interference cannot be minimised, it will be mitigated; and
- The case for proceeding if it is not possible to minimise or mitigate the interference.

Policy DD1

4.3.21 Proposals within or adjacent to licensed dredging and disposal areas should demonstrate, in order of preference
- That they will not adversely impact dredging and disposal activities;
- How, if there are adverse impacts on dredging and disposal, they will minimise these;
- How, if the adverse impacts cannot be minimised they will be mitigated; and
- The case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts.
4.3.22 This policy aims to protect dredging and disposal activities, in or adjacent to licensed dredging and disposal areas, against other new proposals that could compromise the continued access to ports and harbours for the shipping industry. When assessing proposals against this policy, planning authorities will take account of a range of relevant considerations including compliance with legislation and regulations detailed in the maintenance dredging protocol and from the applicable environmental impact assessment.

**Policy GOV1, GOV2 and GOV3**

4.3.23 Policies GOV1, GOV2, and GOV3 have been developed to ensure Planning Authorities ensure land uses are being utilised in a sustainable manner. This has been assured through consistent stakeholder engagement with the necessary statutory bodies, and adherence to local planning policy.

4.3.24 In accordance with GOV1, appropriate provision should be made for infrastructure on land which supports activities in the marine area and vice versa.

4.3.25 This policy ensures that public authorities assess the potential positive and negative impacts, on both the marine and terrestrial environments, of development proposals in a collective and cumulative manner.

4.3.26 In accordance with GOV2, opportunities for co-existence should be maximised wherever possible.

4.3.27 This policy ensures all relevant public authorities ensure that the feasibility of co-existence is taken into account when assessing new development and other activities.

4.3.28 In accordance with GOV3, proposals should demonstrate in order of preference:
- That they will avoid displacement of other existing or authorised (but yet to be implemented) activities;
- How, if there are adverse impacts resulting in displacement by the proposal, they will minimise them; and
- How, if the adverse impacts resulting in displacement by the proposal, cannot be minimised, they will be mitigated against or
- The case for proceeding with the proposal if it is not possible.

4.3.29 This policy has been developed to clarify the provisions of the Marine Policy Statement, complement GOV2 and to provide more detail and prescription in regard to displacement.

**Policy TR1, TR2 and TR3**

4.3.30 Policies TR1, TR2 and TR3 were developed to protect the tourism and recreation industry surrounding marine and coastal areas. It has been recognised that in order to sustain the contribution to the economy these industries make, plans and policies must ensure that
developments from other sectors do not cause a detrimental effect on the tourism and recreation sector.

4.3.31 In accordance with TR1, proposals for development should demonstrate that during construction and operation, in order of preference:
- They will not adversely impact tourism and recreation activities;
- How, if there are adverse impacts on tourism and recreation activities, they will minimise them;
- How, if the adverse impacts cannot be minimised, they will be mitigated; and
- The case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts.

4.3.32 This policy seeks to minimise adverse impacts of development on tourism and recreation. It ensures that the impacts of construction and operation on tourism and recreation are either avoided, minimised or mitigated.

4.3.33 In accordance with TR2, proposals that require static objects in the East marine plan areas, should demonstrate, in order of preference:
- That they will not adversely impact on recreational boating routes;
- How, if there are adverse impacts on recreational boating routes, they will minimise them;
- How, if the adverse impacts cannot be minimised, they will be mitigated; and
- The case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts.

4.3.34 This policy seeks to address the potential conflict between proposals involving static objects and recreational boating, highlights the benefits of early engagement and aims to ensure that any development takes account of the recognised boating areas and most used cruising routes for recreational craft.

4.3.35 In accordance with TR3, proposals that deliver tourism and/or recreation related benefits in communities adjacent to the East Marine Plan areas should be supported.

4.3.36 This policy aims to support sustainable tourism and recreational opportunities within the East Marine Plan areas, to help improve the local economies of many coastal communities. It allows the planning authority to support proposals which can achieve this goal.

4.4 Local Policies

South East Lincolnshire Local Plan 2011-2036

4.4.1 A new Joint Local Plan for Boston is being developed in combination with South Holland District Council, BBC and LCC. A draft version of the document was released for public consultation in January 2016. As the plan is a draft document, it carries limited weight in the
determination of planning applications. However, those policies of relevance are outlined below.

4.4.2 A number of responses to the 2016 Local Plan Consultation related to flood risk. The Environment Agency raised two specific concerns, the first relating to the Council’s strategic approach to flood risk in respect of site allocations. The second concern related to a lack of detail on the level of assessment and mitigation requirements in support of planning applications. The impact of the construction of the Project was queried by a respondent in terms of whether the council have factored in the construction of the tidal barrier in the formulation of planning policy, and selection of development sites.

4.4.3 All previously saved policies in the Boston Borough Local Plan (1999) will be superseded upon adoption of the South East Lincolnshire Local Plan 2011 – 2036.

Policies for consideration
- Policy 1: Presumption in favour of Sustainable Development;
- Policy 2: Spatial Strategy;
- Policy 3: Development management;
- Policy 4: Strategic approach to flood risk;
- Policy 5: Meeting Physical Infrastructure and Service Needs;
- Policy 8: Specific occupier and Restricted use sites;
- Policy 25: The natural environment;
- Policy 26: The historic environment;
- Policy 27: Pollution;
- Policy 28: Climate change and renewable and low carbon energy; and
- Policy 29: Design of new development.

Boston Interim Plan (Non-Statutory Development Control Policy) 2006

4.4.4 The replacement Local Plan prepared by BBC was withdrawn from the statutory adoption process in 2006. A revised version of the replacement local plan for development control purposes is known as the Interim Plan (Non-Statutory Development Control Policy). Little or no material weight can be given to the policies of the Interim Plan for the purposes of determining an application, due to the significant objections to the first draft and re-deposit draft Local Plan stages.

Boston Borough Local Plan 1999 (saved policies)

4.4.5 The Boston Local Plan was adopted following public consultation in April 1999. Following the publication of the Planning and Compulsory Purchase Act 2004, certain policies were ‘saved’ by the Secretary of State. The saved policies of the Local Plan are a material consideration in the determination of planning applications. Applicable saved polices relating to the Project are identified below.
General development polices

Policy G1 - Amenity

4.4.6 Planning permission will only be permitted for development which will not substantially adversely affect other nearby land users residents or general character of the area in terms of the development nature, layout, density, appearance or traffic generation.

Policy G2 – Wildlife and landscape resource

4.4.7 Planning permission will not be granted for proposals which will have a significant adverse impact upon existing landscape, wildlife and vegetation resources.

Policy G4 - Safeguarding the Water and Environment

4.4.8 Planning permission will not be granted for developments which will have an adverse effect on the water environment, or the quality of surface or ground water.

Policy G6 – Vehicular and Pedestrian Access

4.4.9 Planning permission will not be granted for development where the proposed means of pedestrian and vehicular access are unsatisfactory.

Policy G7 – Accessible Environments

4.4.10 Planning permission will not be granted for non-residential developments which include an external layout which would be unsuitable for persons of restricted mobility.

Policy G8 – Air and Soil Resources

4.4.11 Planning permission will not be granted for developments which will have an adverse effect upon the quality of air or soil such as to lead to:

- Harm to local living or working conditions or the operation of nearby land uses;
- Harm to the natural flora and fauna of interest in the locality; or
- Added constraints on future developments in the area.

Economic development policies

Policy ED1 - Development in Industrial/Commercial Areas

4.4.12 In existing and proposed industrial/commercial areas shown on the proposals map, planning permission will be granted for new industrial or commercial development, or extensions to existing buildings, provided that individual developments will not:
In areas of port related development shown on the proposals map (Boston, town centre and Fosdyke insets) planning permission will be granted for development which is associated with the port's activities, provided that it will not:

- Generate levels of traffic, dust, noise, smell or other pollution which would significantly harm the environment, local living or working conditions, or the operation of nearby land uses;
- Cause unacceptable harm to the character of the locality due to their nature, scale, density, layout, appearance or level of traffic generation;
- Cause an unacceptable deterioration in the quality of utility services elsewhere; and
- Adversely affect the wash SSSI or sites of local nature conservation interest.

**Policy ED2 - Development of Ports**

**4.4.13**

In areas of port related development shown on the proposals map (Boston, town centre and Fosdyke insets) planning permission will be granted for development which is associated with the port's activities, provided that it will not:

- Generate levels of traffic, dust, noise, smell or other pollution which would significantly harm the environment, local living or working conditions, or the operation of nearby land uses;
- Cause unacceptable harm to the character of the locality due to their nature, scale, density, layout, appearance or level of traffic generation;
- Cause an unacceptable deterioration in the quality of utility services elsewhere; and
- Adversely affect the wash SSSI or sites of local nature conservation interest.

**Car park and traffic management polices**

**Policy T1 - New Accesses onto Major Roads**

**4.4.14**

On all a-class roads in the built up area of the town of Boston, a new access or junction will not be permitted unless:

- It is in replacement of an existing one to be closed; or
- It can be demonstrated that there will be no adverse effects on the safety and capacity of the road.

**Policy T2 Roads and Footpaths in New Developments**

**4.4.15**

Where a development involves the construction of a new road and/or footpath, planning permission will not be granted unless the proposed road and/or footpath layout:

- Provides for any proposed through road to be accessible to public transport vehicles;
- Caters satisfactorily for the needs of pedestrians, cyclists and persons of restricted mobility; and
- Relates well to the nature and form of the development, and the locality in general.
Visual amenity, nature conservation, cultural heritage and landscape policies

Policy C7 – Development of Sites Adjacent to River Witham

4.4.16 Planning permission will be granted for the development of land adjacent to the river Witham, or the Haven (the tidal stretch of the River) only where the submitted proposals are well designed and visually related to the river scene: and (where appropriate) accommodate and promote any recreational potential of the site concerned.

Policy C8 – Stump Views

4.4.17 Planning permission will not be granted for any development which would obstruct a public view of St. Botolphs church, Boston, or which would challenge the visual dominance of the church.

Policy C17 – Sites of Local Conservation Importance

4.4.18 Development proposals which would adversely affect the sites of local nature conservation interest will only be permitted where:
  - They are in the local interest with public benefits which decisively outweigh their adverse effect; and
  - They could not feasibly be sited in a less sensitive location.

4.5 Lincolnshire Minerals and Waste Local Plan

4.5.1 Lincolnshire County Council adopted the Core Strategy and Development Management Policies (CSDMP) document on 1 June 2016. This document forms the first part of the Lincolnshire Minerals and Waste Local Plan and sets out:
  - The key principles guiding the future winning and working of minerals and form of waste management in the county up to 2031; and
  - The criteria against which planning applications for minerals and waste development will be determined.

4.5.2 The CSDMP document replaces the Lincolnshire Minerals Local Plan (1991) and the Lincolnshire Waste Local Plan (2006), with the exception of Policies WLP2 (Household Waste Recycling Centres), WLP6 (Materials Recovery Facilities) and WLP12 (Energy from Waste) of the Lincolnshire Waste Local Plan (2006). These policies are saved until the second part of the Lincolnshire Minerals and Waste Local Plan, the Site Locations document, has been adopted.
This page has been left intentionally blank.
5 Consultation

5.1 Overview

5.1.1 The Environment Agency has carried out consultation throughout the development of the Project since 2008. This consultation has aimed to provide an opportunity for key organisations and stakeholders (including landowners), members of the public and other interested parties to inform option selection and the subsequent development of the Project. In turn, consultation has allowed the Environment Agency to gain a clearer understanding of the main issues to be considered and to address these.

5.1.2 During the EIA process, consultation has been carried out with key stakeholders and the wider community as described in this Chapter. Further details on wider consultation can be found in the Consultation Report produced as a part of the TWAO application.

5.2 Background

5.2.1 Extensive consultation has been undertaken throughout the development of the Boston Barrier Project. Consultation commenced in 2008 and engagement would continue to occur during the construction of the Project, until 2020.

5.2.2 Consultation has fed into notable outputs including: the Boston Combined Strategy (2008); the Original Scoping Report (2011); the Updated Scoping Report (2014); and this Environmental Statement. Further details of this consultation are outlined below.

5.2.3 Project consultation comprised of two principal components:

- Consultation with statutory bodies; and
- Wider stakeholder engagement.

5.2.4 Since 2008, over 50 organisations, including statutory bodies and non-governmental organisations, parish councils and the general public have been consulted at key stages of the Project and the general public have been consulted and feedback sought through a variety of engagement techniques, including: group meetings, public exhibitions, workshops and site visits.

5.2.5 Matters raised during the Boston Combined Strategy (2008) consultations have been addressed within that document and will not be considered any further in this ES.

5.2.6 A summary of key issues raised as part of the Original and Updated Scoping Report (2011 and 2014 respectively) (excluding WLM) and the Draft ES (2016) and, where responses to these matters are located within the ES Volumes 1 and 2a - 2d, can be found in Appendices C, D, E and F respectively of this Report.
5.3 Consultation to date

Specific consultation with statutory and non-statutory bodies

5.3.1 Consultation has been carried out at key stages in the development of the Project design and during the EIA process with the following organisations:
- Anglian Water Services Ltd;
- Black Sluice Internal Drainage Board;
- Boston and District Fishermen’s Association;
- Boston Borough Council;
- British Waterways;
- Canal and Rivers Trust;
- Centre for Environment Fisheries and Aquaculture Science (CEFAS);
- Crown Estate;
- Department of Environment, Food and Rural Affairs;
- Eastern Inshore Fisheries and Conservation Authority (EIFCA);
- Harbour Master;
- Heritage Trust for Lincolnshire;
- Historic England;
- Lincolnshire County Council;
- Lincolnshire Rivers Trust;
- Lincolnshire Wildlife Trust;
- Marine Management Organisation;
- Maritime and Coastguard Agency;
- Natural England;
- Port of Boston;
- Sports England;
- The Inland Waterways Association;
- The Royal Society for the Protection of Birds (RSPB);
- Trinity House;
- Witham Fourth Internal Drainage Board;
- Western Power Distribution; and
- Witham Sailing Club.

5.3.2 The main purposes of these consultations were to understand the views and opinions of the statutory and non-statutory bodies on the Project and to discuss what they consider to be key issues and priorities.

5.3.3 Throughout development of the Project, the statutory bodies have variously been involved in assisting with the identification of key issues for inclusion in the EIA and advising on the development of an environmentally acceptable design. The main concerns raised by the at the scoping stage are documented in Appendix D, Table D.1. Appendix E, Table E.1 details the key matters raised during the draft ES consultation (2016).
5.3.4 There is continued, on-going consultation with LCC and BBC in Project team discussions on environmental aspects and notably on landscape and heritage matters. Additionally, consultation was sought from statutory and non-statutory consultees on a draft version of the ES in January 2016. This allowed each stakeholder to review the documentation prior to submission and offer any views before finalisation.

5.3.5 In addition, the Environment Agency’s National Environmental Assessment Services (NEAS) has met with individuals from, Eastern Inshore Fisheries and Conservation Authority (EIFCA) and Natural England (NE), BBC Planners and Heritage Specialists, LCC’s Heritage and Conservation Officers, Historic England, and Public Health Officers.

5.3.6 The main concerns raised on the draft ES and the manner in which these have been addressed in the ES are summarised in Appendix E of this Report. Please see Table 5.1 for those considered the most significant.

Table 5.1: Summary of main matters raised during draft ES consultation

<table>
<thead>
<tr>
<th>Theme</th>
<th>Main matters raised during draft ES consultation</th>
<th>Location of responses within ES Volumes 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navigation</td>
<td>Impact of barrier on velocities in the Haven</td>
<td>See Section 14.4 of this Report</td>
</tr>
<tr>
<td></td>
<td>Potential risk of damage to barrier structure when passing due to narrowing of the channel width at low tide (during high fluvial flow)</td>
<td>See Section 14.4 of this Report</td>
</tr>
<tr>
<td></td>
<td>Consider recreational and commercial fishing vessels in assessment</td>
<td>See Section 14.4 of this Report</td>
</tr>
<tr>
<td></td>
<td>How navigation will be maintained during construction</td>
<td>See Section 14.4 of this Report</td>
</tr>
<tr>
<td>Flooding risk</td>
<td>Adequacy of flood defences downstream during operation</td>
<td>See Section 11.4 of this Report</td>
</tr>
<tr>
<td></td>
<td>The location of barrier will / will not provide adequate protection for all of Boston</td>
<td>See Section 11.4 of this Report</td>
</tr>
<tr>
<td></td>
<td>Concern for condition of the Haven banks after construction</td>
<td>See Section 7.4 of this Report</td>
</tr>
<tr>
<td>Environmental concerns</td>
<td>Potential impacts on The Wash shellfish beds</td>
<td>See Section 11.4 of this Report</td>
</tr>
<tr>
<td></td>
<td>Potential construction noise impacts for residents</td>
<td>See Section 9.4 of this Report</td>
</tr>
<tr>
<td>Landscaping</td>
<td>Pedestrian access along right bank during construction</td>
<td>See Section 15.4 of this Report</td>
</tr>
<tr>
<td></td>
<td>Improve condition along right bank after project</td>
<td>See Sections 7.4 of this Report</td>
</tr>
<tr>
<td>Project</td>
<td>Appropriate location of barrier structure</td>
<td>See Section 2.5 of this Report</td>
</tr>
<tr>
<td></td>
<td>Duration of construction works</td>
<td>See Table 2.1 of this Report</td>
</tr>
<tr>
<td></td>
<td>Potential employment opportunities</td>
<td>See Section 17.4 of this Report</td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016
Community consultation

5.3.7 Following a request for an updated Scoping Opinion made to the Secretary of State in October, community consultation was carried out between November and December 2014. This has continued through the EIA process with the opening of the Boston Barrier Community Hub on 5 August 2015.

5.3.8 The community hub is open every Wednesday between noon and 19.00. It provides an opportunity for the local community and organisations to meet project representatives, to seek further project information and to provide feedback. Overall, the feedback received to date shows a high level of support for the Project.

5.3.9 A further round of community consultation which included residents-only sessions was delivered between November and December 2015. During the consultation process, all consultation materials were translated in different languages (Russian, Latvian and Polish) for consultation on the Project within these predominant demographic groups in the area.

5.4 Future engagement

5.4.1 The Environment Agency will continue its engagement programme and maintain working partnerships with stakeholders to address community concerns and suggestions throughout detailed design and the construction phase. Principal engagement activities to be carried out would include:

- Producing and distributing a Project newsletter outlining the opportunities for community members to review the Project’s ES documents, once it is lodged;
- Ongoing participation in local stakeholder briefings and meetings; and
- Regularly updating and promoting information sources through the Project’s community hub.
6 Cultural heritage

6.1 Introduction

6.1.1 This Chapter summarises the findings of the cultural heritage technical assessment that was carried out for the Project (see the ES (Volume 2a): Cultural Heritage Technical Report). It brings forward only the significant effects likely to be associated with the construction and operation phases of the Project identified in the ES (Volume 2a) Cultural Heritage Technical Report. A full assessment of all the heritage assets within the study area (see Section 6.2) can be found in the ES (Volume 2a): Cultural Heritage Technical Report.

6.1.2 The aim of the assessment was to identify and characterise cultural heritage assets surrounding the Project, assess the potential significant issues identified in the Project’s Updated Scoping Report (2014) and to propose management and mitigation to minimise predicted significant impacts and effects. This Chapter deals only with the heritage assets which have the potential to be significantly affected by the Project, either temporarily or permanently.

6.2 Assessment methodology

6.2.1 The cultural heritage assessment involved a combination of desktop research supported by surveys.

Study area

6.2.2 The study area is the site and the area within 500m of the site boundary in all directions. This area accounts for historic views and the setting of heritage assets which could be affected by the Project. Outside of the 500m study area, views of St Botolph’s Church (the Stump) have also been taken into account given its visual and historic dominance in the area. Character areas 1 to 11 of the Boston Conservation Area (see the ES (Volume 2a): Cultural Heritage Technical Report; Appendix A; Figure 4.1), which are also outside the study area, have also been included to address the impact on the conservation area and associated listed buildings during the operation of the barrier and flood risk management measures.

Desktop research

6.2.3 A desktop study was carried out to determine the historic development of the Project area and surrounding area, how this has shaped the historic character and understanding of the area and the main heritage assets which contribute to this character (see the ES (Volume 2a): Cultural Heritage Technical Report; Chapter 3). A full list of references used to prepare the Report can be found in the ES (Volume 2a): Cultural Heritage Technical Report; Chapter 7.

Surveys

6.2.4 Three surveys were used to inform the cultural heritage assessment:
Collection of borehole and geotechnical data within the site to determine the nature of
deposits and to recover datable material from them (Taylor, 2011)\textsuperscript{9};

- A watching brief on geotechnical trial pits alongside the River Witham to record features
  exposed during ground work and determine their date, function and origin (Taylor, 2011);

- A visual survey of heritage assets in the bed of the River Witham where it passes through
  Boston (Nayling, 2011).

6.2.5 Site walkovers were carried out on 5 March and 20 August 2015 to visually identify the
affected heritage assets and assess the impact on those assets. The walkovers included
access into the PoB and access into the proposed temporary dewatering sites for the
dredging materials from the Project. The rest of the survey was carried out in publicly
accessible areas including footpaths and highways.

Consultation

6.2.6 Two meetings with local heritage stakeholders were held on the 19 March and 15 May 2015.
The initial meeting discussed the Project and was held at BBC. It was attended by
stakeholders including heritage specialists representing Historic England, BBC, LCC, Heritage
Lincolnshire and the Environment Agency. The second meeting involved a site visit and
walkover to assess the site and discuss the Project. This was attended by the heritage
stakeholders noted above.

6.2.7 A third meeting on 12 November 2015 with the heritage stakeholders, noted above, discussed
the proposed design mitigation associated with cultural heritage and visual aspects of the
Project.

6.2.8 Heritage stakeholders have consulted on the draft ES and their comments have been taken
into account in the finalisation of this ES.

Impact assessment methodology

6.2.9 The cultural heritage baseline assessment identified the heritage receptors which have the
potential to be impacted by the Project (see Section 6.3). These receptors were then given a
heritage value. The value was assigned based on the definitions in the ES (Volume 2a):
Cultural Heritage Technical Report; Table 2.1.

6.2.10 The magnitude of impact on the value of the heritage assets was then assessed. This was
evaluated by how much the Project was likely to, either beneficially or adversely alter the
assets heritage value. The impact was then assigned based on the definitions in the ES
(Volume 2a): Cultural Heritage Technical Report; Table 2.2 to ascertain the overall effect of

\textsuperscript{9} See Volume 2a; Report 6: Cultural Heritage; Chapter 3
the Project on heritage assets, and to allow comparison with the other environmental impacts within the EIA, the magnitude of impact was cross referenced with the value of the heritage asset and as outlined in Section 3.2 of this Report.

6.2.11 Major and moderate effects (adverse and beneficial) identified during Project construction and operations were classed as significant. These are discussed in this Chapter. All minor effects can be found in the Technical Report (see the ES (Volume 2a): Cultural Heritage Technical Report).

6.3 Baseline

6.3.1 This section summarises the baseline conditions against which the significant impacts of the Project were assessed. A full assessment of baseline conditions can be found in the ES (Volume 2a): Cultural Heritage Technical Report: Chapter 5.

Topography and geology

6.3.2 The height of the study area varies between 2mAOD south of the Haven, rising to 6mAOD north (heading towards the centre of the historic core) and 2.6mAOD east at Skirbeck. The higher ground is constituted of silt ridges and roddens formed by former river channels.

6.3.3 Bore column samples of the river embankments within the study area have produced evidence of a natural sequence of river silts, coastal marsh, tidal, marine deposits and freshwater fen. Peat layers dating to the middle Neolithic period have been found at around -2.8mAOD covered by layers of alluvium (inter-tidal mudflats, fresh water deposits river silts and channel floor deposits).

Summary of heritage value of main heritage assets

6.3.4 Below is a summary of the main heritage assets that have been identified as having the greatest potential to be impacted by the Project either due to their proximity to the Project, their influence on important views across the Project and potential impact on them from the operation of the Project. A comprehensive baseline assessment for the study area can be found in the ES (Volume 2a): Cultural Heritage Technical Report: Chapter 5.

6.3.5 St Botolph’s Church (MM02)\textsuperscript{10}, a Grade I listed building, has a fourteenth century nave and fifteenth century tower known locally as the Stump. It has historically dominated the views in the area. It is a local landmark and navigation marker for shipping entering Boston from The Wash. This dominance in views to and from The Wash along the Haven has been eroded by

\textsuperscript{10} The MM no is a unique reference number assigned to each heritage asset to allow for easy identification and cross referencing. A full list of MM numbers can be found in ES (Volume 2a): Cultural Heritage: Appendix B: Table B.1
the construction of tall buildings, cranes and hoists associated with the PoB. The Stump is now visible in glimpses between other tall structures. Its position on the banks of the River Witham means it has historically been susceptible to flooding. This is a very high value heritage asset.

6.3.6 St Nicholas Church (MM03) is a Grade II* listed church dating from the thirteenth century. The church is set in a prominent position on the River Witham. Its tower is likely to have been a navigation marker, possibly used in conjunction with St Botolph’s tower (MM02). This is a high value heritage asset.

6.3.7 Skirbeck Conservation Area (MM04) covers St Nicholas church (MM03) and churchyard, its former rectory Skirbeck Hall (MM05) and grounds, extending to the foreshore including Maud Foster Sluice. The character of the conservation area has been diluted by two modern developments, which have served to visually distance it from the Project and interrupt any historic views. This is a medium value heritage asset.

6.3.8 Maud Foster Sluice (MM06) is a Grade II listed structure constructed in 1807 as part of a scheme to reclaim the East West and Wildmore Fens. It is within the Project boundary and is constructed of gritstone ashlar with iron bound and timber gates. It is a working structure and has been repaired and upgraded throughout its life. The steel balustrading and walkways are operational and safety requirements but form an unsympathetic modern addition. Its historic setting has been diluted through the construction of the PoB and modern development within the Skirbeck Conservation Area (MM04). This is a medium value heritage asset.

6.3.9 The railway Swing Bridge, gatehouse and signals cabin (MM07), Grade II listed structures, are 300m upstream of the barrier structure. The Swing Bridge, dating from 1884, is iron set on a timber piled platform and is hydraulically opened from the control cabin on the west bank of the Haven. The bridge, gatehouse and signals cabin are still in operation. Their historic context of structures within an industrial port is still apparent, albeit with modern port development. This is a medium value heritage asset.

6.3.10 Boston Town Conservation Area (MM08 and MM09) Character areas 12a High Street South and 12b London Road (MM08) are within the study area. Historically, the gardens, orchards and shipyards filled the area between the rear of the High Street (mostly eighteenth and nineteenth century properties) and the river. In the nineteenth century, this area was developed with a grid pattern of Victorian Terraces. Towards the southern end of the conservation area, the tight urban grain starts to break down with open spaces and ill-defined boundaries. The remainder of the conservation area (MM09) is a mix of medieval, Georgian, Victorian, Edwardian and modern development. The main listed buildings include St Botolph’s Church (MM02), the Guildhall and Fydell House. The main spaces include the Market Place and Central Park. These are medium value heritage assets.

6.3.11 Prehistoric fen deposits (MM10) in the form of Neolithic peat deposits indicate the formation of a freshwater fen during this period. The deposits lie at between -2m and -2.65m AOD. No
cultural items were found in the borehole data columns (Taylor, 2011). Based on the evidence of the borehole data, there is the potential for prehistoric paleo-environmental evidence indicative of prehistoric natural and possible human influenced land-use change in the river embankments. The scouring action of the river, historic canalisation and creation of the docks has reduced the potential for these deposits to survive elsewhere in the Project area. This is a medium value heritage asset.

6.3.12 There is evidence of abandoned hulks, wooden structures and posts in the tidal mudflats (MM12). There are visible remains of timber hulk and posts to the south of the PoB. There is also recorded evidence of a number of abandoned timber hulks including the Satis Barge and the Henry James in this area. This is a low value heritage asset.

6.3.13 There is a moderate to high potential for prehistoric (Mesolithic to Neolithic date) paleo-environmental remains to be present within or below the peat deposits identified within the Haven river banks. There is some potential that fen deposits from the Roman period may be present within the Project area along the Haven right bank. These deposits may contain Roman date paleo-environmental evidence. There is limited potential for Saxon remains with the exception of the Old Fen Bank (MM18) and a moderate to high potential for medieval and post medieval remains within the tidal mud banks. The potential for the archaeological deposits to be present below the river channel and within the PoB (left bank) is low due to the depth of channel and the impact of maintenance dredging by PoB, the cutting of the channel and excavations required to create the port.

6.4 Impact assessment

6.4.1 This section summarises the significant effects (moderate or major) on the key heritage assets identified as part of the impact assessment. The full impact assessment can be found in the ES (Volume 2a): Cultural Heritage Technical Report; Chapter 6.

6.4.2 The assessment is split into two sections: construction effects and operational effects. Construction effects can be temporary (for example, the presence of construction machinery in historic views) or permanent (for example, the excavation required to construct the barrier structure would result in the permanent removal of archaeological deposits and the construction of a flood wall would result in a permanent changes of setting). Both the temporary and permanent effects of construction are assessed in the construction section. The predicted operational effects include the effect of the barrier and flood risk management measures when they are in use.

Construction effects

6.4.3 The majority of heritage assets within the study area are unlikely to experience significant construction effects, either temporarily or permanently. A full assessment for these assets can be found in the ES (Volume 2a): Cultural Heritage Technical Report; Chapter 5. Below is
a summary of the significant construction effects for cultural heritage, either temporary or permanent, which have been identified as part of the impact assessment. Although the impact assessment has indicated that there are no potential significant effects for the Maud Foster Sluice (MM04) (see Section 6.4.6 of this Chapter), it is included below given its direct relationship with the flood protection works (see Chapter 2: Project Description of this Report).

6.4.4 There would be a temporary moderate negative impact on St Nicholas Church (MM03) and Skirbeck Conservation Area (MM04) from the temporary interruption and obscuring of views and setting by the construction plant working along the right bank and in the channel of the Haven. There would also be an increase in the baseline noise levels from construction activity. This would be experienced over and above the noise from PoB. This noise would disrupt the relatively peaceful and calm character of the church (MM03) and its surroundings, which is within the Skirbeck conservation area (MM04). Therefore this temporary moderate negative impact on St Nicholas Church (MM03) and Skirbeck Conservation Area (MM04) results in a temporary moderate adverse effect, which is considered significant.

6.4.5 There would be a permanent major negative and therefore residual impact on any potential prehistoric fen deposits (MM10) and potential remains of any abandoned hulks, wooden structures and posts within the tidal mud banks (MM12) from in-channel excavation and capital dredging associated with the Project. Where capital dredging or excavation would occur, it is assumed that any potential archaeological deposits would be permanently removed to the depth of -3.0mAOD for capital dredging and -8.0mAOD excavation for the barrier structure. This removal could include the archaeological deposits which potentially lie beneath the toe of the embankment and along lower reaches of the mud banks. The impact on the prehistoric fen deposits (MM10) and tidal mud banks (MM12) has been assessed as permanent major negative which results in a permanent moderate adverse effect, which is considered to be significant.

6.4.6 There would be a permanent minor negative and therefore residual impact on the Maud Foster Sluice (MM06) due to the construction of the PoB flood wall abutting the existing sluice parapet. Listed building consent is being sought separately for this work. There would be no physical intervention into the sluice parapet, with no ties or attachments required. A water tight seal between the flood wall and sluice parapet would be created by compressed board/form caulking with a joint sealant. The concrete flood wall, which runs through the PoB at a height of 2m, has been designed to taper down into the sluice parapet. The height of the flood wall would be reduced by 1.4m over a 5m section so that it is the same height as the parapet, and by 0.63m, at the junction between the new wall and the parapet.

6.4.7 The tapering of the flood wall reduce the visual dominance of the wall as it meets the sluice and would allow the Maud Foster Sluice to continue to be read as a standalone structure. The use of concrete for the flood wall in this location is in keeping with the modern industrial character of the PoB, and the difference in material between the parapet and flood wall also ensures that the Maud Foster Sluice can be understood as part of the historic navigation and water management system rather than a structure associated with the PoB. The permanent
minor negative impact to the Maud Foster Sluice (MM06) would result in a permanent minor adverse effect, which is not considered significant.

**Operational effects**

6.4.8 Below is a summary of the significant operational effects for cultural heritage, which have been identified as part of the impact assessment. Heritage assets within the study area not mentioned below are unlikely to experience significant operational effects. A full assessment for these assets can be found in the ES (Volume 2a): Cultural Heritage Technical Report; Chapter 6.

6.4.9 There is the potential for moderate adverse effects on the prehistoric fen deposits (MM10). The potential effect on abandoned hulks, wooden structures and posts within the tidal mud banks (MM12) would remain during the Project operation.

6.4.10 Permanent beneficial significant effects would occur for the following heritage assets due to the reduction in flood risk through the operation of the barrier during extreme tides:

- St Botolph’s Church (MM02);
- Swing Bridge, gatehouse and controls cabin (MM07); and
- Boston Conservation Area and associated 226 listed buildings (MM08 and MM09).

6.4.11 The reduction in flood risk would reduce the potential for permanent damage to historic buildings and streetscapes. It would reduce the temporary impacts on setting of historic buildings, including St Botolph’s Church (MM02), and areas, including part of the Boston Conservation Area (MM08 and MM09), from the immediate aftermath of flood events (such as mud and debris left by the flood water), and building activities related to the repair of buildings and streetscapes.

6.4.12 There is the potential for increased investment in the historic building stock with the minimisation of heavy costs associated with repairing flood damage. Also, there is the possible easing in planning restrictions in high flood risk areas, allowing for development of viable change of use options for historic buildings.

6.4.13 The impact on the St Botolph’s Church (MM02), Swing Bridge, gatehouse and controls cabin (MM07) and Boston Conservation Area and associated 226 listed buildings (MM08 and MM09) has been assessed as permanent moderate positive which results in a permanent moderate beneficial significant effect.

**Mitigation measures**

6.4.14 The design of the right bank flood defence has been through a number of iterations, between the preferred option being identified and present, before the embedded sheet pile design was identified. These are outlined in the Project description (see Chapter 2 of this Report).
6.4.15 In the preferred option the sheet piling was embedded into the front of the embankment and backfilled, leaving a river bank formed of sheet piling. This would have resulted in a harder, more industrial appearance of the river bank along the full extent of the sheet piled section along the right bank. This would have changed the historic views of St Nicholas Church (MM03) and Skirbeck Conservation Area (MM04) looking east along the right bank from a soft, green, semi natural transitional zone between the industrial PoB and commercial units along Marsh Lane and the semi-rural character of the church and surrounding conservation area, to a harder more industrial view. This was assessed as having a moderate negative impact on the setting of St Nicholas Church (MM03) and Skirbeck Conservation Area (MM04) resulting in a significant moderate adverse effect.

6.4.16 During the design process the location of the sheet piling was moved from the front of the embankment to be embedded within the embankment, with the sheet piling visible as it emerges from the embankment. This reduced the impact of the sheet piling as the visible sheet piling was significantly reduced and the green, semi-natural appearance of the embankment remains dominant, albeit with approximately 2m of sheet piling visible (1m to the height of the current embankment with an additional 1m above to form the wall along the top of the embankment). These mitigation measures adopted during the design process have resulted in a design in which the permanent impact of the right bank flood defence works on the setting of St Nicholas Church (MM03) and Skirbeck Conservation Area (MM04) would be minor negative, resulting in a minor adverse effect on both heritage assets.

Recording

6.4.17 The NPPF notes in paragraph 141 that the ability to record evidence of our past should not be a factor in deciding whether such as loss should be permitted, therefore the recording of archaeological deposits and heritage assets which would be lost as part of the Project is not considered mitigation for their loss. However, there is still a requirement under paragraph 141 for developers to record and advance understanding of heritage assets to be lost wholly or in part and to make this evidence publicly accessible.

6.4.18 A programme of archaeological investigation and recording would be designed and agreed with Lincolnshire County Archaeology Services and Lincolnshire Heritage prior to construction and implemented according to the agreed details. This would be subject to the proposed planning condition and approval by BBC. This programme would include field data collection, investigation and creation of a publicly accessible report of the findings and site archive.

Enhancements

6.4.19 Public interpretation, such as information boards and public art, would be incorporated into the Project to tell the history of area including its part in the story of the town as a Port. The interpretation would be designed as part of the interpretation strategy for Boston to ensure that it forms part of the wider story of Boston with the aim of encouraging people to explore the whole town.
6.4.20 The Maud Foster Sluice currently has modern fencing on and around, as well as walkways across the top of the sluice. These have been erected for safe maintenance of the structure as well as safety and security around the PoB.

6.4.21 At detailed design stage, as part of the enhancements offered by the Project, Environment Agency would work with BBC to identify ways the additional structures can be rationalised whilst keeping the required level of security, or look at alternative options for the security fencing which are more visually sensitive to the historic structure whilst providing the required level of security and operational safety.

Significant residual effects

6.4.22 There are significant beneficial residual effects for St Botolph’s Church (MM02), the Swing Bridge, gatehouse and controls cabin (MM07) and Boston Conservation Area and associated listed buildings (MM08 and MM09) resulting from the flood protection provided by the Project.

6.4.23 Significant adverse residual effects are envisaged due to the permanent removal of potential archaeological remains associated with the prehistoric fen deposits (MM10) and hulks and wooden structures (MM12) during Project construction.

6.4.24 The residual significant visual effect for St Nicholas Church (MM03) and Skirbeck Conservation Area (MM04) has been reduced by applying in-design mitigation during the design process. This has been an iterative process and as such the in-design mitigation is reflected in the current design proposals (see Chapter 2: Project Description).

6.4.25 As the impact assessment is based on these design proposals and Project description, the iterative in-design mitigation is assessed as part of the impact assessment. However, it should be recognised that there has been a positive change in the impact to St Nicholas Church and Skirbeck Conservation Area since the preferred option was identified as part of the scoping process.

6.5 Summary

6.5.1 The Project would result in a long term beneficial effect for the historic core of the town of Boston and its associated historic buildings and streetscapes with the reduction of flood risk. This would protect historic materials, features and structures as well as increasing the potential for longer term investment in the historic building stock.

6.5.2 Project construction would have a temporary significant impact on the setting of St Nicholas Church (MM03) and the Skirbeck Conservation Area (MM04) due to the interruption of key views downstream through the Project by construction activity and the increased level of construction noise. This would reduce the quiet character of St Nicholas Church (MM03) and its churchyard.
6.5.3 The proposed in-project mitigation of a driven in sheet piling allowing for the green embankment to be retained would reduce the heavily engineered character of the sheet piling and provide a transitional zone between the industrial appearance of the Project area and the green embankment. This would remove any permanent significant effects on the setting of St Nicholas Church and Skirbeck Conservation Area.
7 Landscape and visual amenity

7.1 Introduction

7.1.1 This Chapter summarises the findings of the landscape and visual amenity technical assessment that was carried out for the Project (see the ES (Volume 2a): Landscape and Visual Impact Assessment Technical Report) and brings forward only the significant effects (likely to be associated by the construction and operation phases of the Project identified in the ES (Volume 2a): Landscape and Visual Impact Assessment Technical Report. A full assessment of all the landscape and visual amenity assets within the study area (see Section 7.2.2 and 7.2.3 of this Report) can be found in the ES (Volume 2a): Landscape and Visual Impact Assessment Technical Report.

7.2 Assessment methodology

7.2.1 The landscape and visual impact assessment involved a combination of desktop research supported by surveys and consultation with regulatory bodies.

Study area

7.2.2 The study area was based on the extent of the zone of theoretical visibility (ZTV) which is defined as the approximate area from which the Project would be theoretically visible.

7.2.3 The study area covers the landscape environment surrounding the Haven and the ZTV. It includes areas and views that could be affected by the construction and operation of the barrier structure and flood protection works.

Desktop research

7.2.4 A desktop based study was carried out to provide sufficient information against which to predict levels of potential impact and to assess the significance of such impacts (see the ES (Volume 2a): Landscape and Visual Impact Assessment; Chapter 3). A full list of references used to prepare the Report can be found in the ES (Volume 2a): Landscape and Visual Impact Assessment; Chapter 7.

Surveys

7.2.5 Two site visits were carried out in September 2014 and March 2015 with trees in full leaf and without leaves, respectively. The site surveys identified local landscape character areas, broadly homogeneous units of distinct features and elements, and key visual receptors.
Consultation

7.2.6 A site visit with local heritage stakeholders and BBC was carried out on 15 May 2015 to discuss the historic landscape qualities and the effects the Project would have on these qualities. A further landscape and heritage stakeholder meeting was held 12 November 2015.

7.2.7 The following measures were discussed with local heritage stakeholders and BBC and have been incorporated into the design of the Project. These include:

- Implementing mitigation proposals for softening and greening the right bank (for example, saline tolerant grass riverside of the proposed sheet piling, with an option for timber fendering along lengths of the proposed sheet piling);
- Minimising loss of quality views to and from St Nicholas Church (including the retention of tidal mudflats within Project area downstream of barrier structure);
- Rehabilitating the Boston Public Footpath No.14 (Macmillan Way) on the right bank;
- Improving appearance and finishing of sheet piling; and
- Incorporating public art/interpretation boards close to the barrier.

Impact assessment methodology

7.2.8 The landscape and visual assessment was carried out in accordance with the guidance contained in the ‘Guidelines for Landscape and Visual Impact Assessment’, Third Edition (Landscape Institute with the Institute of Environmental Management and Assessment, 2013).

7.2.9 A detailed methodology is included in the ES (Volume 2a): Landscape and Visual Impact Assessment Technical Report; Chapter 3.

Assessment of baseline conditions

7.2.10 The baseline and the Updated Scoping Report identified the existing character of the landscape, its elements and features and its geographical and historical context. It assessed the condition of the landscape, the way it is experienced, the value attached to it and its susceptibility to change. The assessment of susceptibility to change examined whether the landscape receptor could accommodate the Project without significant change to landscape character.

7.2.11 Landscape sensitivity (high, medium and low) considers the factors and attributes which affect the value of the landscape and its susceptibility to change.

7.2.12 Visual receptors, designated and protected views potentially affected by the Project were identified in the area. The selection of principal viewpoints from publicly accessible land was based on:

- Extent of the possible visibility of the Project;
- Findings of the site survey;
- Review of planning policy documents; and
Discussions with the local planning authority and key stakeholders.

7.2.13 The sensitivity of different visual receptors (high, medium and low) were categorised into groups reflecting proximity to the site and viewers’ expectations and duration. It was defined through combining the susceptibility to change in views and visual amenity (in relation to the Project) and the value attached to a particular view.

Identification of potential impacts

7.2.14 Impacts on the landscape resource may arise from changes to overall landscape character or to individual elements or features. Factors that may affect the magnitude of change to the landscape resource include the extent of the loss of existing landscape elements, the degree to which aesthetic or perceptual aspects of the landscape are altered by the removal of existing landscape components or the introduction of new ones, the scale of the geographical area affected by the development and the duration and reversibility of the effect.

7.2.15 Factors that may affect the magnitude of change on visual amenity include the context of the existing view, the extent to which the view has been altered, the scale and appearance of the proposed development, the distance of the visual receptor from the development and the angle/position of view, and the duration and reversibility of the effect.

Assessment of significance

7.2.16 Effects have been evaluated by combining the assessment of magnitude of change and sensitivity of the receptor to predict the significance of effect. Significant effects in EIA terms are those that are major and moderate as shown in the ES (Volume 2a): Landscape and Visual Impact Assessment Technical Report; Table 2.1. Negative impacts identified with magnitudes at these levels would require mitigation through design. Effects are assessed during the construction and operational phases. A worst case scenario (that is, winter landscape condition) has been considered for the assessment of impacts and effects during the construction phase, and during the first year of operation.

7.2.17 Major and moderate effects were classed as significant and these are discussed in this Chapter. All minor effects can be found in the Technical Report (see the ES (Volume 2a): Landscape and Visual Impact Assessment Technical Report).

7.3 Baseline

7.3.1 This section summarises the baseline conditions against which the impacts of the Project were assessed. A full assessment of baseline conditions can be found in the ES (Volume 2a): Landscape and Visual Impact Assessment; Chapter 4.
Landscape

7.3.2 The Project area is south of Boston town centre. It comprises the area on both sides of the Haven including the flood defence walls on the right bank and the area within the PoB (see Chapter 2: Project Description and Appendix A, Figure 1.1 of this Report).

7.3.3 The Haven runs through the centre of the study area which is urban in character, low lying and flat. The exceptions include the flood embankments of the Haven, to the south of the PoB and to the east of the knuckle; which are higher elements in the landscape. The tidal mudflats within the Haven channel area are a constantly changing element in the landscape. They are exposed at low tide and covered by the incoming water at high tides.

7.3.4 Land use comprises a mixture of urban and suburban development, with residential areas to the south, including properties on Wyberton Low Road, with small gardens backing onto the flood embankment on the right bank and to the north-east, houses on Rectory Road, Alfred Street and Fishtoft Road; located on lower ground, below the existing flood embankments on the left bank. There is industrial development on both sides of the Haven, with substantial port buildings on the left bank and large-scale (commercial) development, such as the industrial park on the right bank, to the south.

7.3.5 There is limited vegetation within the northern part of study area due to its urban nature and similarly little vegetation within the PoB Estate due to the industrial land use, apart from the row of trees and shrubs on the western edges of the PoB, along Riverside Quay and some tree/shrub cover adjacent to Maud Foster Drain to the east. Managed grass areas are present along the right bank upstream of Black Sluice with some trees. The grass embankment continues downstream of the sluice with some areas of scrub and rough grass. Moving downstream of the WPD substation, the river corridor takes on an increasingly rural character.

7.3.6 The banks of the river are sparsely vegetated, with amenity grassland on the flood embankments and scattered shrubs and isolated semi-mature trees.

Landscape related designations within study area

7.3.7 Several landscape related designated areas have been identified surrounding the study area (see the ES (Volume 2a): Landscape and Visual Impact Assessment; Appendix A).

7.3.8 The Boston Public Footpath No.14 (Macmillan Way) along the right bank of the Haven and along the Windsor Bank to the north are taken into consideration in the ES (Volume 2a): Landscape and Visual Impact Assessment Technical Report; Appendix A.
Landscape character

7.3.9 The study area lies in National Character Area (NCA) 46: The Fens. The local landscape character areas have been identified during the desk-based study and verified on site and include:

- High sensitivity: LLCA 2 Wharves and Moorings; LLCA 4 Historic Urban Core and Riverside; and LLCA 9 Skirbeck Hall and Church;
- Medium sensitivity: LLCA 1 Estuary Corridor, LLCA 5 Skirbeck Quarter, LLCA 8 Skirbeck – Maud Foster Drain, and LLCA 10 Skirbeck – Fishtoft Road; and
- Low sensitivity: LLCA 3 Industrial – Docks, LLCA 6 Industrial (large-scale), LLCA 7 Industrial and Commercial (small-scale).

Visual amenity

7.3.10 The Project lies within the urban area of Boston surrounded mostly by industrial and commercial buildings. The visual envelope is limited to the south by the residential properties along Wyberton Low Road and large sheds associated with the Riverside Industrial Estate, to the east by the green space of Skirbeck church, to the north by the PoB buildings and ancillary structures and to the west by the buildings along Smiths Wharf.

7.3.11 The Boston Stump is visible from the western end of the flood embankment (by the Black Sluice) and from the eastern part of the Boston Public Footpath No.14 (Macmillan Way) (opposite the Church of St Nicholas). None of these views combine the Project and the Stump at the same time.

7.3.12 There are views of the site from properties on Wyberton Low Road, Marsh Avenue and Marsh Lane, from the river, and from the Boston Public Footpath No.14 (Macmillan Way) within the section between the Black Sluice to Lealand Way as well as river users in the Haven. These receptors are considered to have a high or medium sensitivity.

7.3.13 A summary of the key visual receptors and views shown in the ES (Volume 2a) Landscape and Visual Impact Assessment Appendix A; Figure 4.2 is set out in the ES (Volume 2a) Landscape and Visual impact Assessment Appendix A; Table 4.1.

7.4 Impact assessment

7.4.1 This section summarises the significant impacts and effects during both the construction and operation of the Project on the landscape resource and visual amenity. The full impacts assessment can be found in the ES (Volume 2a): Landscape and Visual Impact Assessment Technical Report; Chapter 5.
Construction effects

7.4.2 The locations of receptors and assessment of construction effects are shown in the ES (Volume 2a): Landscape and Visual Impact Assessment Technical Report; Appendix A; Figure 4.2.

Landscape

7.4.3 Construction activities would take place in the LLCA1: Estuary Corridor and would affect its setting (such as increasing noise) through the presence of the construction works, and associated plant and machinery. The Boston Public Footpath No.14 (Macmillan Way) would be temporarily diverted and tranquillity would be reduced. The magnitude of change to the LLCA would be medium reflecting the alteration to key landscape elements and addition of new features that form prominent new elements that would be largely characteristic of their setting, but would alter the character of the landscape. The sensitivity of the LLCA is medium and therefore overall, the effect during construction would be moderate adverse and temporary in nature.

7.4.4 Due to the presence of intervening residential, commercial and industrial buildings together with the current land uses and activities at PoB, no further significant adverse effects are envisaged to affect the key characteristics of the other LLCAs within the study area during Project construction.

Visual

7.4.5 Construction activities, including traffic, lighting and potential removal of vegetation, would be visible from a number of locations immediately surrounding the site. Significant adverse effects during construction are predicted for the following visual receptors:

7.4.6 Residents in properties on Wyberton Low Road between London Road and Marsh Lane (moderate adverse) as the presence of construction plant in an elevated location on the flood embankment would represent a marked deterioration in the existing view from the residential properties; for recreational users of the Boston Public Footpath No.14 (Macmillan Way) along the right bank of the Haven on flood embankment (moderate adverse) would experience a noticeable deterioration in the existing view as the footpath would be diverted through the Riverside Industrial Estate. The construction activity would result in a temporary but noticeable deterioration in the existing view; and the river users of the Haven (moderate adverse). The construction works would be a noticeable feature of the view but the Project would only be prominent for a relatively short reach of the river and a small part of the whole sailing experience towards and from the Wash.

7.4.7 Receptors further away from the construction activities would have views mostly screened by the intervening residential, commercial and industrial buildings and existing vegetation.
Therefore, no significant adverse effects are envisaged for these receptors during Project construction.

**Operational effects**

7.4.8 Operational impacts may be short term, long term, temporary or permanent in nature. The illustrative summary of landscape effects during operation is shown the ES (Volume 2a): Landscape and Visual Impact Assessment Technical Report; Appendix A; Figure 4.1.

**Landscape**

7.4.9 Overall, there are no significant adverse effects of the Project predicted on landscape character of the study area during operation for the LLCAs directly affected by the Project, including LLCA1 Estuary Corridor, and LLCA3 Industrial – Docks. The Project would introduce new prominent elements into the LLCAs and alter existing key features in a small area of the overall LLCA but these elements would not be incompatible within the context of surrounding riverine, port and industrialised setting.

Due to the presence of intervening residential, commercial and industrial buildings together with the current land uses and activities at PoB, no significant adverse effects are envisaged to affect the key characteristics of the other LLCAs within the study area during Project operation.

**Visual amenity**

7.4.10 Project components would be visible above the water level although the barrier gate would lie in recess with the river bed (when not in use). The barrier structure would have a grey/black colour scheme and would be viewed in the context of PoB industrial character with its large-scale buildings and cranes.

7.4.11 The barrier structure and floodwalls would be visible from properties on Wyberton Low Road, from the right bank footpath (the Boston Public Footpath No.14 (Macmillan Way)) and from the Haven. The magnitude of impact on views for pedestrian users of the right bank footpath (Boston Public Footpath No.14 (Macmillan Way)), residents in Wyberton Low road properties facing onto the flood embankment and river users of the Haven has been assessed as medium which results in a permanent moderate adverse effect, which is considered significant.

7.4.12 More distant receptors would have partially screened or no views of the barrier structure, as views would be obscured by intervening buildings and scattered vegetation and would not be significantly affected by the Project.
Mitigation measures

Construction

7.4.13 Project construction would be carried out using industry best practice to reduce potentially adverse effects. The following mitigation measures have been identified within the assessment and assumed to be implemented to mitigate the construction effects identified in this assessment:

- Lighting associated with the construction phase of the Project should be designed to minimise light pollution at night, whilst being consistent with the requirements of site safety and security. Luminaires should be chosen which are directional and minimise up-lighting and skyglow. A lighting statement has been prepared separately (see ES (Volume 2a): Landscape and Visual Impact Assessment: Appendix B; Lighting Statement);
- Existing trees to be retained would be protected during the construction phase with protective fencing where necessary;
- Noise would be carefully monitored in order to minimise impacts on local tranquillity during the construction period; and
- Construction traffic would be kept to a minimum especially near residential areas; a traffic management plan would be agreed with BBC and LCC Highways Department.

Operation

7.4.14 The following mitigation measures have been designed into the Project to mitigate the operational effects identified in this assessment:

- Lighting would be localised task lighting and would minimise the potential impact of light pollution at night;
- The barrier structure would be finished in galvanised steel finish (grey) above the water level and black below the water level in order to reduce the visual impact of the Project on the surrounding areas;
- In consultation with BBC, new street furniture including robust benches along the Haven would be introduced to create a more inviting space for residents and tourists, encouraging greater use of the footpath. These should be located close to the barrier and at the downstream end of the sheet pile wall on the right bank. Consideration of locally raising the embankment at this downstream area to facilitate views over the river towards St Nicholas church and the creation of a viewing area;
- In consultation with the Environment Agency internal stakeholder, a management regime for the embankment would be set out to facilitate the establishment and seeding of the proposed wildflower areas. This would aim to allow the establishment of taller native herbaceous perennial adjacent to the wall to soften the appearance from the footpath;
- In consultation with BBC, artwork could be introduced on the new concrete flood walls close to the barrier to enhance the existing surrounding and create more inviting space for residents and tourists;
- The right bank would be partially reinstated to its current condition, with the landward side of the embankment seeded with a wildflower meadow seed mix and an improved route.
created for pedestrians and light vehicles (for barrier maintenance) running along the crest. The intention is that the crest would be seeded accommodating a sinuous footpath layout and light vehicle access would run over the grassed areas as required; and

- Appropriate grasses (saline tolerant) would be introduced below the new sheet piling (riverwards) along the right bank downstream of the barrier structure, to soften views from St Nicholas Church, with proposed timber fendering along the length of the sheet piling (subject to further consultation with BBC and LCC).

**Significant residual effects**

**Construction**

7.4.15 Overall, temporary moderate adverse, and therefore significant, effects during construction are predicted on the LLCA1 Estuary Corridor due to the presence of the construction works. Piling activity and the presence of plant on the right bank and works within the channel associated with the barrier would introduce new prominent elements into the LLCA that would be at variance with the existing character.

7.4.16 Significant adverse residual effects during construction are predicted for the following visual receptors:

- Residents in properties on Wyberton Low Road between London Road and Marsh Lane;
- Recreational users of the Boston Public Footpath No.14 (Macmillan Way) along the right bank of the Haven on flood embankment; and
- River users of the Haven.

**Operation**

7.4.17 Overall, there are no significant adverse effects of the Project predicted on landscape character of the study area during operation.

7.4.18 Moderate adverse and therefore significant adverse residual visual effects during operation are predicted for the following visual receptors:

- Recreational users of the Boston Public Footpath No.14 (Macmillan Way);
- For residents in properties on Wyberton Low Road; and
- River users of the Haven.

**7.5 Summary**

**Construction**

7.5.1 The Project lies in a flat, open, low-lying area. The study area is located south of Boston town centre and the PoB. The Haven runs through the centre of the study area and is lined with grassed flood embankments along sections of the right bank. Strong vertical visual influences
such as the tower of St Botolph’s Church, other modern large-scale industrial and agricultural buildings and pylons are present.

7.5.2 Construction activities would take place in the LLCA1: Estuary Corridor and would adversely affect the existing character through the presence of construction works and associated plant and machinery that would be at variance with the existing character that cannot be mitigated but would be temporary in nature. Due to the presence of intervening residential, commercial and industrial buildings together with the current land uses and activities at PoB, no further significant adverse effects are envisaged to affect the key characteristics of the other LLCAs within the study area during Project construction.

7.5.3 Construction activity would be visible from a number of close locations surrounding the site. Other receptors would have more screened or oblique views of construction activities due to the intervening residential, commercial and industrial buildings and scattered vegetation. The magnitude of change on views has been assessed as medium resulting in a temporary moderate adverse effect, which are considered significant. However, no further significant adverse effects are envisaged for any visual receptors during Project construction.

7.5.4 These construction impacts would be localised and temporary in nature (for the duration of construction) and the Project would adopt industry best practice to mitigate these.

Operation

7.5.5 No significant adverse effects are envisaged for any landscape resources or designations during Project operation.

7.5.6 Overall, there would be moderate adverse and therefore significant effects during operation on recreational users of the Boston Public Footpath No.14 (Macmillan Way) along the right bank of the Haven, for residents in properties on Wyberton Low Road and for river users of the Haven due to the presence of the new barrier structure and floodwall changing the character of the existing view and the relationship to the river from the footpath. However, the new barrier structure and flood walls would be viewed in the context of the PoB with its large-scale buildings and cranes and in the context of a highly modified landscape.

7.5.7 The proposed Project design of a driven in sheet piling, allowing for the green embankment to be retained as well as addition of timber fendering and saline tolerant grasses, would reduce the heavily engineered character of the sheet piling and provide a transitional zone between the industrial appearance of the barrier site and the green embankment.

7.5.8 The barrier has been designed to meet the defined engineering parameters and although large, is in keeping with the highly modified and industrial setting. The finishes and colours of the structure should be neutral and matte to reduce visual intrusion. Mitigation measures to reduce the ‘engineered appearance’ of the right bank crest and the new floodwall have been incorporated into the Project such as the establishment of a native wildflower meadow seed
mix adjacent to the wall to soften the appearance from the footpath and the creation of a sinuous path along the grassed crest of the embankment. This creates an accessible footpath with viewing areas at the barrier looking towards St Nicholas church which would encourage greater use of the footpath.

7.5.9 As the detailed design develops, options to reduce the overall crest width could be considered where compatible with maintenance requirements. Additionally, providing views over the floodwall towards local landmarks such as St Nicholas church could be considered with environmental improvements to create a local focal point to attract more people onto the Boston Public Footpath No.14 (Macmillan Way).
This page has been left intentionally blank.
8 Land use

This Chapter has been left intentionally blank as there were no likely significant effects identified by the assessment. Please see the ES (Volume 2a): Land Use Technical Report for the detailed assessment.
This page has been left intentionally blank.
9 Noise and vibration

9.1 Introduction

9.1.1 This Chapter summarises the findings of the noise and vibration technical assessment that was carried out for the Project (see the ES (Volume 2a) Noise and Vibration Technical Report. The impacts of noise and vibration effects on fish are documented in the ES (Volume 2b): Ecology and Nature Conservation Technical Report and Chapter 10 of this Report. The aim of the assessment was to assess noise and vibration receptors surrounding the Project, assess the potential significant issues identified in the Project’s Updated Scoping Report and to propose management and mitigation to minimise predicted significant impacts.

9.2 Assessment methodology

9.2.1 The noise and vibration impact assessment involved a combination of desktop research supported by surveys.

Study area

9.2.2 The study area for noise extends 600m around the proposed construction works. The size of this area is derived from guidance contained in the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 310. The study area for vibration is more localised and primarily dependant on the nature of the construction works.

Desktop research

9.2.3 Initial desktop research was carried out on the Project area and surrounding area in order to assess the existing baseline conditions of the study area. Ordnance Survey (OS) mapping, and preliminary construction details and methodology were referenced in order to gain an understanding of the area, the key sensitive receptors and an indication of the key potential noise and vibration impacts associated with the Project. A full list of references used to prepare the Report can be found in the ES (Volume 2a): Noise and Vibration Technical Report; Chapter 7.

Surveys

9.2.4 Noise surveys were carried out at sensitive receptors to measure and quantify the baseline acoustic conditions within the study area. Baseline noise surveys were carried out between 19 March and 25 March 2015 and 28 September and 5 October 2015. The surveys comprised a long term, unattended measurement (LT1 and LT2) and short term, attended measurements at three positions (ST1, ST2 and ST3) in the study area.

9.2.5 Information on measurement equipment used and individual noise monitoring locations are given in the ES (Volume 2a): Noise and Vibration Technical Report; Chapters 3 and 5.
Impact assessment methodology

9.2.6 Sensitive receptors were identified based on their potential to be impacted by noise and vibration associated with the construction and operation of the Project (see Section 9.3).

9.2.7 The sensitivity of receptors was appraised as ‘high, medium or low’ (see ES (Volume 2a): Noise and Vibration Technical Report; Table 2.2). This assessment assumes all identified sensitive receptors that could be affected by the Project would have a high environmental value/sensitivity.

9.2.8 The magnitude of impacts due to noise and vibration was then assessed for both the construction and operational stages of the Project.

Construction noise activities

9.2.9 Construction noise impacts are assessed in accordance with the noise impact threshold criteria outlined in BS5228-1. Noise impacts are deemed to be significant if:
- Total noise (pre-construction baseline noise plus construction noise) exceeds the pre-construction baseline noise by 5dB or more, subject to lower cut-off values of 65dB (daytime), 55dB (evening) and 45dB L_{Aeq} (night-time); and
- Duration of construction noise exceeds one month, unless works of a shorter duration are likely to result in significant impact.

9.2.10 Time periods for noise are defined in BS5228; the day-time period is defined as 07:00 to 19:00; the evening period as 19:00 to 23:00 and the night-time period as 23:00 to 07:00.

Construction traffic

9.2.11 Table 9.1 sets out the scale for changes in noise levels perceptible to humans. The Design Manual for Roads and Bridges regards a change in road traffic noise of 1 dB L_{A10,18h} in the short term (e.g. when a project is opened) to be the smallest that is considered perceptible, with the magnitude of impact increasing incrementally. The criteria for assessment of traffic noise is shown in Table 9.1.

Table 9.1: Criteria for assessment of traffic noise

<table>
<thead>
<tr>
<th>Change in level dB(A)</th>
<th>Magnitude of impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term</td>
<td></td>
</tr>
<tr>
<td>0-1</td>
<td>No impact</td>
</tr>
<tr>
<td>&gt;1</td>
<td>Negligible</td>
</tr>
<tr>
<td>1&lt;3</td>
<td>Minor</td>
</tr>
<tr>
<td>3&lt;5</td>
<td>Moderate</td>
</tr>
<tr>
<td>&gt;5</td>
<td>Major</td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016
Construction vibration

9.2.12 Construction vibration has been assessed in accordance with BS5228-2, which provides the following guidance on effects at various vibration levels:

- Vibration level of 0.14mm/s – vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction;
- Vibration level of 0.3mm/s – vibration might be just perceptible in residential environments;
- Vibration level of 1.0mm/s – “It is likely that vibration of this level in residential environments would cause complaint, but can be tolerated if prior warning and explanation has been given to residents”; and
- Vibration level of and over 10mm/s – vibration is likely to be intolerable for any more than a very brief exposure to this level.

9.2.13 BS 7385:1993 ‘Evaluation and Measurement for Vibration in Buildings Part 2: Guide to damage levels from ground-borne vibration’ provides guidance on the levels of vibration that would be necessary to cause structural damage to commercial and residential buildings. The standard indicates that continuous Peak Particle Velocity (PPV) of more than about 7 mm/s would cause structural damage to residential buildings.

Operational noise

9.2.14 Operational noise from plant equipment has been assessed using BS 4142:2014 “Methods for rating and assessing industrial and commercial sound” which provides guidance on assessing new industrial noise sources in mixed use commercial and residential areas. Since movement of the dock gates would be by hydraulic means, it is not expected to generate significant noise.

Operation vibration

9.2.15 Operational vibration is not predicted to have a significant impact on the sensitive receptors as there would be no significant vibration-inducing activity associated with operation and has therefore not been assessed.

Significance of effects

9.2.16 The NPPF require that the assessment establishes any significant effects on sensitive noise and vibration receptors resulting from predicted noise and vibration impacts. NPPF requires this to be undertaken through the use of observable adverse effect levels. These concepts are introduced through NPPF which references the Noise Policy Statement for England where they are discussed in more detail – see the ES (Volume 2a): Noise and Vibration Technical Report.
The Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL) were used based upon noise insulation threshold levels, from WHO guidance (WHO, 1999) and, for construction noise and vibration, guidance from BS5228 Parts 1 and 2.

Residual effects would be considered significant only when, with incorporated mitigation, they exceed SOAEL. However, where impacts lie between LOAEL and SOAEL, reasonable steps to mitigate and minimise adverse effects on health and quality of life should be taken. This assessment considered significant impacts which were identified to occur between LOAEL and SOAEL.

This assessment assumes all identified sensitive receptors potentially affected by the Project would have a high environmental value/sensitivity.

**Construction noise**

LOAEL and SOAEL values for construction noise were determined as follows:

- **LOAEL** is considered to be an external noise level of 50dB $L_{Aeq,16\text{hour}}$ during day-time consistent with the threshold for moderate annoyance;
- **LOAEL** is considered to be a noise level of 45dB $L_{Aeq,8\text{hour}}$ during the night-time consistent with the threshold for sleep disturbance from the WHO Guidelines for Community Noise; and
- **SOAEL** would be regarded as a total noise level (pre-construction ambient plus construction noise) at the noise of 65dB $L_{Aeq,T}$ during the day-time, 55dB $L_{Aeq,T}$ during the evening and 45dB $L_{Aeq,T}$ at night.

To provide clarity for the assessment, some impacts which would not be considered significant have been included within this Technical Chapter.

Assessment of noise from construction-related traffic on the road network was considered in the same context as operational traffic noise. Therefore, LOAEL for the operational noise assessment based upon the DMRB methodology is considered to be a façade level of 50dB $L_{Aeq,18\text{hour}}$ during day-time consistent with the threshold for moderate annoyance, from the WHO Guidelines for Community Noise. Note that the time base has been modified to 18hours to align with the Calculation of Road Traffic Noise (CRTN) (DoT, 1988).

LOAEL for the night-time construction noise assessment is considered to be a façade level of 45dB $L_{Aeq,6\text{hour}}$ during the night-time consistent with the threshold for sleep disturbance from the WHO Guidelines for Community Noise. Note that the time base has been modified to 6 hours to align with the CRTN assessment methodology.

Construction noise effects due to the Project would predominantly result from changes in vehicular traffic noise due to changes to the road network. Therefore, SOAEL for operational noise would be based upon the “specified noise level” from the Noise Insulation Regulations 1975 (amended 1988) and would be 67.5dB $L_{A10}$ (18hour).
Construction vibration

9.2.25 Vibration from construction activities would be temporary and intermittent in nature. On this basis, in this assessment PPV of 1.0 mm/s, lasting for a minimum of one hour during the normal hours of working or more, is considered to result in a significant adverse impact.

9.2.26 Major and moderate effects were classed as significant and these are discussed in this Chapter. All minor effects can be found in the Technical Report (see ES (Volume 2a): Noise and Vibration Technical Report).

Operational noise

Although not defined in terms of LOAEL and SOAEL, BS4142 defines impacts in terms of noise change (as defined by the rating level) with respect to the background noise level:

“A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context…

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source would have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.”

9.3 Baseline

9.3.1 This section summarises the baseline conditions against which the impacts of the Project were assessed. The nearest key noise sensitive receptors were identified and representative noise measurement positions defined, typically due to their proximity to the Project area and in particular the main construction activities. A full assessment of baseline conditions can be found in the ES (Volume 2a): Noise and Vibration Technical Report; Chapter 4.

Noise survey

9.3.2 The baseline noise surveys comprised two long-term unattended measurements (LT1 and LT2) and short term, attended measurements at three positions (ST1, ST2 and ST3) around the study area. Noise monitoring positions were selected at sensitive receptors close to the Project area:

- LT1 – Wyberton Low Road;
- LT2 – The Featherworks;
- ST1 – London Road;
- ST2 – Bath Gardens; and
- ST3 – The Featherworks.
9.3.3 The precise location of noise monitoring positions is presented in the ES (Volume 2a): Noise and Vibration Technical Report; Figure 4.1.

9.3.4 The existing noise climate during the daytime at the various short term (ST) measuring positions around location of barrier structure typically comprise road traffic noise from London Road and the local road network. There were also contributions from pedestrians walking and talking nearby, cars reversing near the measurement location, car door slams, birdsong and dog barking.

Noise monitoring results are presented within the ES (Volume 2a): Noise and Vibration Technical Report; Figure 4.1.

9.4 Impact assessment

Construction effects (noise)

9.4.1 This assessment has been carried out using the Project design and construction methods described in the Chapter 2 of this Report. The following assumptions have been made:

- Construction would be carried out in line with best practice;
- Construction would typically be limited to between Monday and Friday (07:30 to 18:30), except for construction associated with the Wet Dock and dredging operations, affected by tidal conditions, where construction would be 24 hours/7 days a week;
- Construction noise would be carefully monitored during construction to minimise impacts on the local area;
- During construction works, the PoB would continue operating; and
- Normal tidal activity would continue in the Haven during the construction period.

9.4.2 Assessment methodology has been based upon BS5228. Results are indicative of potential noise impacts during construction and it should be noted that detailed analysis can only be carried out when precise details of works are available in terms of equipment, processes, and timings. Once appointed, the Contractor would be obliged to provide this information, along with more detailed calculations, to the EHO as part of the Section 61 process, whereby formal consent is given to working methods.

Enabling works - right bank

9.4.3 Enabling works associated with cable laying are predicted to have significant adverse effects for residents on Wyberton Low Road. Noise levels are predicted to reach 95 dB L_{Aeq} at the worst case sensitive receptor which would exceed the SOAEL and in addition, works are expected to take up to 2 months to complete. Calculations of noise levels assume there is the possibility for plant to operate simultaneously, however in practice, this is considered unlikely and the resulting impacts are likely to be lower than predicted. Minimising the quantity of plant equipment and the percentage of operating time would not completely remove the likelihood
of significant adverse effects but the magnitude of the impact is likely to be reduced. In addition, given that cable laying would be a transient activity, it is unlikely that individual properties would not be exposed to levels above the SOAEL for extended periods of time of more than a month as construction activity moves. Mitigation to further reduce impacts shall be provided and is summarised below.

Dredging activities

9.4.4 Phase 1 and Phase 2 dredging works are scheduled to take place for a total of 9-12 weeks, with the duration of Phase 1 predicted to last between 3-4 weeks and Phase 2, 6-8 weeks. Worst case noise levels are expected to be 69 dB L_{Aeq} for Wyberton Low Road, 53 dB L_{Aeq} for Marsh lane, 50 dB L_{Aeq} for Victoria House and 52 dB L_{Aeq} for London Road. Therefore, SOAEL would be exceeded and it would result in temporary significant adverse effect based on the calculated noise levels provided in ES (Volume 2a): Noise and Vibration Technical Report; Appendix C. Predicted noise levels due to dredging works are calculated based on the shortest distance between the works and the nearest properties to determine a worst case noise level at each receptor. Due to the nature of dredging, the location of the works would move to other parts of the Phase 1 works area during operation and the distance to the nearest receptor would increase. As the distance increases the noise level at the receptor would be reduced and thus the daytime noise levels at the nearest properties may not exceed SOAEL for a period of a month or more. However during the evening and night time periods, due to the lower SOAEL, noise levels are still likely to exceed SOAEL for a period of up to a month, at the nearest sensitive properties. However, dredging activities outside of normal working hours would only take place where it was affected by tidal conditions. Therefore, this is expected to be a worst case assessment, and in reality the noise levels may be lower over the evening and night time averaging period. Phase 1 dredging is not predicted to have significant effects on residents to the north and east of the site at any period of the day or night.

9.4.5 Worst case noise levels during Phase 2 works are expected to be 56 dB L_{Aeq} for Wyberton Low Road, 53 dB L_{Aeq} for Marsh lane, 51 dB L_{Aeq} for Victoria House, 59 dB L_{Aeq} for The Featherworks, 57 dB L_{Aeq} for Windsor Bank, 52 dB L_{Aeq} for Alfred Street, 49 dB L_{Aeq} for Alfred Street, 49 dB L_{Aeq} for Skirbeck Road and 46 dB L_{Aeq} for London Road. Therefore the noise levels exceeds SOAEL during the evening and night time at the nearest sensitive receptors along Wyberton Low Road, The Featherworks and Windsor Bank during the evening and at all receptors identified in the assessment during the night time period. Therefore, there is a temporary significant adverse effects based on the calculated noise levels given in ES (Volume 2a): Noise and Vibration Technical Report; Appendix C. Predicted noise levels due to dredging activities are calculated based on the shortest distance to the nearest receptors which would be reduced when works are taking place in other areas of the Phase 2 works area. However during the evening and night time periods, due to the lower SOAEL, noise levels are still likely to exceed SOAEL for a period of a month or more at the nearest sensitive properties. However, dredging activities outside of normal working hours would only take place where it was affected by tidal conditions. Therefore, this is expected to be a worst case
assessment, and in reality the noise levels may be lower over the evening and night time averaging period. Significant adverse effects are not predicted during Phase 2 dredging during the daytime.

9.4.6 Phases 3 and 4 dredging works during the evening and night time periods are predicted to reach 73dB $L_{Aeq}$ which would exceed SOAEL and have temporary significant adverse effect on residents to the west (London Road) and south (Wyberton Low Road) see ES (Volume 2a): Noise and Vibration Technical Report; Appendix C. Phase 3 is predicted to take 2-3 weeks to complete and Phase 4 is predicted to take 1-2 weeks to complete therefore individual properties would not experience noise levels above SOAEL for more than a month. Phases 3 or 4 dredging are not predicted to have significant effects to residents to the north and east of the site at any period of the day or night.

**Wet Dock construction**

9.4.7 The construction associated with the Wet Dock would consist of the widening of the existing northern entrance wall and installation of new dock gates. The widening of the entrance would include earthworks to the existing river bank, sheet piling and concreting. The strategy for sheet piling from the Environment Agency is that piling works would only take place during the day time; therefore, this has not been assessed during the evening and night time periods. Worst case noise levels are expected be to 63 dB $L_{Aeq}$ for The Featherworks, 50 dB $L_{Aeq}$ for Windsor Bank, 51 dB $L_{Aeq}$ for Alfred Street and 48 dB $L_{Aeq}$ for Skirbeck Road as a result of earthworks and concreting taking place during the night time period. Therefore these activities have the potential for significant adverse effect based on exceedance of SOAEL thresholds. Fewer significant adverse impacts are expected during the evening due to the higher SOAEL threshold at these locations. During the daytime, SOAEL is not expected to be exceeded at any of nearest residential properties during concreting or earthworks at the Wet Dock. Residential properties over 300m away from the Wet Dock construction works are not expected to experience any significant adverse effects during the evening or night time construction. Mitigation for properties nearest the Wet Dock construction area shall be provide to reduce noise impacts and is outlined below.

**Sheet piling**

9.4.8 The strategy for sheet piling from the Environment Agency is that works would take place during the day time only and not during the evening or night time.

9.4.9 Noise levels from the left bank piling works are not anticipated to exceed the SOAEL thresholds.

9.4.10 The predicted noise levels resulting from the sheet piling required for the barrier structure and the flood wall on the right bank would exceed the daytime noise threshold. In terms of absolute noise levels, SOAEL levels would be exceeded (75 dB $L_{Aeq}$) at residential properties along Wyberton Low Road. However, in addition to total noise level, in defining significance
BS5228 advises duration in excess of 1 month are necessary. The progress of sheet piling is estimated to move 10m per day during the construction works. Given that installation of sheet piles would be sequential, and that none of these activities are static, it is unlikely that noise sensitive receptors would be exposed to significant impacts for extended periods of time thus not resulting in significant adverse effects. However, noise increases would fall within the requirement to mitigate in order to 'mitigate and minimise adverse impacts'.

**Construction traffic**

### 9.4.11

Table 9.2 summarises the construction noise impacts at each of the selected noise sensitive receptors.

**Table 9.2:** Summary of predicted construction noise impacts from construction traffic

<table>
<thead>
<tr>
<th>Location</th>
<th>Predicted existing noise level, $L_{Aeq,16h}$</th>
<th>Predicted worst case range noise levels during construction $L_{Aeq,16h}$</th>
<th>Predicted worst case change $L_{Aeq,16h}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wyberton Low Road</td>
<td>44.3</td>
<td>45.8 – 79.1</td>
<td>1.5 - 34.8</td>
</tr>
<tr>
<td>Wyberton Low Road and Marsh Lane</td>
<td>44.3</td>
<td>45.7 - 68.8</td>
<td>1.4 – 24.5</td>
</tr>
<tr>
<td>Marsh Lane and Marsh Avenue</td>
<td>44.3</td>
<td>46.1 – 66.6</td>
<td>1.8 – 22.3</td>
</tr>
<tr>
<td>Wyberton West Road and London Road</td>
<td>44.3</td>
<td>45.1 - 61.9</td>
<td>0.8 – 17.6</td>
</tr>
<tr>
<td>Bath Gardens</td>
<td>50.3</td>
<td>50.9 – 55.4</td>
<td>0.6 – 5.1</td>
</tr>
<tr>
<td>Tower Gardens</td>
<td>50.3</td>
<td>50.6 – 54.9</td>
<td>0.3 – 4.6</td>
</tr>
<tr>
<td>Alfred Street</td>
<td>49.3</td>
<td>49.7 – 66.4</td>
<td>0.4 – 17.1</td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016

### 9.4.12

There would be temporary noise impacts associated with construction traffic accessing and egressing from two construction compounds (left and right banks) at sensitive receptors to the south of the barrier structure, to the east of A16 and along Skirbeck Road.

### 9.4.13

Impacts due to road traffic including construction traffic are assessed in terms of change to noise levels in accordance with the design manual for roads and bridges. Therefore, where noise levels due to road traffic are predicted to increase by 5dB or more it is considered to be a major impact. In addition, where noise levels exceed SOAEL of 67.5dB, significant adverse effects are predicted. Based on the predicted noise levels given in Table 9.2 there is the potential for significant temporary impacts from construction traffic noise at all front-line receptors assessed with the exception of Tower Gardens based on the worst case predicted noise levels change. In addition is it predicted that SOAEL could be exceeded at properties

---

11 Residential properties nearest the road
along Wyberton Low Road and Marsh Lane where the upper range of the predicted noise levels is reached resulting in temporary significant adverse effects during construction. Mitigation measures are outlined in the mitigation section below.

**Construction effects (vibration)**

9.4.14 In predicting potential vibration impacts due to piling, it is understood that percussive piling would be used. The closest sensitive receptors (residential properties along Wyberton Low Road) to the right bank piling works are approximately 20m distant. The corresponding level of vibration at that distance is approximately 1.0 mm/s. This falls at the threshold of SOAEL outlined in the assessment methodology at which "It is likely that vibration of this level in residential environments would cause complaint, but can be tolerated if prior warning and explanation has been given to residents". With prior warning, and on the basis that piling activities directly adjacent to any given property would be transient (the progress of sheet piling is estimated to move 10m per day during the construction works) no significant adverse effects are predicted at closest properties.

9.4.15 Vibration impacts due to plant equipment other than piling have been assessed. Vibratory rollers are typically used in the construction of road surfaces. For front-facing sensitive receptors approximately 10m from the carriageway the corresponding level of vibration would be approximately 1.5 mm/s. This is above the threshold of SOAEL at which "It is likely that vibration of this level in residential environments would cause complaint, but can be tolerated if prior warning and explanation has been given to residents". Thus, due to the short-term nature of the work it is likely to be tolerated provided that prior notice is given to the occupiers, and works do not continue for more than one hour. In addition the contractor shall adopt Best Practice in accordance with the Best Practicable Means principles (BPM, as defined in BS 5228:2009-Part 1 Noise). These would be applied to construction activities with the potential to generate vibration impacts, in addition to all other on-site construction activities. Significant adverse effects due to construction vibration are therefore not predicted.

9.4.16 BS 7385:1993 provides guidance on the levels of vibration that would be necessary to cause structural damage to different types of buildings. This Standard indicates that continuous PPVs of more than about 7mm/s would be required to cause structural damage to residential buildings. Therefore, there is no indication of significant effects in terms of potential cosmetic or structural damage in residential buildings. However, as a precautionary measure the Environment Agency is committed to undertaking pre-construction structural condition surveys of properties along Wyberton Low Road and implement remedial measures where necessary.

9.4.17 Adopting Best Practice in accordance with the principles of Best Practicable Means (BPM), (as defined in BS 5228:2009-Part 1 Noise), would be applied to all on-site construction activities.
Operational effects (noise)

9.4.18 The Project is not expected to result in any significant permanent adverse effects on the noise environment within the study area.

9.4.19 Routine maintenance of barrier structure would be carried out. Noise associated with the maintenance of the barrier would comprise:
- Maintenance of plant and equipment in the control building and Wet Dock gate control building; and
- Minor traffic movements (small vehicles) associated with routine maintenance and delivery of basic office supplies for control building.

9.4.20 Plant and equipment associated with the movement of the barrier structure would be stored in a control building approximately 30m to the north of the left bank within the PoB. This would be approximately 120m away from the nearest sensitive receptor on Wyberton Low Road. Equipment used to control the Wet Dock gate would be contained inside a building near the gate. This would be approximately 100m away from the nearest residential receptor (Windsor Bank).

9.4.21 A maximum total internal ambient noise limit for plant and machinery inside the barrier control and WDE control building is set at 80dB(A) average by the Environment Agency. A glass reinforced plastic composite construction with acoustic louvres has been specified for the design of the control building and WDE control building. Breakout noise calculations have been carried out at the nearest residential receptor to both of these. Calculations indicate that external noise levels due to plant machinery inside the control room and WDE control building would be below the existing baseline noise levels recorded during the baseline survey during the day and night time. Therefore, no significant impact from operational noise is predicted.

Operational effects (vibration)

9.4.22 There would be no vibration impact associated with the operational phase of the Project.

Mitigation measures

9.4.23 There would be temporary significant noise impacts at particular phases of works during the construction period. The Project would implement best practicable means (BPM) as defined in BS 5228:2009-Part 1 Noise), to all on-site construction activities. In particular, this would include selecting lower noise plant and equipment where possible and utilising plant and equipment fitted with white noise reversing alarms.

9.4.24 A construction noise and vibration management plan would be developed prior to construction starting. This would set out suitable construction methodologies to be used. It would also include details on working hours, construction methods and plant and noise limits and
monitoring as appropriate. The noise and vibration management plan would be subject to approval by BBC pursuant to the proposed planning condition.

9.4.25 In addition, the Contractor would be required to apply for ‘Prior Consent’ under Section 61 of the Control of Pollution Act 1974. This process enables the management of noise and vibration using ‘best practicable means’. This would include provision of hours of work, methodology, programme, details of plant (including sound power levels), predicted noise and vibration levels and mitigation measures proposed. This would be documented in the noise and vibration management plan which would be subject to approval by BBC pursuant to the proposed planning condition.

9.4.26 Screening of piling and breaking activities would be provided to significantly reduce noisy activities. Exact details of locations would be provided once the methodology has been finalised. Any requirement to operate percussive piling rigs or breakers outside of the standard working hours of 07:30 to 18:30 Monday to Friday would be agreed with BBC beforehand. Additional mitigation measures such as individual noise insulation or temporary relocation of local residents would be considered on a case by case basis if excessive prolongation of significant noise impacts is envisaged once the construction works commence.

9.4.27 Construction compounds would adopt the following mitigation measures:
- Erection of temporary noise barriers where there are sensitive receptors close to the proposed works;
- Location of appropriate ingress and egress points; and
- Implementation of appropriate traffic management plan for the construction compound to minimise standing traffic.

9.4.28 In addition, further mitigation in the form of timely and effective stakeholder consultation is outlined within the EAP. This would ensure that residents are kept informed of on-going and future operations. For example, local residents would be informed by letter drop of proposed works, particularly where these are due to occur outside standard working hours. The letter would include details of proposed cause, start dates and duration of works to be undertaken.

9.4.29 No significant impacts and effects due to construction related vibration are predicted. Nevertheless, the contractor would adhere to the mitigation measures included in BS5228:2009 where practicable to reduce vibration levels from general and piling activities to the lowest possible levels. In addition, as a precautionary measure the Environment Agency is committed to undertaking pre-construction structural condition surveys of properties along Wyberton Low Road and implement remedial measures where necessary.

9.4.30 In addition, technologies such as silent sheet piling which produces less vibration than conventional piling methods and very low noise levels would be investigated to limit impacts. In addition, the use of softer alternatives (to hammering) of piling techniques would be used where ground conditions allow.
Additional mitigation measures such as individual noise insulation or temporary relocation of local residents would be considered on a case by case basis if excessive prolongation of significant noise impacts is envisaged once the construction works commence. BS5228 indicates potential threshold noise levels during construction whereby additional mitigation such as individual noise insulation or temporary relocation may be applicable.

Technologies such as silent sheet piling which produces less vibration than conventional piling methods and very low noise levels would be investigated to limit impacts. In addition, the use of softer alternatives (to hammering) of piling techniques would be used where ground conditions allow.

**Significant residual effects**

After implementation of the mitigation measures, no permanent significant residual effects are envisaged as a result of the Project.

However, some potential short term residual effects during the construction stage of the Project are outlined below.

There is the potential for temporary residual effects at properties on Wyberton Low Road during cable laying enabling work. However, with incorporated mitigation it is considered these impacts would not be significant.

There is the potential for temporary residual effects during dredging where carried out during the night time period at all sensitive receptors with the exception of Bath Gardens. However, with mitigation included it is considered these impacts would not be significant.

There is possibility for temporary residual effects during the construction of the new WDE to properties on Windsor Bank and The Featherworks where construction is required to take place during the night time in particular. With mitigation included it is considered that these effects would not be significant.

No residual significant effects are predicted for the operational stage of the Project.

No residual significant vibration effects are predicted for the construction or operational stage of the Project.

**Summary**

The potential temporary and permanent noise and vibration impacts associated with the Project have been considered with respect to criteria outlined under Section 9.2.
9.5.2 No permanent significant residual effects are predicted as a result of the Project; however, some potential short term residual non-significant effects during the construction stage of the Project are outlined below.

9.5.3 There is the potential for temporary residual effects at properties on Wyberton Low Road during cable laying enabling work represented by receptors 1-5 in the ES (Volume 2a): Noise and Vibration Technical Report; Appendix A: Figure 2.1.

9.5.4 There is the potential for temporary residual effects during dredging where carried out during the night time period at all sensitive receptors with the exception of Bath Gardens.

9.5.5 There is the potential for temporary residual effects during the construction of the new WDE to properties on Windsor Bank and The Featherworks where construction is required to take place during the night time in particular.

9.5.6 For front line properties (those on Wyberton Low Road and Windsor Garden) approximately 10m from the carriageway, there is the potential for temporary residual adverse effects due to construction vibration operations. However, due to the short-term nature it should is likely to be tolerated provided that prior notice is given to the occupiers.

9.5.7 In order to minimise noise and vibration impacts from the Project, a schedule of noise control measures have been formulated for the construction phase, documented in this Report.

9.5.8 In addition, the Contractor would be required to apply for ‘Prior Consent’ under Section 61 of the Control of Pollution Act 1974. This process enables the management of noise and vibration using ‘best practicable means’. This would include provision of hours of work, methodology, programme, details of plant (including sound power levels), predicted noise and vibration levels and mitigation measures proposed.
10 Ecology and nature conservation

10.1 Introduction

10.1.1 This Chapter summarises the findings of the Ecological Impact Assessment that was carried out for the Project (see the ES (Volume 2b): Ecology and Nature Conservation Technical Report) and brings forward only the significant effects likely to be associated with the construction and operation phases of the Project identified in the ES (Volume 2b) Noise and Vibration Technical Report. A full assessment is provided in ES (Volume 2b): Ecology and Nature Conservation Technical Report.

10.1.2 The aim of the assessment was to characterise ecological aspects surrounding the Project, assess the potential significant issues identified in the Project’s Updated Scoping Report and to propose management and mitigation to minimise predicted significant impacts.

10.2 Assessment methodology

10.2.1 The ecological impact assessment involved a combination of desktop research supported by surveys.

Study area

10.2.2 All designated sites, sensitive habitats, and species of importance that occur within an ecological Zone of Influence (ZoI) of the Project were considered in this assessment, the extent of which varies according to the ecological receptor in question. For this Project, the ecological ZoI is defined as follows:

- Terrestrial designated sites within 2km of the Project;
- Aquatic designated sites within 5km of the Project;
- Terrestrial species and habitats generally within 100m;
- Amphibians (including great crested newts) within 500m; and
- Waterbirds, fish and aquatic habitat from the Grand Sluice upstream of the barrier structure, to the tidal extent of the estuary at Tabs Head (4.7km along the channel and 4.2km in a straight line) downstream.

Desktop research

10.2.3 A desktop study was initially carried out to identify ecological designations and features within the Project area. Specific ecological surveys were also carried out by the Environment Agency and Mott MacDonald to inform the ecological impact assessment. These surveys included:

- Extended Phase 1 Habitat Survey (Jacobs September, 2010 and Mott MacDonald, September 2014);
- Saltmarsh survey (Environment Agency, September 2011 and Mott MacDonald, September 2014a);
Estuarine baseline surveys (saltmarsh, fish community, water and sediment quality, phytoplankton and benthic invertebrate community) (Environment Agency, between 2010 and 2014); and

Reptile surveys (Mott MacDonald April - June 2015).

A full list of further surveys is provided in the ES (Volume 2b): Ecology and Nature Conservation Technical Report; Chapter 2.

A full list of sources used in the desktop study is listed in the ES (Volume 2b): Ecology and Nature Conservation Technical Report; Section 2.2. The key international and UK legislation and planning policies for biodiversity and nature conservation that are relevant to this Project can be found in the ES (Volume 2b): Ecology and Nature Conservation Technical Report; Chapter 3.

Impact assessment methodology

The potential impacts that the Project may have on ecological receptors within the ZoI were assessed using a methodology based on the Chartered Institute for Ecology and Environmental Management’s (CIEEM) Guidelines for EcIA in the UK (2016). This methodology does not require the specification of confidence levels. Confidence levels have been incorporated into the ES (Volume 2b): Ecology and Nature Conservation Technical Report for completeness; however, they are not included within this ES to avoid potential confusion in terminology. This methodology is specific to ecological receptors and differs from the general methodology set out in Chapter 3 of this Report. The levels of significance used are defined in Table 10.1.

Table 10.1: Definitions used to classify the significance of effects

<table>
<thead>
<tr>
<th>Value of effect</th>
<th>Significance level</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major</td>
<td>International</td>
<td>Impact affecting the integrity of an ecological resource or receptor of very high value.</td>
</tr>
<tr>
<td>Major</td>
<td>National</td>
<td>Impact affecting the integrity of an ecological resource or receptor of high value.</td>
</tr>
<tr>
<td>Moderate</td>
<td>County/Regional</td>
<td>Impact affecting the integrity of an ecological resource or receptor of medium value.</td>
</tr>
<tr>
<td>Minor</td>
<td>Local/District</td>
<td>Impact affecting the integrity of an ecological resource or receptor of low value.</td>
</tr>
<tr>
<td>Minor</td>
<td>Negligible</td>
<td>Impact not affecting the integrity of an ecological resource beyond the level of the principal study area.</td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016

Major and moderate effects are classed as significant and these are discussed in this Chapter. All minor effects can be found in the technical Report (see ES (Volume 2b): Ecology and Nature Conservation Technical Report)
10.3 **Baseline**

10.3.1 The ecological baseline of the Project area within the extent of the ZoI is summarised below for each receptor. A full description of baseline conditions found from relevant sources and/or ecological surveys can be found in ES (Volume 2b): Ecology and Nature Conservation Technical Report.

**Statutory designated sites**

10.3.2 There is one internationally designated site within 5km of the Project. The Wash is a Ramsar site, Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI) and, together with the North Norfolk Coast, is a Special Area of Conservation (SAC). It is 4.2km (in a straight line) or 4.7km (along the channel) downstream of the barrier structure and is of international importance.

10.3.3 In accordance with Article 6(3) of the Habitats Directive, ‘Article 6 Assessments’ are required where a plan or project not directly connected with or necessary to the management of a European site(s), may give rise to significant effects upon a European site(s). The requirement for Article 6 Assessments has been transposed into UK law under Regulation 61(2) of the Conservation of Habitats and Species Regulations 2010 (‘Habitats Regulations’) (S.I. 2010/490) (as amended) and is commonly referred to as a Habitats Regulations Assessment (HRA) or an ‘Appropriate Assessment’ (AA).

10.3.4 A test of likely significance undertake under the HRA (see the ES (Volume 2b): Ecology and Nature Conservation Technical Report; Appendix D) has been carried out for this Project (Environment Agency, 2015). The assessment reported that there would be ‘no likely significant effect’ on The Wash designations during the construction and operational phases of the Project.

10.3.5 Havenside Local Nature Reserve (LNR) is located approximately 0.2km downstream of the Project. It is designated for its mix of rough grassland with scrub and bramble, grazed meadows, shallow seasonal ponds, estuary and mud flats and is of county importance.

**Non-statutory designated sites**

10.3.6 There are eight non-statutory designated sites within 2km of the Project. The closest (SFFD Local Wildlife Site) is approximately 0.3km upstream of the Project on the right bank. All these sites are of district importance.

10.3.7 All the non-statutory designated sites are unlikely to be significantly affected by the Project due to their distance from the Project area.
Estuarine habitats and flora

10.3.8 The river habitat is a habitat of principal importance under Section 41 of the Natural Environment and Rural Communities Act (NERC) (2006) and therefore is of regional importance.

10.3.9 The following estuarine habitats are also habitats of principal importance: mudflats, saltmarsh, saline lagoons; and reedbeds. They are of regional importance. Saltmarsh, reed bed and saline lagoons are also priority habitats within the Lincolnshire Biodiversity Action Plan (BAP).

Estuarine fauna

Fish

10.3.10 There are previous records for 33 species of fish in the ZoI (see the ES (Volume 2b): Ecology and Nature Conservation Technical Report; Table 4.4). The Project area also contains migratory routes for the following species of fish (Environment Agency, 2014b):
- Smelt (Osmerus eperlanus);
- Eel (Anguilla anguilla); and
- River lamprey (Lampetra fluviatilis).

10.3.11 These three fish species are listed in Section 41 of the NERC Act (2006) and as priority species on the Lincolnshire Biodiversity Action Plan (LBAP).15

10.3.12 Most of the fish species occurring in the Project area are bottom-dwelling species and feed on benthic prey, including small-sized benthic, epibenthic and hyperbenthic organisms (for example mysids, shrimps, amphipods, fish larvae).

10.3.13 It is likely that sea trout (Salmo trutta) are also present in the ZoI. Spined loach (Cobitis taenia) is also known to occur in this section of the Haven. Both of these species are listed in Section 41 of the NERC Act (2006) and as priority species on the LBAP. Therefore, the fish assemblage present in the ZoI is considered to be of up to regional importance. Migratory fish species need to be considered at catchment level because the distribution of these species is not restricted to the ZoI.

Waterbirds (non-breeding populations)

10.3.14 There are previous records of 70 waterbirds of importance within 2km of the Project area, including 22 Annex 1 species13, 17 Schedule 1 species 14 and nine Section 41 species15, as

11 The LBAP is a biodiversity and nature conservation strategy that identifies the issues facing the habitats and species of Lincolnshire and describes the actions needed to bring about a more sustainable situation.
well as 59 Amber listed Birds of Conservation Concern (BoCC) and ten Red listed BoCC\(^\text{16}\) (see the ES (Volume 2b): Ecology and Nature Conservation Technical Report; Table 4.5). Of the 70 waterbirds listed, 17 are listed as qualifying features of The Wash SPA, 11 as qualifying species of The Wash Ramsar site, and four species are present in populations of significant international importance at The Wash Ramsar site (over 1% of international population).

10.3.15 Due to the type and extent of habitat present in and adjacent to the Project area, it is not expected that the waterbird species listed in previous records would occur in population numbers of more than county importance (that is, more than 1% of county total). Also, no regularly occurring species likely to occur within the Project area are considered to be of county importance. Therefore, the assemblage of birds in the Project area is considered to be of district importance.

Aquatic mammals

10.3.16 There are no recent records or suitable habitat in the Project area for aquatic mammals such as otter (\textit{Lutra lutra}) or water vole (\textit{Arvicola amphibius}).

Aquatic invertebrates

10.3.17 The Project area is likely to support common species of aquatic invertebrates typical of fine sediment estuarine habitats. Fifteen species were recorded during the 2010 surveys, ranging from oligochaetes and polychaetes (worms) to crustaceans (shrimp and crab species) (Environment Agency, 2014b). These species are considered to be of district importance.

10.3.18 Invasive invertebrate species have been reported in the lower Witham. These include; shrimp species (\textit{Dikerogammarus haemobaphes} and \textit{Hemimysis anomala}); mitten crabs (\textit{Eriocheir sinensis}) – a schedule 9 species\(^\text{17}\) and signal crayfish (\textit{Pacifastacus leniusculus}) - a Schedule 9 species – which are also present.

---

14 Schedule 1 to the Wildlife and Countryside Act 1981 (as amended) (UK)
15 Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006) (UK)
16 ‘Birds of Conservation Concern’ references the population status of birds in the UK as assessed and reviewed by the UK’s leading governmental and non-governmental bird conservation organisations including the British Trust for Ornithology, (PTO) Royal Society for the Protection of Birds and the Joint Nature Conservation Committee. The review used a range of criteria to place regularly occurring species onto one of three lists: Red, Amber or Green. This categorisation provides an indication of the priority that should be given to each species when allocating resources for conservation action.
17 The Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) lists the non-native and invasive animal and plant species which are established in the wild and pose a conservation threat to native biodiversity and habitats. This list has been amended by the Wildlife and Countryside Act 1981 (Variation of Schedule 9) (England and Wales) Order 2010.
Macrionvertebrate

10.3.19 Four species of invertebrate found in the lower Witham are non-native; the shrimps *Dikerogammarus haemogaphes* and *Hemimysis anomala*, mitten crab *Eriocheir sinensis* and signal crayfish *Pacifastacus leniusculus*. It is not possible to estimate whether noise or vibration would have a positive or negative effect upon these species, due to the lack of data regarding their sensitivities or possible effects of noise. There are also currently no exposure criteria for invertebrates.

10.3.20 Given their similar habitat preference and lifestyle to other invertebrates present, it is unlikely their sensitivities or responses to noise/vibration (if present) would vary from their native counterparts.

Terrestrial habitats and flora

10.3.21 No notable or protected flora was recorded during the surveys within the Project area (See the ES (Volume 2b): Ecology and Nature Conservation Technical Report; Section 2.3 for a description of the surveys carried out).

10.3.22 Terrestrial habitats recorded within the Project area include semi-improved neutral grassland, amenity and poor semi-improved neutral grassland, introduced shrubs, tall ruderal vegetation and scrub (see the ES (Volume 2b): Ecology and Nature Conservation Technical Report; Appendix A: Figure 4.2 Phase 1 Habitat Map). These habitat types are common and widespread and are therefore of ‘ZoI only’ importance. Also, within the Project area are scattered trees and broadleaved plantation woodland. These habitats are considered to be of local importance.

10.3.23 Invasive non-native plant species under Schedule 9 to the Wildlife and Countryside Act 1981 (as amended) have been recorded within 2km of the Project area, but not within the Project area. These include giant hogweed (*Heracleum mantegazzianum*), Japanese rose (*Rosa rugosa*), wall cotoneaster (*Cotoneaster horizontalis*), yellow archangel (*Lamium galeobdolon ssp. argentatum*). Japanese knotweed (*Fallopia japonica*) has been previously recorded within 2km of the Project area (Greater Lincolnshire Environmental Centre, 2015) and has been recorded along the Haven, outside the Project area.

Terrestrial fauna

*Birds*

10.3.24 There are previous records of 61 terrestrial bird species of conservation interest within 2km of the Project area. These include 10 Annex 1 species, 20 Schedule 1 species, 22 Section 41 species, 29 Amber BoCC, and 25 Red BoCC. The Extended Phase 1 Habitat Survey recorded terrestrial habitats with potential to support common bird species. However, these habitats are unlikely to support species of greater than district importance, or Schedule 1,
given the low importance of existing habitats (for example, buildings, scattered trees, scrub and hedgerow).

Reptiles

10.3.25 There is suitable habitat for foraging, basking and refuges for reptiles, including species such as common lizard, grass snake and slow worm in multiple habitats in the Project area. Grass snake and common lizard were recorded in 2013 and a small breeding population of grass snake was identified in the Project area in 2015. The species are considered to be of district importance.

Amphibians

10.3.26 There are previous records of four amphibian species within 2km of the Project area: common frog (*Rana temporaria*), common toad (*Bufo bufo*), smooth newt (*Lissotriton vulgaris*) and great crested newt (*Triturus cristatus*).

10.3.27 Great crested newts are of national importance; however, due to their presence and population size they are considered to be of regional importance for this assessment. Eleven freshwater ditches and ponds are present within 500m of the Project area but Habitat Suitability Index assessments found that they are unsuitable to support populations of great crested newts. Also, the River Witham, SFFD, the Haven and busy roads represent significant barriers to movement of newts between waterbodies. Therefore, as the Project area does not support a viable population of amphibians, it is considered that amphibians would not be impacted by the Project.

Bats

10.3.28 The Project area has low potential to support roosting bats, given limited suitable habitat. However, there is suitability for foraging bats along the river and along suitable vegetation on the riverside. Bat habitats are considered to be of district importance.

10.3.29 During the Preliminary Ecological Appraisal (Mott MacDonald, 2014b) the buildings in the PoB Estate including the Buoy Repair Shop were considered to have negligible suitability for roosting bats.

Other terrestrial mammals

10.3.30 There is limited habitat suitable for badger (*Meles meles*) or brown hare (*Lepus europaeus*) in the Project area, and no mammals were recorded during the Extended Phase 1 Habitat Survey in 2014.
Terrestrial invertebrates

10.3.31 The Project area is likely to support common species of terrestrial invertebrates in the tussocky grassland, scrub, shrubs, trees and woodland along the estuary. These are considered to be of local importance.

10.4 Impact assessment

10.4.1 This section summarises the significant effects (moderate or major) on the designated sites, sensitive habitats, species of importance and protected species identified as part of the impact assessment. The full impact assessment can be found in the ES (Volume 2b): Ecology and Nature Conservation Technical Report; Chapter 5.

Construction effects

10.4.2 The majority of the ecological receptors in the ZoI would experience no significant effects, either temporarily or permanently, from the Project. These receptors are:
- Statutory designated sites including the Wash SPA/SAC/Ramsar site and Havenside LNR;
- Non-statutory designated sites;
- Estuarine and terrestrial habitats and flora;
- Waterbirds and terrestrial birds;
- Aquatic and terrestrial mammals;
- Reptiles and amphibians; and
- Aquatic and terrestrial invertebrates.

10.4.3 Temporary significant effects are predicted on fish movements up and down the Haven due to the in-channel works (barrier construction, cofferdam installation and removal). Also, the narrowing of the channel to 18m while the cofferdam is in place could affect velocities. This may result in a temporary obstruction to fish movement, depending on the speed of water flowing through the channel. The impact on predicted fish movements has been assessed as temporary moderate negative which results in a temporary moderate adverse effect, which is considered to be significant at the regional level.

10.4.4 Further temporary significant effects on fish are also predicted due to the increase in noise and vibration levels during construction, particularly due to steel sheet piling activities. Furthermore, works in the Wet Dock are expected to occur 24 hours per day, 7 days per week over a worst case scenario of 9 months causing a continuous disturbance. However, noisier activities (for example, sheet piling) would be limited to daytime periods only. The effects of high levels of noise on fish can include:
- Swim bladder rupture or tissue damage;
- Behavioural responses (avoidance of areas affected by increased noise);
- Physical injury;
118

Boston Barrier Tidal Project
A17/1 – Environmental Statement: Volume 1: Main Report

- Auditory tissue damage (including temporary and permanent hearing loss);
- Physiological responses (stress, health and overall wellbeing); and
- Mortality.

10.4.5 The impact on fish populations due to increase in construction noise and vibration has been assessed as temporary moderate negative which results in a temporary moderate adverse effect, which is considered to be significant at the regional level.

10.4.6 The potential for lighting impacts on fish has been scoped out as no impact was envisaged with good lighting design.

Operational effects

10.4.7 Ecological receptors would experience no significant effects, either temporarily or permanently from Project operations with the exception of fish, in particular smelt. Significant effects have been described for smelt due to the reduction of the period that fish are able to undertake migration. This is due to a change in velocity as a consequence of the constriction of the channel.

Mitigation measures

10.4.8 The mitigation measures in this section have been documented in the EAP and would be included in an ecological management plan, where deemed practical, to be prepared and approved by BBC pursuant to the proposed planning conditions.

10.4.9 To minimise adverse effects on sensitive aquatic habitats and associated fish species, the following mitigation measures are recommended:
- Measures to minimise sediment release during in-channel and bank works;
- Minimise dust generating activities, for example by damping down work areas regularly in dry conditions;
- Capital dredging to occur in cooler months (between mid-October and mid-March) to reduce risk of algae blooms occurrence resulting from potential nutrient mobilisation;
- Capital dredging to avoid smelt spawning periods as far as practically possible (generally between mid-February to end March and also dependent on water temperature);
- Consider either seeding and/or planting spoil bunds or covering spoil with geotextile sheets;
- All works should adhere to the guidance outlined in the Environment Agency Pollution Prevention PPG01 (general guide to the prevention of water pollution) and PPG05 (works and maintenance in or near water); and
- Monitoring of fish movements along this reach of the Haven would be carried out to establish if there are significant changes in populations and particularly migration patterns. If significant changes are detected then appropriate strategies would be develop.
10.4.10 The construction of ‘refuge areas’ for fish (methodology to be agreed during detailed design) would be undertaken to ensure periods of rest for fish under potentially higher velocities than the current situation (identified for fish receptors according to published thresholds for eel, trout and smelt). Refuge areas would consist of areas of lower flow, in the ‘shadow’ of the main flow and afford vital rest areas for a variety of fish species. In addition, measures favouring vegetation colonisation in areas of the estuary may increase protection for smelt eggs, but this depends also on the spatial distribution of spawning habitats in the estuary, which are currently unknown (valid for both construction and operation). Given this, it is suggested the survey/monitoring of the use of the Witham estuary as a spawning ground for smelt may be of value in order to better understand their distribution and the importance of the area and thus more accurately assess possible impacts to the specific receptor resulting from the Project (valid for both construction and operation).

10.4.11 Increased noise levels have been highlighted as a significant adverse impact to fish during construction. The following mitigation measures would be implemented, where practicable, and are expected to reduce the magnitude of the impact to low (not significant):

- Limit the use of noisy plant or vehicles and switch off vehicle engines when not in use;
- Establish operating levels for equipment;
- Sheet piling activities can be particularly damaging to fish (this is particularly relevant in areas where works would be carried out continuously). Silent sheet piling is a new technology which produces less vibration than conventional piling methods and very low noise levels. The use of softer alternatives (to hammering) of piling techniques would be used where ground conditions allow. Where not possible, soft start piling procedures should be utilised. The soft-start duration must be a period of not less than 20 minutes, and should piling cease for a period greater than 20 minutes, the soft start procedure must be repeated; and
- A toolbox talk would be carried on site by an ecologist before piling activities start to highlight the potential effects of noise and vibration on fish and the importance of using soft start piling techniques.

10.4.12 In addition the following it is recommended where practicable to reduce piling activities during key migration periods. It is understood that piling activities within the Haven would be undertaken between June and December, during daylight hours and piling would not be continuous during this period. This period overlaps with migration periods for elvers and sea trout and fully overlaps with migration periods for adult eels and juvenile lamprey. Migrating adult eel and lamprey would be less affected as they mostly migrate during night time. Considering the above conditions, and timing, behaviour and sensitivity of these species, it is suggested that frequency of piling days is reduced during June-October (allowing “downtime” periods between piling days to allow times for fish recovery (where possible) and provision of windows of opportunities for undisturbed migration), whereas it can be increased towards November-December. The actual periods of downtime would be determined during detailed design when the precise piling methods are known.
**Good practice measures**

10.4.13 Where the likely effect of the Project on ecological receptors has been assessed as not significant, no mitigation would be required. However, some good practice measures during construction would be implemented to ensure the effects of the Project remain low, and to sustain the long-term longevity of the ecological receptors in the Project area. These are summarised in Table 10.2 and included within the EAP.

Table 10.2: Good practice measures to be implemented for non-significant ecological receptors

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Non-significant effect</th>
<th>Good practice measures to be implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mudflats</td>
<td>Temporary loss of approximately 260m² of habitat</td>
<td>Measures to minimise sediment release to be implemented during in-channel and bank works (to avoid further deposition of sediment on the mudflats)</td>
</tr>
<tr>
<td>Saltmarsh, saline lagoons and reedbeds</td>
<td>Changes in erosion and accretion processes</td>
<td>Dust generating activities to be minimised, for example by damping down work areas regularly in dry conditions. Seeding and/or planting spoil bunds to be considered, or covering spoil with geotextile sheeting. All works to adhere to Environment Agency PPG01 on the prevention of water pollution and PPG05 on works and maintenance in or near water.</td>
</tr>
<tr>
<td>Macroinvertebrates</td>
<td>Potential spread of aquatic invasive species</td>
<td>Biosecurity measures must be put in place to avoid the spread of invasive species into other water bodies. Species specific biosecurity measures for signal crayfish (<em>Pacifastacus leniusculus</em>) to prevent the spread of crayfish plague which kills native white-clawed crayfish (<em>Austropotamobius pallipes</em>). This may include disinfecting and drying equipment after use (Environment Agency, 2006) and before moving into other areas. An ecologist or ECoW would deliver toolbox talks to all staff on the effects of the potential spread of these species and biosecurity techniques. These must include the inspection of footwear and vehicles as appropriate and the check, clean and dry methods (NNSS, 2015). Inspection of footwear and vehicles using the check-clean and dry methods to be used as appropriate.</td>
</tr>
<tr>
<td>Wintering waterbirds</td>
<td>Displacement of roosting or foraging birds out of the Project area due to noise disturbance</td>
<td>Construction compounds, stockpiles, and welfare areas to be located away from mudflat areas. Limit use of noisy plant machinery. Mufflers to be fitted where possible. Machinery to be turned off when not in use. Ecologist to deliver toolbox talks to all staff to brief them on these measures.</td>
</tr>
<tr>
<td>Hedgehog</td>
<td>Habitat loss and the risk of killing or injuring hedgehog during site enabling</td>
<td>Ecologist to conduct hand search of suitable hedgehog habitat prior to any vegetation removal. Any hedgehogs found would be moved to predetermined release location in suitable habitat outside of the works area. If a hedgehog is found with young or in a nest, the area would be left undisturbed and monitored until the hedgehog is no longer present.</td>
</tr>
</tbody>
</table>

---

18 The Environment Agency has produced a range of Pollution Prevention Guidelines (PPGs) for England and Wales, Northern Ireland Environment Agency (NIEA) and Scottish Environment Protection Agency (SEPA) which provides good practice guidelines and environmental practice targeted at a (PTO) particular type of business or activity.
### Boston Barrier Tidal Project

**A17/1 – Environmental Statement: Volume 1: Main Report**

#### Receptor Non-significant effect Good practice measures to be implemented

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Non-significant effect</th>
<th>Good practice measures to be implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reptiles</td>
<td>Habitat loss and the risk of killing or injuring reptiles during site enabling works.</td>
<td>Reptiles to be relocated out of the works area prior to work commencing and released in a suitable receptor area. Receptor area to be located as close to the works area as possible in area of suitable habitat. Habitats in receptor area to be improved for reptiles. Reptile mitigation and management plan would be produced prior to any enabling works. The plan would be produced during winter 2016 with a view to implementing the mitigation by spring 2017.</td>
</tr>
<tr>
<td>Breeding birds</td>
<td>Habitat loss and the risk of killing or injuring birds, or damaging or destroying their eggs or nests during site enabling works and construction.</td>
<td>Vegetation should be cut back prior works commencing in order to deter birds from nesting. Material stockpiles, structures, building to be demolished should be carefully monitored. Vegetation removal during breeding season would be avoided. Ecologist to conduct a pre-works check for active nests (during breeding season). Suitable buffer zone to be erected if nesting birds are found. Works to avoid creating vertical sides due to slips in spoil or dredging that is suitable for sand martins. Geotextiles to cover slips immediately. All machinery to be stored as far away from nesting habitats as possible. Machinery to be left in place until any chicks have fledged if nests established within it. Ecologist to deliver toolbox talks to all staff to brief on these measures, including procedures for checking machinery before starting work. Surrounding habitats to be improved for nesting birds by erecting bird boxes if considered appropriate by recognised authority.</td>
</tr>
<tr>
<td>Commuting and foraging bats</td>
<td>Lighting</td>
<td>Works in darkness to be avoided where possible. Lighting to be installed low and at a minimum brightness as practical to reduce light spill. Hood or cowl filters fitted to focus light to where it is needed. Motion sensors to be installed to reduce duration of illumination for any security lighting. Illuminating of features suitable for commuting of foraging bats to be avoided where possible such as the back gardens along Wyberton Low Road, scrub edges, and the river channel.</td>
</tr>
<tr>
<td></td>
<td>Non-significant effect</td>
<td>Ecologist to deliver toolbox talks to all staff on hedgehogs and procedures if hedgehog is found during construction.</td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016

### Improvement works – Boston horsetail

**10.4.14** As part of the landscaping works to restore the right bank post construction, Boston Horsetail could be re-instated in areas which surveys deem to be suitable for potential growth.

**10.4.15** Boston Horsetail is native to the local area, is a protected species, and has been in decline in recent years. Therefore the re-introduction of this to the area is considered an improvement on existing conditions and is beneficial. This would be documented within the EAP.
Residual effects

10.4.16 With the implementation of the proposed mitigation and good practice measures, the effects of the Project on ecological receptors during construction would be reduced to a level which is not significant.

10.4.17 With regard to the fish receptors, noise and vibration was identified as a temporary significant impact during construction. It is considered that the use of the mitigation measures mentioned above (softer alternatives to hammering if possible and in particular the use of soft start (gradual increase in noise)) would allow fish to avoid the areas affected by higher levels of noise and vibration. This would result in a temporary effect as the piling activities would only occur during day time and the effect would not be felt continuously. Measures to this effect would be incorporated within the EAP.

10.4.18 Therefore, there would be no significant residual effects on ecological receptors as a result of the Project.

10.5 Summary

10.5.1 The majority of the ecological receptors in the ZoI would not experience significant effects, either temporary or permanent, from Project construction. However, good practice measures would be implemented to ensure the effects of the Project remain low, and to sustain the long-term longevity of the ecological receptors in the Project area.

10.5.2 Temporary moderate adverse effects are predicted during construction and operation of the Project on fish movements along the Haven due to in-channel works (barrier construction, cofferdam installation and removal), which is considered significant.

10.5.3 Temporary major adverse effects are predicted on fish from increase in construction noise and vibration levels due to steel sheet piling activities, which is considered significant.

10.5.4 The main mitigation measures to be implemented include:

- Capital dredging to occur in cooler months (between mid-October and mid-March) to reduce risk of algae blooms occurrence resulting from potential nutrient mobilisation;
- Capital dredging to avoid smelt spawning periods as far as practically possible (generally between mid-February to end March and also dependent on water temperature); and
- Monitoring of fish movements along this reach of the Haven would be carried out to establish if there are significant changes in populations and particularly migration patterns.

10.5.5 Increased noise and vibration levels have been highlighted as giving rise to a significant adverse impact to fish. The following mitigation measures would be implemented:

- Sheet piling activities would use softer alternatives (to hammering) where possible;
- Piling activities would be reduced during migration months; and
- Capital dredging would occur during cooler months.
10.5.6 Mitigation measures, documented in this Chapter and included in the EAP, have been proposed which reduce the adverse effects during construction to levels which are non-significant and it is concluded that there would be no significant residual effects on ecological receptors as a result of the Project.
11 Surface water and flood risk

11.1 Introduction

11.1.1 This Chapter summarises the findings of the surface water technical assessment that was carried out for the Project (see the ES (Volume 2b): Surface Water and Flood Risk Technical Report).

11.1.2 The aim of the assessment was to identify surface water impacts surrounding the Project, assess the potential significant issues identified in the Project’s Updated Scoping Report (2014) and to propose management and mitigation to minimise predicted significant impacts.

11.1.3 Potential impacts on flooding are discussed in a separate Project Flood Risk Assessment (the ES (Volume 2d): Flood Risk Assessment. Groundwater quality issues related to dredging (and to piling) are addressed in Chapter 13 of this Report and within the ES (Volume 2b) Contaminated Land Technical Report.

11.1.4 Compliance of the Project with WFD requirements has been assessed separately (see the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Appendix B; Preliminary WFD Compliance Assessment). However, key themes from the preliminary WFD compliance assessment are included in this Chapter.

11.2 Assessment methodology

11.2.1 The surface water assessment involved desktop research supported by a review of water survey and modelling data and consultation.

Study area

11.2.2 The study area for surface water covers the Haven (Witham Transitional waterbody) which had been scoped into the preliminary WFD compliance assessment. It is the tidal part of the River Witham extending from the tidal limit at Grand Sluice to The Wash. The water body is shown in the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Appendix A; Figure 4.1.

11.2.3 It should be noted that the preliminary WFD compliance assessment study area considered an additional three water bodies to the Witham Transitional (see Section 11.3 of this Report).

Desktop research

11.2.4 A desktop study was carried out to understand water resources of the Project area and surrounding area (see the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Chapter 2). A full list of references used to prepare the Report can be found in the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Chapter 7.
Surveys

11.2.5  Surveys were carried out between spring 2010 and winter 2011 to identify any existing pollutants or sources of contamination that may affect the design of the barrier (HJA, 2011).

11.2.6  The Estuarine and Coastal Monitoring and Assessment Service (ECMAS) has been carrying out routine monthly sampling from August 2013 for the following:
- Dissolved nutrients;
- Chlorophyll and phytoplankton;
- Physicochemical – suspended solids, salinity, dissolved oxygen and temperature;
- Dissolved Metals – Lead, Arsenic, Mercury, Zinc, Cadmium, Chromium, Copper; and Nickel; and
- Organotins.

11.2.7  Quarterly data was also collected for biological oxygen demand (BOD) and a targeted gas chromatography–mass spectrometry (GCMS) scan. The scan identifies peak concentrations of a broad range of organic compounds. A full list of surveys carried out to prepare the Report can be found in the ES: (Volume 2b): Surface Water and Flood Risk Technical Report; Chapter 3.

Consultation

11.2.8  A high level technical workshop with stakeholders was held in February 2011 to consider and discuss the potential implications of the preliminary WFD compliance assessment for the Project. This was for an alternative Project design, which included WLM. Although WLM has now been removed from the Project design (see Section 1.2), the initial ‘screening’ exercise carried out at the workshop is still considered valid. Therefore, the focus of the preliminary WFD compliance assessment assessed the potential impact of the Project on four water bodies:
1. The Haven (Witham Transitional);
2. Lower Witham;
3. SFFD; and
4. The Wash (inner).

11.2.9  There are no groundwater bodies which could be potentially impacted by the Project.

11.2.10  It is noted that some aspects originally screened as relevant to WFD interests are now no longer of interest due to the removal of WLM. Where this is the case, justification is provided within the text.

Impact assessment methodology

11.2.11  The methodology used to assess the significance of impacts follows the approach outlined in Chapter 3 of this Report.
11.2.12 A separate methodology was used for compliance with WFD objectives. This can be found in the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Appendix B Preliminary WFD Compliance Assessment).

11.2.13 The sensitivity of the baseline environment to each impact has been assessed using a combination of professional judgement and predefined criteria, categorised as being very high, high, medium, low or not sensitive (see the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Table 3.2). Receptors only need to meet one of the defined criteria to be categorised at the associated level of sensitivity.

11.2.14 The magnitude of a potential impact would depend upon whether the impact would cause a fundamental, material or detectable change. The criteria for assessing the magnitude of potential impacts are categorised as being major, medium, low or negligible (see the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Table 3.2). Probability, duration and proximity to infrastructure have been considered where they influence the magnitude of an impact.

11.2.15 The significance of a potential impact is defined by the sensitivity of the receiving water environment (the receptor) and the magnitude of the potential impact. A description of how significance is judged from the combination of sensitivity and magnitude can be found in the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Section 3.5; Table 3.1. In some cases, magnitude or sensitivity cannot be quantified with certainty, and in these cases professional judgement remains the most effective way to identify the significance of an impact. Where this is necessary it would be highlighted within the text and full justification presented.

11.2.16 Where the significance of an effect is ‘major’ or ‘moderate’, mitigation is required in order to reduce impacts to an acceptable level. Only impacts which are ‘moderate’ or ‘major’ after mitigation are considered to be residual significant effects under our assessment methodology.

11.2.17 Major and moderate effects were classed as significant and these are discussed in this Chapter. All non-significant effects can be found in the Technical Report (see the ES (Volume 2b): Surface Water and Flood Risk Technical Report).

11.3 Baseline

11.3.1 This section summarises the baseline conditions against which the impacts of the Project were assessed. An additional three water bodies were identified in the baseline of the preliminary WFD compliance assessment and are included below. A full assessment of baseline conditions can be found in the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Section 4. A map indicating the extent of the water bodies discussed in this
baseline section can found in the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Figure 4.1.

The Haven (Witham Transitional)

11.3.2 The Anglian River Basin Management Plan (RBMP, 2009) classifies the Haven (also known as "Witham Transitional") (Water body ID GB530503000100) as a Heavily Modified Water Body (HMWB) with moderate ecological potential. During the Project programme the RBMP was updated. Therefore, the 2009 classification has been cross-checked against the 2015 classification. Where there is a significant departure from the 2009 status, the more recent classification has been used within the preliminary WFD assessment (ES (Volume 2b): Surface Water and Flood Risk Technical Report; Appendix A).

11.3.3 There are a number of existing hydromorphological pressures within the Haven/Witham Transitional including land reclaim, bank reinforcement, channel dredging, tidal river channelisation/re-alignment/straightening and construction.

11.3.4 The WFD requires all HMWB to achieve Good Ecological Potential (GEP). It is expected that the Witham Transitional water body would achieve GEP by 2027 as it was considered to be disproportionately expensive and/or technically unfeasible to achieve GEP by 2015. To achieve GEP, six specific mitigation measures must be in place and functioning (RBMP, Annex B, 2009, p1416). At present, all the mitigation measures are in place along the water body and relate to reducing the impact of dredging through altering the timing and disposal thereof, setting out a strategy to avoid the need to dredge and seeking opportunities for bank rehabilitation and re-profiling.

11.3.5 A detailed account of existing quality based on individual quality elements under WFD and of these mitigation measures are provided in the preliminary WFD compliance assessment report (see the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Appendix A). The survey results identified good water quality for all sites, with only one single exceedance of the Environmental Quality Standard for Iron at Site 2 (downstream of confluence with SFFD). The survey concluded that physiochemical parameters were within expected levels. Depressed salinities recorded over the winter months are likely to have been caused by increased freshwater flows, preceding the survey times.

11.3.6 The water and sediment sampling carried out within the Witham estuary in 2010/2011 is provided in the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Appendix C. Three intertidal and three sub-tidal sediment samples were collected within The Haven in 2010/2011 (HJA, 2011). Sediment chemistry analysis at each site was undertaken. The nearest sample site to the proposed works (named "Upstream of the Docks" in HJA Report, 2011) is located where dredging works are proposed during construction and operation of the WDE and Gate. The sediment analysis was compared with Threshold effect levels (TEL –
Concentrations below which contaminants are not considered to represent significant hazards to the aquatic environment) and probable effect levels (PEL – lowest concentration of a substance that is known to have an adverse effect on the aquatic environment) of the Environment Canada (CCME, 1999) guidelines to assess potential impacts to the aquatic environment. The results concluded that no PELs were exceeded in the sediment chemistry analysis, although arsenic, chromium, copper, lead, nickel and zinc TELs were exceeded, principally at sites with a predominance of fine sediments. This level of sediment contamination is expected in an estuary with a working dock and associated history.

11.3.8 During the 2014 ground investigation (WYG Environment, 2014), sediment sampling was undertaken at eight locations within the Haven. The samples were taken in order to determine the potential for use or requirement for disposal of the dredged sediment during construction. The results are provided in the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Appendix C and a map of sediment sampling locations can be found in the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Appendix A: Figure 4.1.

11.3.9 Elevated levels of arsenic, chromium, nickel, lead, zinc and Polyaromatic Hydrocarbons (PAHs) were measured at differing degrees and sites as summarised in Chapter 12 of this Report.

11.3.10 Existing survey results identified good water quality for all sites, with only one single exceedance of the Environmental Quality Standard for Iron at Site 2 (downstream of confluence with SFFD). The survey concluded that physiochemical parameters were within expected levels.

**Lower Witham**

11.3.11 The Lower Witham comprises the lower reaches of the River Witham from Stamp End Lock in Lincoln to Boston. It has a large storage area upstream of Lincoln (that is, on the Upper Witham). Its water level is controlled by the Grand Sluice within Boston (where it meets the Haven) and Branston Sluice. Boat passage through Grand Sluice is dependent upon the state of the tides.

11.3.12 No additional water or sediment quality data has been collected for the Project from within this fluvial water body as neither is likely to be affected by the Project. The Project would not affect the water resources of the Lower Witham and therefore it was not considered further in the surface water impact assessment.

**South Forty Foot Drain**

11.3.13 The SFFD is connected to the Witham Transitional via the Black Sluice. It is approximately a 34km long water course that is fed by pump from approximately 30 Internal Drainage Board (IDB) ditches. The SFFD drains into the Haven on the right bank at Black Sluice, upstream of
the Project. The SFFD drains by gravity through Black Sluice during low points in the tidal cycle.

11.3.14 Black Sluice acts as an effective barrier to flows upstream, effectively blocking any temporary impacts from construction or operation of the Project from being detectable within this waterbody. Due to the occasional use of the barrier during the operational phase, and the existence of Black Sluice, there is no justification for assuming any operational effects on this waterbody and therefore it was not considered further in the surface water impact assessment.

The Wash (inner)

11.3.15 The Haven discharges into the Wash (inner) which is a transitional waterbody between the Haven and Wash coastal waterbodies and covers the innermost areas of the Wash. It is approximately 25km long and is designated as a heavily modified water body due to designations for flood defence, navigation and shellfish beds. The Wash (inner) has a hydrological connection to the Witham Transitional.

11.3.16 The Witham Transitional and the Wash (inner) are considered in the impact assessment.

11.4 Impact assessment

11.4.1 This section summarises the significant effects (moderate or major) on the key water resources receptors identified as part of the impact assessment. However, some water resources receptors that were assessed to have only minor significant effects but were identified as matters of interest during stakeholder consultation have been summarised below. The full impact assessment can be found in the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Chapter 5.

Construction effects

11.4.2 The principal construction activities with the potential to impact the surface water environment relate to works undertaken in or near the water environment. The Project elements which may result in effects on the surface water environment include:

- Installation and removal of coffer dams (including associated dredging) for barrier construction, impacting turbidity levels in the water body;
- Excavations required for in-river construction works and barrier tie in walls;
- Construction of the barrier structure;
- Runoff from temporary access roads and other hardstanding; and
- In channel works associated with modification to the WDE.

11.4.3 Construction impacts may have a temporary or permanent effect. The potential impacts considered relevant were:

- An increase in turbidity due to dredging;
- Mobilisation of sediment bound contaminants;
- Pollution incident/oil spillage; and
- Pollution from silt laden runoff.

11.4.4 It should be noted, current plans for capital dredging as part of the Project is to dispose of it at landfill as the last resort. It has been agreed that there would be no disposal of dredge material at sea.

11.4.5 As Project construction would be carried out in line with construction best practice and normal tidal activity would continue in the Haven for the duration of the construction period, the assessment concluded that the surface water bodies Witham Transitional and The Wash (inner) would experience no significant effects, either temporarily or permanently from Project construction. A summary is provided below.

11.4.6 For pollution related impacts, the assessment of significance was based on good practice being followed. If a pollution event were to occur, best practice would result in an event of short duration with no long term changes to the water chemistry. The impact on the Transitional Witham and The Wash (inner) has been assessed as temporary minor negative which results in a temporary minor adverse effect, which is not considered to be significant.

11.4.7 For increases in turbidity and mobilisation of sediment bound contaminants, regular tidal flushing would reduce the effects of both turbidity and contaminant related impacts. Capital dredging has been planned with minimising environmental impacts in mind. Further control of dredging related impacts would occur through the development of detailed dredging method statements. Monitoring would detect any impact at early onset and hence dredging managed so as to reduce the impact to an acceptable level. The impact on the Transitional Witham and The Wash (inner) has been assessed as temporary minor negative which results in a temporary minor adverse effect, which is not considered to be significant.

**Operational effects**

11.4.8 The main activities during the operation of the barrier structure that may cause potential impacts are:
- Closing of the barrier structure for a flood event; and
- Closing of the barrier structure for maintenance.

11.4.9 It should be noted, the current level of maintenance dredging carried out by the PoB through the Haven is not expected to change as a result of the Project.

11.4.10 Therefore, based on the current project plans (see Chapter 2 of this Report) the assessment concluded that the surface water bodies Witham Transitional and The Wash (inner) would experience no significant effects, either temporarily or permanently from Project operations. A summary is provided below.
11.4.11 The barrier structure would represent a new channel modification, representing a permanent constriction; however, it would not prevent the implementation of the identified WFD mitigation measures for the Witham Transitional. In addition, construction related impacts would not affect WFD quality elements as changes are expected to be short-term and reversible. Therefore, based on the preliminary WFD assessment, no changes to the classification of any WFD elements are predicted as a result of the Project.

11.4.12 Predicted maximum changes in velocities and depths would be limited to the immediate vicinity of the barrier structure (a maximum of 250m up/downstream under normal flow and tidal conditions). No net change is anticipated in sediment mobilisation and deposition for the 250m reach up and down stream. There may be local changes in deposition/mobilisation around the barrier structure, however it would not significantly alter larger scale sediment transport patterns in the two waterbodies. The impact on the Transitional Witham and The Wash (inner) has been assessed as temporary minor negative which results in a temporary minor adverse effect, which is not considered to be significant.

11.4.13 When closed, the barrier would temporarily result in a blockage to suspended sediment transport. In addition, there would be a reduction in the mixing of fresh water from upstream and incoming brackish/saltwater. This is considered insignificant, as the barrier would only be closed for approximately eight to nine hours during an extreme tide event. Mixing would recommence on barrier opening. Even if barrier closure was to occur for a longer period (18 hours), no permanent changes are anticipated. The impact on the Transitional Witham and The Wash (inner) has been assessed as temporary minor negative which results in a temporary minor adverse effect. This is not considered to be significant.

11.4.14 The Project would not result in the discharge of chemical substances into the Witham Transitional. In terms of preliminary WFD compliance assessment, the principal risk to WFD water quality parameters is from remobilisation of sediment or chemical substances. Predicted changes during the operational phase of the barrier are minimal, as maintenance dredging requirements would not increase from existing arrangements. Therefore, the risk of increasing nutrient levels (through re-suspension of nutrients within sediment) would not be greater than currently occurs from ongoing dredging by the PoB. The impact on the Witham Transitional has been assessed as temporary minor negative. This results in a temporary minor adverse effect, which is not considered to be significant.

11.4.15 The modellng results and the extent of the capital dredging regime indicates that effects on shellfish areas are unlikely. Re-suspended material from dredging is unlikely to travel as far as the shellfish beds. Any increase in re-suspended sediment would be negligible in terms of the overall local sediment budget and so it is not considered that there is any significant risk to shellfish beds. However, the Environment Agency would carry out specific assessment of sediment sampling primarily to confirm sediment quality, as part of the risk assessment for on-land disposal. It is anticipated that this sampling and further assessment would be carried out following production of the ES, but prior to commencement of construction. The impact on
The Wash (inner) has been assessed as temporary minor negative and this would result in a temporary minor adverse effect, which is not considered to be significant.

11.4.16 Therefore, based on the current project description (see Chapter 2) the assessment concluded that the surface water bodies Witham Transitional and The Wash (inner) would experience no significant operational effects, either temporarily or permanently from the operation of the Project.

11.4.17 Flood risk modelling (see the ES (Volume 2d) Flood Risk Assessment) has identified that on completion of the barrier the risk from tidal flooding is significantly reduced for the urban areas upstream of the barrier in Boston town. There is also no substantial change in the water levels within the Haven downstream of the barrier once the barrier and associated works is complete. Therefore, the risk of overtopping during tidal flood events remains unchanged for Skirbeck and parts of the Riverside Industrial Estate.

11.4.18 Fluvial flood risk is not anticipated to be affected by the presence of the barrier, see ES (Volume 2c): Flood Risk Assessment.

Mitigation measures

11.4.19 No significant adverse effects on surface water bodies have been identified during the construction or operation of the Project during the impact assessment. Therefore, no further mitigation measures identified over and above the embedded mitigation within the Project design and best practice measures (as a minimum the Pollution Prevention Guidelines (PPG), jointly published by UK environment agencies and CIRIA guidance on good site practice) are proposed.

Additional studies

11.4.20 The following additional studies would be carried out:

- Water quality monitoring would be outlined in the ecological management plan and would be carried out prior to, during and post construction. Should this identify significant changes to turbidity levels or contaminants, additional measures would be identified to reduce any impacts. For instance, the cessation of dredging until tidal flushing reduces turbidity or dilutes concentrations of any harmful substances; and
- The Environment Agency would carry out specific assessment of sediment sampling to confirm sediment quality, as part of the risk assessment for on-land disposal of dredged material. Disposal out to sea would not be considered as part of the Project. It is anticipated that this sampling and further assessment would be carried out following production of the ES, but prior to commencement of construction.
Significant residual effects

11.4.21 No significant residual adverse effects are predicted on surface water bodies during Project construction and operation.

11.5 Summary

11.5.1 Additional water quality monitoring would be carried out prior to, during and post construction to identify significant changes to turbidity levels or contaminants.

11.5.2 Also, the Environment Agency would carry out specific assessment of sediment sampling to confirm sediment quality, as part of the risk assessment for on-land disposal of dredged material and suitability the for re-use of the dredged material during construction. It is anticipated that this sampling and further assessment would be carried out in mid-2016 following production of the ES, but prior to commencement of construction.

11.5.3 No significant residual effects predicted on the surface water environment.
12 Estuarine processes and geomorphology

12.1 Introduction

12.1.1 This Chapter summarises the findings of the geomorphological and estuarine technical assessment that was carried out for the Project (see the ES (Volume 2b): Estuarine Processes and Geomorphology Technical Report) and brings forward only the significant effects likely to be associated with the construction and operation phases of the Project. A full assessment can be found in the ES (Volume 2b): Estuarine Processes and Geomorphology Technical Report).

12.1.2 The aim of the assessment was to characterise contamination routes surrounding the Project, assess the potential significant issues identified in the Project’s Updated Scoping Report and to propose management and mitigation to minimise predicted significant effects.

12.1.3 Impacts of the Project on flooding are discussed in a separate Project Flood Risk Assessment (see the ES (Volume 2c) Flood Risk Assessment). Groundwater quality issues related to dredging (and to piling) are addressed in Chapter 13 of this Report.

12.1.4 The preliminary WFD compliance assessment considered the Project’s potential impact on surrounding water bodies’ biological, hydromorphological and physico/chemical characteristics. This can be found in the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Appendix B; Preliminary WFD Compliance Assessment, with summaries addressed in Chapter 10: Ecology and Nature Conservation and Chapter 11: Surface Water and Flood Risk of this Report.

12.1.5 Potential impacts on intertidal and subtidal habitats within the study area are assessed in the ES (Volume 2b): Ecology and Nature Conservation Technical Report; Chapter 5.

12.2 Assessment methodology

12.2.1 The geomorphological and estuarine assessment involved desktop research and stakeholder consultation. A full list of references used to prepare the Report can be found in the ES (Volume 2b): Estuarine Processes and Geomorphology Technical Report; Chapter 7.

Study area

12.2.2 The study area for geomorphological and estuarine processes assessment covered the whole of the Haven, from the Grand Sluice to Tabs Head, where the Haven joins The Wash (see: the ES (Volume 2b): Estuarine Processes and Geomorphology Technical Report: Appendix A, Figure 2.1).

12.2.3 It should be noted that the preliminary WFD compliance assessment study area considered the inclusion of four water bodies as identified in Section 11.3 of this Report. Only one water
body, the Witham Transitional water body was taken forward for preliminary WFD compliance assessment at the preliminary level.

**Desktop research**

12.2.4 A desktop study evaluating existing ISIS\(^\text{19}\) modelling was used to provide a tidal range at four main sites within the study area:
- Grand Sluice;
- Swing Bridge;
- Black Sluice; and
- Tab’s Head.

**Modelling**

12.2.5 The development of the Project has been informed by three dimensional (3D) and 2D numerical computer models, including a 2D sediment model and 2D flood risk model. These included:
- Hydraulic and sediment modelling by Halcrow Jacob Alliance (HJA, 2013) was undertaken in the first phase of the Project to help develop the initial design; and
- 2D and 3D hydraulic and sediment modelling has been undertaken by Mott MacDonald and has been used to progress the design and inform the EIA. Further detail can be found in the Volume 2 Technical Reports for Surface Water and Estuarine Processes and also in the standalone Hydraulic Modelling and Flood Risk Assessment Reports.

**Consultation**

12.2.6 Consultation has been carried out with the Environment Agency and the MMO. Scoping responses were also received from the MMO (supported by CEFAS) and the Environment Agency (see Appendix D of this Report).

**Impact assessment methodology**

12.2.7 The methodology used to assess the significance of impacts follows the approach outlined in Chapter 3 of this Report.

12.2.8 A separate methodology was used for the preliminary WFD compliance assessment. This can be found in the ES (Volume 2b): Surface Water and Flood Risk Technical Report; Appendix B; Preliminary WFD Compliance Assessment.

\(^{19}\) ISIS is a software package which is routinely used within the water industry to model water elevations and flows in both man-made and natural channels.
12.2.9 The sensitivity of the baseline environment to each impact has been assessed using a combination of professional judgement and predefined criteria, categorised as being very high, high, medium, low or not sensitive (see the ES (Volume 2b): Estuarine Processes and Geomorphology Technical Report; Table 2.2). Receptors only need to meet one of the defined criteria to be categorised at the associated level of sensitivity.

12.2.10 The magnitude of a potential impact would depend upon whether the impact would cause a fundamental, material or detectable change. The criteria for assessing the magnitude of potential impacts are categorised as being major, medium, low or negligible (see the ES (Volume 2b): Estuarine Processes and Geomorphology Technical Report Table 3.2). Probability, duration and proximity to infrastructure have been considered where they influence the magnitude of an impact.

12.2.11 The significance of a potential impact is defined by the sensitivity of the receiving water environment (the receptor) and the magnitude of the potential impact. A description of how significance is judged from the combination of sensitivity and magnitude can be found in Table 3.1 (Section 3.2 of this Report). In some cases, magnitude or sensitivity cannot be quantified with certainty, and in these cases professional judgement remains the most effective way to identify the significance of an impact. Where this is necessary it would be highlighted within the text and full justification presented.

12.2.12 Where the significance of an effect is ‘major’ or ‘moderate’, mitigation is required in order to reduce impacts to an acceptable level. Only impacts which are ‘moderate’ or ‘major’ after mitigation are considered to be residual significant effects.

12.2.13 Major and moderate effects were classed as significant and these are discussed in this Chapter. All minor effects can be found in the Technical Report (see the ES (Volume 2b): Estuarine Processes and Geomorphology Technical Report).

### 12.3 Baseline

12.3.1 This section summarises the baseline conditions against which the impacts of the Project were assessed. A full assessment of baseline conditions can be found in the ES (Volume 2b): Estuarine Processes and Geomorphology Technical Report; Section 4.

#### Physical extent of estuary

12.3.2 The River Witham downstream of Grand Sluice (the Haven), is an estuarine environment that stretches approximately 11km between the upstream tidal extent at Grand Sluice and its downstream confluence with The Wash at Tabs Head (see Appendix A of this Report: Maps and Figures; Figure 1.1). Grand Sluice forms an artificial upstream barrier and protects upstream areas from tidal influences from the North Sea and The Wash. The Haven drains to the sea in a generally south-easterly direction.
12.3.3 The water area of the Haven is approximately 1.0km$^2$ during a mean high water spring tide (MHWS). Of this, 0.08km$^2$ is upstream of the barrier structure (that is approximately 8% of the overall area of the Haven). In volume terms, the tidal prism of the Haven is 4.8 x 10$^6$ m$^3$, of which the tidal volume upstream of the barrier structure is 3.8 x 10$^5$ m$^3$ (that is approximately 8% of the overall tidal prism).

**Freshwater inputs**

12.3.4 The main sources of freshwater inputs to the Haven are artificially maintained through sluice structures. Freshwater inputs include flows from the Lower Witham (upstream of Grand Sluice), the SFFD (at Black Sluice), Maud Foster Drain (and Sluice) and Hobhole Drain (and Sluice), until it eventually discharges into The Wash. The Haven is dominated by The Wash’s tidal and sediment regime. The SFFD outfall via Black Sluice is approximately 150m upstream of the barrier structure and the Grand Sluice is approximately 2km upstream.

12.3.5 Freshwater flows through these sluices are controlled by the Environment Agency (Grand Sluice, Black Sluice and Maud Foster Sluice) and the Witham Fourth Internal Drainage Board (Hobhole Drain). Grand Sluice, Black Sluice and Maud Foster Sluice are used to maintain water levels upstream (in the River Witham, SFFD and Maud Foster Drain), with lower water levels in the winter months. The higher water levels in the River Witham and SFFD during the summer are primarily for agricultural benefit but also permit recreational craft navigation in the River Witham and SFFD.

**Water levels and flow**

12.3.6 The MHWS and Mean Low Water Springs (MLWS) tide values have been taken from the existing ISIS model to provide a tidal range at four main sites within the study area.

12.3.7 High water occurs first at the estuary mouth and then progressively extends up the estuary as the tidal wave propagates upstream. There is very little variation in either height or time along the estuary. During a spring tide, the vertical tidal range in the Haven is 4.52m at Grand Sluice and 5.49m at Tabs Head. At the barrier structure, the tidal range is 5.24m. The estuary is classed as macro-tidal, that is, estuaries with a vertical range of more than 4m. The maximum velocities across the channel at the barrier structure range between 0 and 1m/s, and between 0 and 0.5m/s at entrance to the Wet Dock.

**Wave conditions**

12.3.8 The Haven is a sheltered estuary with limited influence of local wind action and offshore tidal waves (limited to lower reaches). Wave action has been considered as part of the barrier design, within the freeboard$^{20}$.

---

$^{20}$ Freeboard is an allowance within a design to account for factors such as wave action and modelling uncertainty.
12.3.9 The main influence of wave action is likely to come from commercial vessel traffic downstream of the barrier structure, up to the WDE, and by smaller vessels upstream of the barrier structure.

**Sediment supply and geomorphology**

12.3.10 The flow in the Haven is highly controlled with several sluices controlling the fluvial inflow and sources of sediment from upstream catchments. Sediment is also sourced from the mouth of the Haven at The Wash. Since the fluvial flows are restricted, the main source and influence of sediment is offshore inputs from The Wash. Sediment is mostly carried into the Haven on an incoming flood tide then is transported out of it on the ebb tide. This leads to sedimentation of the channel margins and river bed. High winter fluvial flows remove sediment build-up periodically. Desilting, via maintenance dredging is carried out by the PoB when required. Areas of mudflats are visible within the Haven at low tide.

12.3.11 The sediment regime in the Haven is predominantly controlled by an asymmetrical semi-diurnal tidal regime with a tidal range of approximately 5.2m. There is the potential for net sediment transport into the estuary during higher velocity flood tides, which settles out largely on the intertidal mudflats during the slack period between flood and ebb tides.

12.3.12 The Haven at the barrier structure is heavily modified and hard engineered walls create a trapezoidal form. Between Grand Sluice and the PoB, the channel is almost continuously confined on either side by a combination of vertical steel sheet piling and walls/wharves (brick and concrete). Downstream of the PoB, down to The Wash, the channel is still engineered with occasional fringing mudflat and saltmarsh giving it a more diverse (semi-natural) hydromorphology.

**Existing dredging regime**

12.3.13 Maintenance dredging has been carried out by PoB typically in the dry dock, the entrance to the Wet Dock and minor amounts along the riverside quays along the left bank. The PoB dredges approximately 28,000 tonnes of sediment per year from various locations within the Port and the Haven to maintain access for shipping (MMO, 2011). The annual licensed value is 60,000 tonnes.

12.3.14 The Haven has been historically modified for flood protection and navigation and is currently constrained by development on both banks and in particular through the town of Boston. The Haven is considered to be of medium value/sensitivity.

**12.4 Impact assessment**

12.4.1 This section summarises the significant effects (moderate or major) on the key water resources receptors identified as part of the impact assessment. However, some water resources receptors that were assessed as having only minor significant effects but were
identified as matters of interest during stakeholder consultation have been summarised below. The full impact assessment can be found in the ES (Volume 2b): Estuarine Processes and Geomorphology Technical Report; Chapter 5.

Construction effects

12.4.2 Based on the results of modelling carried out the assessment concluded that the Haven in terms of changes in the erosion and depositional regime would experience no significant effects, either temporarily or permanently from the construction of the Project.

12.4.3 The main impacts on estuarine processes and geomorphology during construction relate to changes in the erosion and depositional regime as a result of temporary works constricting the channel of the Haven. As the channel is a low energy environment, the additional constriction is not enough to significantly alter sediment mobilisation. The hydraulic modelling carried out for the Project indicated only minor changes during the temporary works. However, some scour protection would be required, as detailed in Chapter 2 of this Report. The impact on the Haven in terms of changes in the erosion and depositional regime has been assessed as temporary minor negative resulting in a temporary minor adverse effect, which is not considered to be significant.

Operational effects

12.4.4 The Haven is considerably constrained by engineered structures along its banks. The barrier structure and installation of sheet piles along both banks would not significantly change the overall morphological character of the waterbody but would reduce the morphological capacity of the waterbody and may result in localised changes to flow directions, sediment movement and refugia for benthic ecology. The impact on the morphological conditions within the Haven has been assessed as temporary moderate negative which results in a temporary moderate adverse effect, which is considered to be significant.

Mitigation measures

12.4.5 Following assessment of impacts, there are no significant adverse effects on estuarine processes and geomorphology identified during Project construction. However, the channel would be constricted due to the installation of the barrier cofferdam and Wet Dock cofferdam which are predicted to result in localised erosion and deposition. Therefore, bathymetric surveys would be carried out during the construction period, to determine the rate of erosion and deposition. This would act as an early warning to identify if actual erosion and deposition is exceeding predicted values. Should this be the case, further temporary erosion control and/or dredging would be carried out.

12.4.6 During Project operations, bathymetric surveys would be carried out during the early life of the barrier to identify the need for further channel maintenance and confirm permanent scour protection extents are appropriate.
Enhancements

12.4.7 Also, consideration would be given in detailed design towards softer measures to reduce the morphological impact from sheet piles. For instance; willow spilling, green bank reinforcement, facine mattresses; as detailed in the Environment Agency’s ‘Estuary Edges’ guidance. This is also applicable to measures used for erosion control. In particular, the guidance provides examples of modifying hard engineered structures such as sheet piling by fixing timber, providing additional habitat. This type of modification has the potential to be used at select locations as part of the Project, but requires more detailed assessment within detailed design, in order to assess the environmental gain against the cost.

Significant residual effects

12.4.8 After implementation of the mitigation measures, no significant residual adverse effects are envisaged on estuarine processes and geomorphology during Project construction and operation.

12.5 Summary

12.5.1 Following assessment of impacts, no significant adverse effects on estuarine processes and geomorphology were identified during Project construction.

12.5.2 Project operation would have a significant impact on localised changes to flow directions, sediment movement and refugia from the installation of sheet piles along both banks.

12.5.3 Bathymetric surveys would be carried out during the construction period. If actual erosion and deposition is exceeding predicted values, further temporary erosion control and/or dredging would be carried out.

12.5.4 Consideration would be given in detailed design towards softer measures (described in section 12.4. of this Report) to reduce the morphological impact from sheet piles as identified in the Environment Agency’s ‘Estuary Edges’ guidance. Also, bathymetric surveys would be carried out during the early life of the barrier to identify the need for channel maintenance.

12.5.5 There are no significant residual effects predicted on the estuarine processes and geomorphology assuming best practice and mitigation is implemented during the construction and operational phases.
13 Contaminated land

13.1 Introduction

13.1.1 This Chapter summarises the findings of the contaminated land technical assessment that was carried out for the Project (see the ES (Volume 2b): Contaminated Land Technical Report) and brings forward only the significant effects likely to be associated with the construction and operation phases of the Project. A full assessment can be found in the ES (Volume 2b): Contaminated Land Technical Report. The aim of the assessment was to characterise contamination routes surrounding the Project, assess the potential significant issues identified in the Project's Updated Scoping Report and to propose management and mitigation to minimise predicted significant impacts.

13.1.2 This Chapter does not consider Project impacts on flooding and surface water (see Chapter 11), or waste management (see Section 2.2).

13.2 Assessment methodology

Study area

13.2.1 The study area relevant to this assessment is the area of proposed construction works (see the Appendix A; Maps and Figures; Figures 1.1 and 1.2 of this Report). This includes both land based and in-channel elements, including all areas of proposed dredging (see Chapter 2 of this Report).

Desktop research

13.2.2 The contaminated land assessment involved desktop research and ground investigations.

13.2.3 To gather desk top information on the site, the following information sources and survey documents were reviewed:

- British Geological Survey (BGS) borehole scans (available via www.BGS.co.uk);
- BGS, Geology of the country around Kings Lynn and the Wash, NERC, 1994;
- The Environment Agency website, accessed March 2015;
- Interactive mapping of geographic information about the natural environment from the Multi Agency Geographic Information for the Countryside (www.magic.gov.uk); and
- Consultation with the Environment Agency and BBC.

13.2.4 The following survey documents are available for the site and were reviewed:

- WYG Environmental (WYG) Environment, Boston Barrier Phase 2 Ground Investigation (2012);
13.2.5 The following ground investigations (GI) have been carried out in the area of the Project:
- Soil Engineering (2010) - to inform initial geotechnical design considerations at two potential barrier locations and determine the condition of existing flood risk management measures. Investigations were completed on both the right and left banks in the barrier locations;
- WYG Environment (2012) - to facilitate design and construction of a new tidal barrier. Investigation locations were on both the right and left bank at the barrier location; and
- WYG Environmental (2014) - to obtain additional information associated with the land and water based aspects of the Project.

13.2.6 The scoping process for this Project was undertaken using professional judgement, based on our understanding of the baseline environmental conditions and methods by which the development would be constructed and operated. Where significant effects were identified in the Updated Scoping Report, these have been considered further in the ES. These are:
- Flooding;
- The disposal of potentially contaminated dredged material; and
- Remobilisation of potentially contaminated sediments during dredging and operation of the barrier with the potential to affect the Haven water quality and fauna and flora.

Significance of effects

13.2.7 The impact assessment was undertaken using guidance including the Environmental Protection Act 1990 (as amended) and associated guidance, and through use of the source-pathway-receptor methodology as identified in the CIRIA ‘Contaminated Land Risk Assessment, A Guide to Good Practice’ report (CIRIA C552, 2001) to identify significant pollutant linkages.

13.2.8 Sensitivity criteria were derived to take into account the nature of the receptor (construction workers, future site users, controlled waters and the build environment) as well as the period of exposure. The sensitivity of the receptor/resource is based on the value of the feature and is summarised in the ES (Volume 2b): Contaminated Land Technical Report; Table 3.1. Effects of contaminated land on identified receptors were assessed by taking into account the magnitude (expressed in terms of severity; high, moderate and low) (in the ES (Volume 2b): Contaminated Land Technical Report; Table 3.2). The combined effect of these factors is used to derive the severity of the effect (see the ES (Volume 2b): Contaminated Land Technical Report; Tables 3.3 and 4.3 for further information on methodology).
13.2.9  Major and moderate effects were classed as significant and these are discussed in this Chapter. All non-significant effects can be found in the Technical Report (see the ES (Volume 2b): Contaminated Land Technical Report).

13.3  **Baseline**

13.3.1  This section summarises the baseline conditions against which the impacts of the Project were assessed. A full assessment of baseline conditions can be found in the ES (Volume 2b): Contaminated Land Technical Report; Chapter 5.

13.3.2  Geology at the site comprises a variable depth of made ground underlain by Alluvium, Glacial Till and Kimmeridge Clay. The BGS geological mapping suggests that Oxfordian Age Ampthill Clay underlies the Kimmeridge Clay (see the ES (Volume 2b): Contaminated Land Technical Report; Section 5.1 for full descriptions and thicknesses of the strata).

13.3.3  Natural soils in the area of the Project comprise ‘loamy and clayey soils of coastal flats with naturally high groundwater’ (MAGIC, 2015). These soils are considered to be lime rich with moderate fertility. The agricultural classification of this area is ‘urban’ suggesting low sensitivity of soils.

13.3.4  The Alluvium and Glacial Till that underlie the site are classified as unproductive strata in terms of groundwater by the Environment Agency. There are no licensed groundwater abstractions or groundwater source protection zones within 1km of the Project. High water spring tides around the site are higher than the ground level which leads to tidal flooding. This area of the Haven fails chemical quality analysis (Environment Agency website, 2015).

13.3.5  Historical maps (Landmark, 2014) show the development of the port area on the left bank from 1888. The PoB was built in 1884, prior to the publication of the first edition of the Ordnance Survey (OS) maps of the area. Detailed information on the site history is included in the Mott MacDonald GIR in the ES (Volume 2b): Contaminated Land Technical Report; Appendix B.

13.3.6  Potential contaminative land uses at the PoB include:

- Aggregate depot located in the south of the PoB (2002);
- Ammonium nitrate storage adjacent in the south of the dock area (2003);
- Timber drying kiln in western area of the site (2006);
- Hazardous substance storage of ammonium nitrate in south eastern area of the PoB (2009); and
- Historic dock railway and hydraulic engine house, infilled historical channels, saw mill, iron works, oil depot, electrical substation and potential above/below ground tanks.

13.3.7  Other potential contaminative sources in the area identified from the Envirocheck report include:

- A historical landfill site approximately 230m to the north west of the left bank;
Made ground as a result of historical use of the area as a dock and construction and associated demolition works; and
Contemporary trade directory entries: agricultural merchants adjacent to the north and northwest of the site; oil fuel distributors approximately 100m to the south and distribution services approximately 200m to the south.

13.3.8 The 2014 ground investigation included a number of boreholes and window sample locations on the land based areas which would be affected by the Project (see the ES (Volume 2b): Contaminated Land Technical Report; Figure 4.1). It also included sediment sampling within the Haven in the vicinity of the barrier structure. The proposed area of capital dredging (the ES (Volume 2b): Navigational Impact Assessment Technical Report; Figure 4.1) includes an area downstream and a small area upstream of the barrier.

13.3.9 Environmental analysis was carried out on soil, groundwater and channel sediment samples. Results provided information on baseline contamination at the site (see the ES (Volume 2b): Contaminated Land Technical Report).

13.3.10 The Ground Investigation Report (Mott MacDonald, 2014d) contains chemical results from the left and right banks although mainly focusing on the left. A conceptual site model (CSM) and risk assessment are also included (the ES (Volume 2b): Contaminated Land Technical Report; Appendix B). Notable findings of the 2014 investigations are listed below:
- Localised areas of contamination were identified in soils at the site through visual inspection and laboratory analysis. Contaminants included asbestos, metals and Polycyclic Aromatic Hydrocarbons (PAH) within the made ground.
- The presence of Total Petroleum Hydrocarbons (TPH) was noted to be widespread across the site at low concentrations, generally marginally above detection and restricted to the made ground. The made ground was shown to be variable in depth and is present up to depths of 6.6m.
- Sediments were found to contain elevated levels of PAHs and localised exceedances of metals above CEFAS Action Level 1. Options for reuse of the dredged sediment being considered include backfill the flood embankments or capping at a landfill site (as a worst case). The sediment samples tested contained exceedances of metals including lead, copper, mercury and zinc when compared to Canadian sediment quality values but no exceedances of the current UK guidance values for commercial land use or public recreational areas were identified. Testing only included a small range of contaminants and further analysis would be required to assess suitability of the material for reuse.

13.3.11 Historical investigations were undertaken in 2010 and 2012 at the PoB. A summary of these investigations are included in the ES (Volume 2b): Contaminated Land Technical Report.
13.4 **Impact assessment**

13.4.1 This section summarises the likely significant effects on receptors identified as part of the full impact assessment. The impact assessment which identifies both likely significant and non-significant effects of the Project can be found in the ES (Volume 2b): Contaminated Land Technical Report; Chapter 5.

**Construction effects**

13.4.2 The identified potential pollutant linkages during Project construction are shown in Table 13.1.

<table>
<thead>
<tr>
<th>Source</th>
<th>Pathway</th>
<th>Receptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing made ground up to 6.6m thick. Identified presence of widespread hydrocarbons and localised metals, PAH and one positive identification of asbestos containing material</td>
<td>Direct contact and inhalation and ingestion of contaminated soil, sediment and water.</td>
<td>Construction workers</td>
</tr>
<tr>
<td>Presence of groundwater in the underlying Glacial Till or Alluvium. Historical landfill adjacent to the northern access road.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dredged sediment stored on land during drying</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential leaks and spills during construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing made ground up to 6.6m thick. Presence of widespread hydrocarbons and localised metals, PAH and one positive identification of asbestos containing material</td>
<td>Direct contact inhalation of dust or direct contact with perched water migrating off-site.</td>
<td>Adjacent site users</td>
</tr>
<tr>
<td>Potential leaks and spills during construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disturbance of sediment and storage of sediment on land during drying</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing made ground up to 6.6m thick. Presence of widespread hydrocarbons and localised metals, PAH and one positive identification of asbestos containing material</td>
<td>Surface water run-off or migration of perched water/leachate. Transport through manmade pathways (sheet piled walls)</td>
<td>The Haven</td>
</tr>
<tr>
<td>Potential leaks and spills during construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disturbance of sediment and storage of sediment on land during drying</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016

13.4.3 The impact to construction workers from the presence of contaminated made ground, ground gas and dredged sediment has been assessed as temporary moderate negative which results in a temporary moderate adverse effect, which is considered to be significant. No other impacts identified in Table 13.1 are considered significant.

**Operational effects**

13.4.4 Impacts were considered to the Haven, the site users of the proposed control building during operation. The identified potential pollutant linkages during operation are summarised in Table 13.2.
Table 13.2: Potentially active pollutant linkages identified

<table>
<thead>
<tr>
<th>Source</th>
<th>Pathway</th>
<th>Receptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of ground gas</td>
<td>Accumulation in proposed control buildings and subsequent inhalation. Explosive risk potential damage to buildings if accumulation of methane occurs</td>
<td>Site end users</td>
</tr>
<tr>
<td>Potential re-use of dredged sediment (off-site) and made ground</td>
<td>Surface run-off&lt;br&gt;Leaching&lt;br&gt;Transport through man-made pathways (sheet piled walls)</td>
<td>The Haven</td>
</tr>
<tr>
<td></td>
<td>Direct contact, ingestion, inhalation</td>
<td>Site end users</td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016

13.4.5 Impacts on control building users has been assessed as permanent moderate negative which results in a permanent moderate adverse effect. This significant impact is due to presence and potential accumulation of ground gas within the control building leading to potential explosive risk (see Table 13.2).

**Mitigation measures**

**Construction**

13.4.6 The following mitigation measures would be implemented during construction and are outline in the EAP:

- Tool box talks would be given to all construction workers at the site on potential presence of contamination including hydrocarbons and asbestos cement. Construction workers would be trained to identify these contaminants and any significant contamination would be reported.
- Where significant hydrocarbon or asbestos contamination is identified, a watching brief during construction by a suitably qualified specialist would also be implemented, if required.
- A method statement would be put in place in the event that significant contamination is encountered during construction; this would include methods of excavation, appropriate storage, testing and treatment/disposal options.
- PPE would be used appropriate to the task. This may include gloves, safety boots, eye protection and masks (if required).
- If working in excavations at the site, monitoring of ground gas levels would be completed and appropriate protective equipment used based on the monitoring.
- Dust suppression (including in sediment storage) would be included in selected construction methodologies;
- Inclusion within the EAP of information detailing the appropriate storage of fuels on site, including use of bunded tanks and spill kits;
Additional chemical analysis of sediment would be required to inform the risk assessment including a wider range of parameters to assess off-site re-use options and additional parameters to support transport to a dewatering site;

Collection of drainage water and treatment and/or disposal would be implemented during the sediment drying process. The treatment/ disposal options would be identified following additional sediment analysis;

Control building would be designed to include ground gas protection measures based upon best practice as set out in CIRIA C665 (2007), Assessing Risks Posed By Hazardous Ground Gas to Buildings - BBC’s Building Control and Environmental Health would be consulted with in this regard. The gas protection measures are the responsibility of the contractor, who would ensure installation of gas protection measures is closely managed, tested and validated by appropriately qualified persons; and

Surface water run-off is managed during any dewatering operations to ensure protection of surface waters in line with the European Union Water Framework Directive (2000) and associated UK River Basin Management Plans.

Operation

13.4.7 With the exception of control building users (where mitigation measures have been addressed in the construction mitigation measures (please see Section 13.4), no further significant impacts have been identified during operation. However, the following mitigation measure would be implemented:

- Incorporate appropriate ground gas protection measures and monitoring equipment within the design and construction of the building based upon best practice as set out in CIRIA C665 (2007), Assessing Risks Posed By Hazardous Ground Gas to Buildings.

Significant residual effects

13.4.8 No significant residual adverse effects are envisaged from contamination during Project construction and operation following implementation of the mitigation measures.

13.5 Summary

13.5.1 The ground investigation and desk study information obtained for the site have identified two potential significant effects relating to contaminated land associated with the proposed construction and operation of the Project:

- Impacts on construction workers associated with direct contact with contaminated made ground and presence of ground gas; and
- Impacts on site end users (control building users) associated with accumulation of ground gas in the control building and inhalation.

13.5.2 Materials management options would be considered for the site in terms of reuse or disposal of excavated soils and sediments. Additional chemical analysis of sediment, as detailed in
Section 11.5 of this Report, would be required to inform risk assessment and the required materials management plan.

13.5.3 Following the mitigation measures set out above, the significant effects would be reduced to non-significant.
14 Navigational impact assessment

14.1 Introduction

14.1.1 This Chapter summarises the findings of the navigational technical assessment that was carried out for the Project (see the ES (Volume 2d): Navigational Impact Assessment Technical Report) and brings forward only the significant effects likely to be associated with the construction and operation phases of the Project. A full assessment of the likely significant and non-significant effects, and baseline, can be found in the ES (Volume 2d): Navigational Impact Assessment Technical Report (NIA).

14.1.2 The aim of the assessment was to identify key access routes for all modes of transport on the river and identify locations on the navigable river which could be sensitive to changes in traffic flows, assess all potential issues identified through the scoping process and to propose mitigation measures to minimise the significance of these issues.

14.2 Assessment methodology

Desktop study

14.2.1 The main sources of information used for this desk study were as follows:
- General information collected, derived and assessed during concept design stage;
- Numerical modelling results carried out by Mott MacDonald technical specialists;
- Construction information provided by an independent contractor under Early Contractor Involvement (ECI) during concept design stage;
- Publicly available information; and
- Consultation feedback.

14.2.2 A site walkover was carried out on 13 August 2015 and included a meeting with the Harbour Master to establish navigation practices and constraints and with the PoB to identify their current operations, assets and potential impacts. Further meetings were held with the Harbour Master, PoB, BDFA and other stakeholders during the consultation period to discuss the NIA.

Consultation

14.2.3 Consultation has been ongoing since 2009 to assist in the development of the Project design and this ES.

14.2.4 Consultation focusing on navigation impacts was carried out for the NIA between August 2015 and May 2016. The consultation has been carried out to understand the views of the statutory bodies and stakeholders on the Project and identify what they consider to be the potential impacts to navigation during construction and the lifetime of the Project.

14.2.5 During construction, the stakeholders identified the anticipated increase in activity on the river as a key hazard both as a result of the change to PoB operations and construction activities.
During operation, the barrier location and width has been identified by consultees as challenging to those vessels with limited manoeuvrability and power. The need for a temporary mooring area for occasions when the barrier is closed was also identified as necessary to accommodate the vessels which need to traverse the barrier for commercial or recreational reasons.

**Study area**

The site application boundary (Appendix A; Figure 1.2 of this Report) defines the Project area. The study area for navigation impacts covers the waterway from the Grand Sluice to The Wash (i.e. the mouth of the Haven), including access to the PoB and upstream of the Haven as far as the Boston Gateway Marina.

**Significance of effects**


Impacts on navigation receptors, which were defined as the river users, were assessed using a consistent scale of sensitivity and magnitude.

The sensitivity has been scored using criterion ranging from low sensitivity to very high. The greater the business/safety/operation impact, and/or the lower the ability to adapt to the impact, the greater the sensitivity.

The geographical extent, the duration and the likelihood of occurrence of the impact have been considered to assess the magnitude of the impact. The magnitude of navigation impact incorporates a degree of subjectivity and it has been assessed based on professional industry experience in marine structures and navigation in combination with baseline data, consultation feedback from stakeholders and expert experience.

Significance of the impacts has been evaluated by combining the assessment of both magnitude and sensitivity. Significant effects in EIA terms are those that are major and moderate effects and those impacts are discussed in this Chapter. Impacts identified as minor adverse have not been considered significant and can be found in the Technical Report (see the ES (Volume 2d): Navigational Impact Assessment Technical Report; Chapter 4).

The assessment has reviewed construction impacts (temporary) and operational impacts (permanent) including maintenance operations.
14.3 **Baseline**

14.3.1 This section summarises the baseline conditions against which the impact of the Project was assessed. A full assessment of baseline conditions can be found in the ES (Volume 2d): Navigational Impact Assessment Technical Report; Chapter 5.

**Existing environmental conditions in the Haven**

14.3.2 The Haven is a fully tidal river downstream of the Grand Sluice. The ability to navigate through it safely is constrained by tidal variation, air draft (the clear headroom between the vessel and the bridge soffit) and underkeel clearance.

14.3.3 The Haven consists of the section of the River Witham between the Grand Sluice and The Wash. The channel width varies from approximately 20m to 90m along its length and is approximately 56m, measured from edge of visible mud flat bank at low tide and PoB quay wall at the works location. The bed level varies between -1.5mOD at Grand Sluice to -3.3mOD downstream of the PoB entrance.

14.3.4 The sediment regime in the Haven is predominantly controlled by an asymmetrical semidiurnal tidal regime with a spring tidal range of approximately 6.4 metres.

14.3.5 The tidal regime is made of comparatively rapid flood tides (5 hours) and longer ebb tides (7 hours).

14.3.6 Based on the vessel draft and bed bathymetry, small craft can safely pass through the barrier location when water level is at -0.5mOD. Below this level, the water level is too low to allow navigation.

14.3.7 Ebb flow velocities were numerically modelled by Mott MacDonald for a spring tide with a 2 year return period (i.e. likelihood of occurring in 2 years). The result has shown that the existing maximum ebb flow velocities within the vicinity of the PoB and the barrier structure vary from 0.2 knots to 1.8 knots during a Mean High Water Spring (MHWS) tidal event. The maximum flow velocity in the vicinity of the barrier when the water level is at -0.5mAOD is approximately 1.2 knots.

**Existing physical features**

14.3.8 The Grand Sluice acts as an artificial barrier to the tidal influences of the North Sea and The Wash and defines the upstream tidal limit of the Witham Estuary (also known as ‘the Haven’), (see the ES (Volume 2d): Navigational Impact Assessment Technical Report; Appendix A; Figure 4.2).

14.3.9 Boston Gateway Marina is located upstream of the Grand Sluice, offering short-term and long-term mooring for recreational boats.
14.3.10 The Grand Sluice operates between 0.0m AOD and approximately +1.45mAOD.

14.3.11 The Haven is connected to the west by the Black Sluice lock. The lock can accommodate boats up to 21 m long and 6 m wide. Summer retention water level in the Black Sluice Navigation is 0.0mAOD and the winter retention water level is of -0.6mAOD.

14.3.12 The navigable Haven is constrained by four bridges with limited headroom under bridges at high water and limited underkeel clearance at low water. The channel width around low water is also a constraint.

14.3.13 The Black Buoy Sand is located near the downstream entrance to the Haven. The sand bar is located at Tab’s Head (see the ES (Volume 2d): Navigational Impact Assessment Technical Report; Appendix A; Figure 4.1). The Harbour Master has confirmed that this feature has no impact on navigation.

**River users**

14.3.14 The river is primarily used by small recreational vessels, fishing vessels and commercial vessels. The main users of the river were identified as shown in Table 14.1.

<table>
<thead>
<tr>
<th>Table 14.1: River users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users</td>
</tr>
<tr>
<td>Commercial - PoB General cargo</td>
</tr>
<tr>
<td>Boston fishing fleet</td>
</tr>
<tr>
<td>Other commercial operators</td>
</tr>
<tr>
<td>Recreational - Sailing, motor boat owner and other non-commercial users.</td>
</tr>
</tbody>
</table>
Table 14.2 summarises the operating traffic pattern of the main users of the Haven. This information has been sourced from meetings, discussions and consultation with the Harbour Master, BDFA, PoB and other river users.

Table 14.2: Traffic pattern of the main users of the Haven

<table>
<thead>
<tr>
<th>Typical Fleet</th>
<th>Operating pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>General cargo (PoB)</td>
<td>All ships over 30m are required to enter the Haven with a pilot on board. Navigation between The Wash and the entrance of the Wet Dock takes about 1h.</td>
</tr>
<tr>
<td>Fishing vessel</td>
<td>Predominantly depart when water level is rising (flood tide) and return on the falling (ebb tide). Total trip is between 5-7 hours out in the Wash. Leave from the fishing quay located nearby London Road, downstream Swing Bridge. Journey takes up to 1 hour out to the Wash.</td>
</tr>
<tr>
<td>Sailing boat &amp; motor boat</td>
<td>Leave on the falling tide passing through Grand Sluice lock at, or soon after, the tide level in the Haven falls below 1.45m AOD such that they have sufficient time to travel down the Haven, clear the sand bar at Tab's Head and enter The Wash. Return is on the rising tide and is dictated by having sufficient time (to clear the sand bar, travel up the Haven and pass through the Grand Sluice lock before the tide level reaches 1.45m AOD.</td>
</tr>
<tr>
<td>Commercial passenger vessel</td>
<td>Maritime leisure cruises trips generally depart on a rising tide soon after the Grand Sluice lock opens at 0.0m OD when there is sufficient water draft in the Haven. The boat returns approximately 4.5 hours later on the falling tide and passes through the Grand Sluice lock before it closes at 0.0m OD.</td>
</tr>
<tr>
<td>Canoe (and non-powered vessel)</td>
<td>Variable</td>
</tr>
</tbody>
</table>

Communication/navigation aids

14.3.16 The Port Information Service is in operation for the control of shipping. Communication with the PoB can be done via VHF Channel 12. The PoB communicates using VHF radio to notify ship movements to all users.

14.3.17 The navigational channel from Tab's Head to Swing Bridge is marked by a series of fixed white lights alternating fixed and flashing red lights on the right bank and fixed and flashing green lights on the left bank.

14.4 Impact assessment

14.4.1 This section summarises the construction and operation effects, the mitigation measures and finally the significant residual impacts on the river users identified as part of the impact assessment during construction stage. The full construction stage impact assessment can be found in the ES (Volume 2d): Navigational Impact Assessment Technical Report; Chapter 6.
Construction effects

14.4.2 The significance of each impact has been reviewed against the PoB fleet, the fishing fleet, other commercial users such as tour operator and recreational boats, including the non-powered fleet.

14.4.3 During construction the assessment has shown that there would be significant effects as a result of:
- Reduced manoeuvrability, increased river traffic and reduced river width;
- Increased collision risk;
- Reduction in available quay length; and;
- River restrictions/closures.

14.4.4 The works would include construction activities and new structures within the navigable river channel. There would also be a large increase in river traffic as construction plant may comprise barges or safety craft and it is assumed that 90% of construction material for the Project would be brought to site by barge. 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.

14.4.5 Due to the increase in the number of vessels in the channel during construction there are increased risks of collision with construction plant and between users and with moored ships on the river berths. Smaller, less manoeuvrable craft may be more susceptible to that hazard. In addition, while the WDE works are ongoing all PoB commercial vessels would be turned outside the wet dock. This increase in the number of cargo ships turned outside the WDE increases the risk of collision with other users. Divers are likely to be required during construction which would pose additional safety risk to divers themselves and river users.

14.4.6 During construction the PoB’s available quay length would be reduced in order to upgrade the quay walls and the WDE. This would impact commercial vessel activities both inside and outside the Wet Dock and would lead to an associated reduction in port capacity. In addition, relocation of all PoB traffic to riverside berth during the closure of the WDE would impact PoB’s operation and in particular their berthing/unberthing operations.

14.4.7 It is anticipated that the installation of the barrier gate would be the only activity that would require the river to be closed to maritime traffic. It is currently estimated that the closure would be for up to two days; however, this would be confirmed during detailed design. Activities such as dredging and installation of scour protection would require navigation restrictions to be put in place for short periods of time, up to one hour at a time. Outside of these specific elements of work there may also be isolated restrictions on navigation where deemed appropriate by the works contractor and the Harbour Master.
14.4.8 The above impacts are considered significant for all receptors and range from moderate to major adverse. A detailed breakdown of the construction impacts are provided in ES (Volume 2d) : Navigational Impact Assessment Technical Report; Chapter 6.

Construction mitigation measures

Traffic management

14.4.9 A traffic management system introduced and managed by the Harbour Authority, would be in place prior to the installation of the by-pass channel to ensure safe navigation during the construction works. Additional mitigation measures such as safe mooring areas and any required navigation aids would also be in place as appropriate for the construction activities.

Communication with users

14.4.10 Communication with river users on the construction of the works would begin ahead of the commencement on site to ensure that users are aware of the works and the impact to navigation as well as the mitigation measures in place.

14.4.11 Information would be circulated to local stakeholders/river users to ensure that they are informed on a day-to-day basis. This would be achieved by setting up a contact list for distributing this information.

14.4.12 Daily communication between the marine contractors, the PoB and the Harbour Authority would be carried out to ensure vessel manoeuvres and construction barges movements are appropriately scheduled.

14.4.13 Daily communications with the river users would be undertaken throughout the construction works to allow for alternative arrangements to be made, if required. A programme of works would be produced prior to the construction phase being undertaken and communicated to the users and be continually updated if programme of works changes.

Lighting and navigation aids

14.4.14 All marine plant and exclusion zones would be clearly marked and lighted in accordance with maritime standards. Safety zones and exclusion zones for construction and operation as well as all navigation aids would be assessed and implemented based on consultation with Maritime Coastguard Agency and Trinity House.

14.4.15 Appropriate lights would be installed on all constructions works areas, indicating the presence of cofferdam, working platforms and dredger in use, to enable safe navigation for river users.

14.4.16 Lighting could be placed upstream and downstream the barrier that would turn on, when a vessel approaches from one direction on the bend, to warn vessels coming in the opposite
direction from around the bend to alter their approach to suit the circumstances. This would be reviewed as the design progresses.

Collision mitigation measures

14.4.17 Construction works would, where possible, be undertaken from the land to reduce the congestion of the river by machinery.

14.4.18 Minimum clearance between navigation and working areas or moored vessels would be further assessed and fast-time simulation and/or full bridge real-time simulation would be considered. Consultation would be carried out with the Harbour Authority during these simulations.

14.4.19 Safe mooring areas upstream and downstream of the bypass/barrier would be provided. Locations next to Black Sluice and Maud Foster Sluice are under review. These mooring areas would be provided with appropriate access to/from shore, mooring equipment and lighting, and water depth to ensure access. The impact of discharges from the Black Sluice on the mooring area locations would be further assessed. It is anticipated that these mooring areas could be used on completion of the works to allow safe mooring during the operations of the barrier.

14.4.20 To mitigate the collision risk through the by-pass the installation of leading guides/buoys upstream and downstream of the cofferdam, and/or donut fenders in front of the by-pass on either sides and/or rubbing strips on the by-pass edges to limit collision damage would take place. Measures would be appropriate for the range of vessels using the by-pass.

Relocation of fishing fleet

14.4.21 The fishing fleet would be provided with an alternative mooring location for the duration of the construction works. The PoB have agreed in principle that a quayside on the PoB Estate would be available to the fishing fleet for the duration of the barrier construction works.

14.4.22 Should the fishing fleet be relocated, most impacts identified would have a non-significant impact on the fishing fleet.

Relocation of the Witham Sailing Club

14.4.23 Witham Sailing Club would be provided with alternative moorings downstream of the barrier for the duration of the construction activities that impact their navigation. These are likely to be used when flow conditions are considered unsuitable.

14.4.24 Should the Witham Sailing Club be relocated, all construction impacts identified would have a non-significant impact on the recreational craft.
**Operational effects**


14.4.26 Once built and operational, the assessment has shown that the tidal barrier would result in significant effects as a result of:
- Reduced manoeuvrability and river width;
- Increased collision risk;
- River restrictions/closures;
- Reduction in available quay length; and
- Underkeel clearance restriction.

14.4.27 The barrier installation would reduce the channel width at the location of the barrier. This would result in a reduction in the available navigable channel width at high tide. This would lead to reduced manoeuvrability of all vessels in the vicinity of the barrier and potential requirement for one way traffic for larger vessels. In addition, any local increase in bed height as a result of sediment deposition could reduce manoeuvrability and increase the risk of collision and grounding.

14.4.28 The barrier may reduce visibility and have an impact on sight lines of all vessels navigating this part of the Haven. A reduction in visibility of the structure and barrier closure at night would increase risks of collision with the river users and structures. When navigating through the barrier at night or when it is closed at night as a result of an extreme tide warning there is a risk of collision with the barrier, other ships or ships moored on the riverside berths. Changes in velocity and risk of a vortex forming just south of the barrier tie-in may increase the risk of collisions. In addition, the new barrier has the potential to attract new river users who would be unaware of the risks associate with the new barrier and new navigation conditions.

14.4.29 During periods when the barrier is closed, river traffic is at risk of being trapped upstream or downstream of the barrier with no available waiting mooring areas.

14.4.30 The barrier is located at one of PoB’s berths thereby removing it from use for PoB vessels.

14.4.31 Any local increase in bed height as a result of increased sediment deposition could reduce the manoeuvrability of larger ships and increase the risk for collision and grounding. In addition, the bed level would be maintained at its current depth at the barrier location. However, the effect on a vessel impacting with a hard structure (if this is to occur) is likely to be more severe than an impact with the existing bed conditions.

14.4.32 The above impacts are considered significant for all receptors and range from moderate to major adverse.
Operation mitigation measures

Traffic management

14.4.33 A traffic management system would be identified to manage the navigation through the barrier. It is anticipated that a vessel traffic system (VTS) or local port service (LPS), managed by the Harbour Authority or a Navigation Authority and in collaboration with the Environment Agency, would be in place.

14.4.34 The Harbour Authority currently manages the traffic along the Haven and it is therefore foreseen that the Harbour Authority would manage the traffic through the barrier. The current procedures would be reviewed, agreed and implemented in agreement with the Environment Agency. The Environment Agency is responsible for flood control and would remain the operator of the barrier.

14.4.35 The traffic management system could be a simple radio system operated by a qualified staff. The system in place would be set out in agreement with the Harbour Authority, any Navigation Authority, Canal River Trust and the Environment Agency in a barrier operational document.

14.4.36 Provision of a navigation centre to support any requirements of a VTS adjacent to the barrier may be considered in future stages, from where the relevant Authority can control the barrier and broadcast information about the barrier and warning of closures. All vessels entering the control zone whether intending to transit through the barrier or not should seek permission to proceed or report their position to the navigation centre. This would be further reviewed as the design progresses in detailed design.

Communication with navigation users

14.4.37 The traffic management system would be in communication with other users such as the PoB, Grand Sluice and Black Sluice Authorities and river users as/if required.

14.4.38 To ensure safe navigation, a permanent control zone would be defined, encompassing the barrier. This zone would be marked by fixed notice boards showing warning notices. These boards would advise when the barrier would be closed and important messages.

Collision measures and safe mooring areas

14.4.39 Safe mooring areas upstream and downstream of the barrier would be provided. The preferred location is on the left bank of The Haven, within the Boston/Skirbeck urban area. It is located approximately 1.2km downstream of the barrier location and 3.2km southeast of the Witham Sailing Club base. These mooring areas should be provided with appropriate access to/from shore, mooring equipment and lighting, and water depth to ensure access.
14.4.40 To mitigate the collision risk through the barrier it is foreseen that, in addition to the communications system, collision mitigation measures such as: leading guides/buoys upstream and downstream of the barrier, and/or donut fenders in front of the barrier on either sides and/or rubbing strips on the barrier edges would be installed.

14.4.41 An impact protection system may be installed to mitigate collision with the structure. The system may consist of jarret energy absorption units connected to floating cables.

**Lighting and navigation aids**

14.4.42 Navigation aids would be assessed, defined and implemented to reduce the risk of collision, particularly at night time.

14.4.43 Special lighting could be placed upstream and downstream the barrier that would turn on, when a vessel approaches from one direction on the bend, to warn vessels coming in the opposite direction from around the bend not to approach. This would be reviewed as the project definition increases.

14.4.44 In situations of low visibility, the use of racons is advised and would be reviewed. These would have to be fitted to the upstream and downstream ends of the piers to assist mariners in identifying and passing through the barrier.

14.4.45 Sailing Instructions would be revised to include the new Project, including all communication systems, time restriction and new navigation aids.

14.4.46 A notice to mariners would be issued should there be any significant change to the flows or position of the channel along the Haven.

**Maintenance activities**

14.4.47 Regular hydrographic surveys would be undertaken to monitor the bed levels in the Haven as part of the PoB maintenance dredging campaign. Regular maintenance dredging would be undertaken to reduce the potential effect of accretion.

14.4.48 The barrier would be subject to regular closures for maintenance and testing purposes. Therefore, a maintenance programme of closures of the barrier gate would be produced typically every 6 months in advance and circulated to all Haven users. The programme should contain specific dates and times of barrier closures for maintenance and inspection checks.
**Significant residual effects**

**Construction**

14.4.49 With the implementation of the mitigation measures it is anticipated that all the significant effects would be reduced to non-significant apart from:

- Increased collision risk – risk of collision with moored ships on river berths by vessels utilising the bypass as a result of increased in-channel activities; and
- Reduction in available quay length – progressive closure of riverside berths and relocation of all PoB traffic to riverside berth during the closure of the WDE would impact PoB’s operation and require all commercial vessels to be turned outside the WDE.

14.4.50 The NIA has shown that the dredging and the left bank works would result in obstruction of navigational activities which would result in significant residual effects to the river users. Impacts include potential closure of the traffic for short periods which could be managed through relocating the fishing fleet, providing alternative moorings for small craft and through appropriate programming with a residual impact considered not significant.

**Operations**

14.4.51 The only remaining significant impact would be the impact to PoB’s quay length and operations. Once the barrier is in place a section of quay wall would not be useable to moor and offload vessels although the landside areas would remain useable. Alongside this, the widening and other improvements to the WDE would have long term positive effects on PoB’s operations.

14.4.52 Additional hydraulic numerical modelling would be considered at the detailed design stage and during operation to ensure that the changes in flow velocities through the by-pass are further assessed and the significance of the discharges from both the Black Sluice and Grand Sluice are assessed.

**14.5 Summary**

14.5.1 Construction of the Project is likely to result in significant residual adverse impacts to commercial and recreational river users which would be managed through an appropriate programming of the works, installation of aids to navigation, collision protection measures appropriate to the range of river users, and implementation of effective communication between the Harbour Authority, Canal River Trust, Environment Agency, the works contractor and river users. In addition, there would be a provision of moorings upstream and downstream of the tidal barrier for use by those affected by river closures during construction. Additionally, the Witham Sailing Club and fishing fleet would be re-located as part of the enabling works.

14.5.2 For the operational phase of the Project, the significant impacts would be reduced to non-significant when appropriate mitigation measures are implemented. The reduction of PoB’s
quay length available for berthing is considered the only significant residual impact for operation; however, this is offset by the widening of the WDE.
This page has been left intentionally blank.
15 Traffic and transport

15.1 Introduction

15.1.1 This Chapter summarises the findings of the traffic and transport technical assessment that was carried out for the Project (see the ES (Volume 2d) Traffic and Transport Technical Report) and brings forward only the significant effects likely to be associated with the construction phase of the Project. The operational phase was not considered to result in significant impacts and was therefore excluded from further assessment during the scoping process. An assessment of the likely significant and non-significant effects, as well as baseline can be found in the ES (Volume 2d) Traffic and Transport Technical Report.

15.1.2 The aim of the assessment was to identify key access routes for all modes of transport within the designated study area and identify locations which could be sensitive to changes in traffic flows, assess all potential issues identified through the scoping process and to propose mitigation measures to avoid or reduce those effects. This Chapter summarises those issues identified as being significant (major or moderate) and proposes mitigation to address them.

15.2 Assessment methodology

15.2.1 The assessment of traffic and transport focused on the on-land traffic and transport related impacts. The navigation assessment within the Haven has been addressed in Chapter 14 of this Report and ES (Volume 2d): Navigation Impact Assessment. The assessment of on-land traffic and transport impacts involved a combination of desktop research supported by surveys.

Desktop research

15.2.2 A desktop study (see the ES (Volume 2d) Traffic and Transport Technical Report; Chapter 2) was carried out in order to identify the baseline traffic and transport conditions and relevant information related to all modes of transport and the key access routes which helped to shape the proposed study area to be assessed within this Chapter. A full list of references used to prepare the Report can be found in the ES (Volume 2d) Traffic and Transport Technical Report; Chapter 7.

Surveys

15.2.3 Surveys used to inform the assessment included a site visit and the installation of Automatic Traffic Count (ATC) equipment at sites around the study area.

15.2.4 A site visit was undertaken on 10 September 2015 around the surrounding area related to both sides of the Haven. This visit involved the identification of key infrastructure assets including bus stops, footpaths and cycle routes and allowed for an informed assessment of the condition of these assets to be made. The visit also allowed for observations regarding pedestrian and cyclist movements and timing of these movements to be made.
15.2.5 ATC equipment was installed at 11 sites for a period of one week around the relevant highway network (see the ES (Volume 2d) Traffic and Transport Technical Report; Appendix A: Figure 4.1) between 12 and 18 September 2015. The information recorded by the ATCs was used to establish a 2015 neutral month (which was agreed with LCC) set of traffic flows for the area surrounding the proposed development site, from which to forecast future traffic growth.

Consultation

15.2.6 Agreement was sought for the position of ATC equipment around the highway network from LCC Highway Development Control Department on 4 September 2015. During this consultation it was confirmed that the proposed study area for this assessment was appropriate and that key receptors were included.

Study area

15.2.7 The study area for this assessment includes key highway links and links supporting sustainable modes including walking and cycling, as well as key assets which may be impacted by the proposed changes (see the ES (Volume 2d) Traffic and Transport Technical Report; Appendix A; Figure 2.1) within the study area. The area takes into account the Air Quality Management Area situated to the north of the development along A16 John Adams Way.

Significance of effects

15.2.8 The traffic and transport baseline assessment identified the key receptors which have the potential to be impacted by the Project (see the ES (Volume 2d) Traffic and Transport Technical Report; Chapter 4). Using values which have been assigned based on definitions contained in the ES (Volume 2d) Traffic and Transport Technical Report; Table 2.1, each receptor was categorised based on their value in relation to traffic and transport.

15.2.9 Impact categories, specific to traffic and transport were identified as part of this assessment and the potential level of magnitude associated with these impacts was defined, for both adverse and beneficial scenarios, related to the Project. This was evaluated by how much the Project was likely to, either beneficially or adversely, alter the assets value. The impact was then assigned based on the definitions in the ES (Volume 2d) Traffic and Transport Technical Report; Chapter 2, Table 2.2. To ascertain the overall effect of the Project on key assets related to traffic and transport, and to allow comparison with the other environmental impacts within the EIA, the magnitude of impact was cross referenced with the value of the asset. This is set out in the ES (Volume 2d) Traffic and Transport Technical Report; Chapter 2, Table 2.3.
15.3 Baseline

15.3.1 This section summarises the baseline conditions against which the impact of the Project were assessed. A full assessment of baseline conditions can be found in the ES (Volume 2d) Traffic and Transport Technical Report; Chapter 4.

Vehicular access

15.3.2 Key roads identified within the study area are noted as being the A52 Queen Street which provides connectivity to the north west of Boston and the A16 Spalding Road/John Adams Way which connects through Boston in a south-west to north-east direction.

15.3.3 Local road access to PoB is via St John’s Road, which connects to A16 John Adams Way on the left bank at a signalised junction to the north. Access to the right bank of the Haven is via Marsh Lane which connects the Riverside Industrial Estate and residential area to the A16 Spalding Road at an unsignalised roundabout.

Locations of importance

15.3.4 The following locations of importance were identified following a site visit to the area as having the potential to be impacted by the proposed development:

- Royal Mail Depot on A1138 South End;
- Riverside Industrial Estate on Marsh Lane;
- Witham Sailing Club;
- Bath Gardens residential properties on South Terrace and local park;
- Residential properties on Wyberton Low Road;
- Boston College on Skirbeck Road;
- Port of Boston Limited on St John’s Road; and
- Recreational area on St John’s Road.

15.3.5 See the ES (Volume 2d) Traffic and Transport Technical Report; Section 4.3 for a full description of these locations.

Public transport

15.3.6 Key bus services which follow routes and have bus stops within the identified study area are included in the ES (Volume 2d) Traffic and Transport Technical Report; Section 4.4. These services provide connectivity to Boston Town Centre including the bus station and further afield to Kirton and Spalding.

Public Rights of Way (PROW) and cycle routes

15.3.7 Key PRoW and cycle routes within the study area are identified in the ES (Volume 2d) Traffic and Transport Technical Report; Section 4.5 and 4.6.
15.3.8 The Boston Public Footpath No.14 (Macmillan Way) is part of a long distance route (the Macmillan Way) which connects Lincolnshire to Dorset. The route follows the right bank of the Haven to London Road via Wyberton Low Road. The ES (Volume 2d) Traffic and Transport Technical Report; Appendix A; Figure 4.4 provides an overview of PRoWs within the study area.

15.3.9 Other PRoWs providing local connectivity between key locations identified above include footpaths along Marsh Lane and St John’s Road.

15.3.10 The route of National Cycle Route 1 provides a long distance connection between Dover and the Shetland Islands, but more locally to this development provides a connection for cyclists along Marsh Lane, Wyberton Low Road and London Road within the study area. The ES (Volume 2d) Traffic and Transport Technical Report; Figure 4.3 outlines the route of this cycle path within the study area.

15.4 **Impact assessment**

**Construction traffic trip generated**

15.4.1 HGVs would be used to deliver premixed concrete and remove dewatered dredged material from the construction compounds. It is anticipated that 90% of construction materials (excluding premixed concrete) would be delivered via barge to the construction compounds. This would minimise traffic effects on local road users that are typical of this type of development.

15.4.2 Construction traffic from the left bank compound is expected follow St John’s Road onto the A16 and A52, and HGV traffic from the right bank construction compound would follow Marsh Lane onto the A16.

15.4.3 During the first full year of construction in 2018 a total of approximately 34,800 total two way vehicle movements are estimated, and broken down as follows:
- 53% cars;
- 31% HGVs;
- 8% crew bus; and
- 8% delivery vans.

15.4.4 The profile of monthly vehicle movements across the construction period, including pre-construction capital dredging (Phase 1) has been estimated and is summarised in Plate 15.1.
Plate 15.1: Predicted monthly vehicle movements to the Project during construction

Source: Mott MacDonald 2016
15.4.5 The combination of activities associated with all stages of construction would result in a significant moderate adverse temporary effect, resulting from additional construction related traffic, leading to an increase in Average neutral month Daily Traffic (ADT) flow on St John’s Road. The introduction of construction traffic here has been forecast to increase traffic flows by 7% in 2018. This increase, whilst not considered significant in Institute of Environmental Management and Assessment (IEMA) guidance could affect journeys made by local residents to and from properties on Bath Gardens and Wyberton Low Road, as a result of increases in delays when accessing their properties particularly during specific construction activities including the removal of dewatered material.

**Significant receptors**

15.4.6 This section summarises the significant impacts for the sensitive receptors on the following roads/routes; South Terrace, recreation area near St John’s Road and Skirbeck Road, Wyberton Low Road, National Cycle Network Route 1 and the Boston Public Footpath No.14 (Macmillan Way).

15.4.7 No increase in traffic flow has been forecast to occur on South Terrace during the construction of the Project. However, due to the potential for intense periods of construction activities, particularly the removal of dewatered dredged material over 24 hour periods, a worst case has been considered which would result in a potential moderate adverse effect for residential properties on South Terrace. The proximity of the recreation area to St John’s Road and Skirbeck Road and the additional construction traffic related movements which are forecast along St John’s Road would have a negative effect on users’ perception of this recreation area. Users may perceive the additional construction traffic on the road as having the potential to negatively alter road safety in this area and the perception of severance may lead to a reduction in general enjoyment of the recreational area. This would result in a potential moderate adverse effect.

15.4.8 Similarly to residential properties located on South Terrace, no increases in traffic flows are forecast to occur on Wyberton Low Road as a result of the construction of the Project. However, due to the intense nature of the construction movements concerning removal of dewatered dredge material over 24 hours periods a worst case has been considered which would result in a potential moderate adverse effect for residential properties on Wyberton Low Road.

15.4.9 Vehicular access to residential properties located on the northern segment of Wyberton Low Road would be restricted during the diversion of electricity cables over 10 weeks in the 3rd and 4th Quarters in 2017. Access would be restricted and a diversion and/or parking restrictions would be put in place. Residents may experience an additional delay seeking to access their properties during this period. This has the potential to result in a moderate adverse effect for these receptors.
15.4.1 Cyclist access would be maintained on Wyberton Low Road during the diversion of the three 11kv electrical cables to reduce disruption to users of the National Cycle Network Route 1. The construction works would negatively alter the relative pleasantness of the cyclists’ journey along this section of the route and therefore it is anticipated to result in a minor adverse effect for these receptors.

15.4.2 The closure and diversion of the Boston Public Footpath No.14 (Macmillan Way), which would be diverted throughout the entirety of construction the Project, would result in a significant impact. This would require pedestrians to be diverted towards footpaths which are adjacent to construction traffic routes. This would negatively alter the relative pleasantness of their journey particularly during peak construction periods involving the removal of dewatered dredged material. This would result in a potential moderate adverse effect for these receptors.

15.4.3 The assessment of both likely significant and non-significant impacts can be found in the ES (Volume 2d) Traffic and Transport Technical Report; Chapter 3; Chapter 5.

Mitigation measures

15.4.4 A framework Construction Traffic Management Plan (CTMP) has been produced, and would be updated by the appointed contractor in agreement with LCC. This document would be a key tool to introducing appropriate mitigation measures which reduce negative impacts associated with construction traffic generated by the Project. The framework CTMP is provided in ES (Volume 2d) Traffic and Transport Technical Report; Appendix B and would include following mitigation measures:

- Vehicle movements would be scheduled wherever possible to avoid peak traffic periods to reduce traffic delays;
- Appropriate signage would be put in place and information provided to local residents and businesses regarding the closure of Wyberton Low Road;
- Appropriate signage would be used to ensure drivers use the agreed routes to and from the construction sites in order to prevent impact on local side roads;
- All delivery vehicles would be unloaded within the site compound boundaries to avoid disruption on adjacent public highways to both sites;
- An appropriate area within or close to the site compounds would be identified for HGV delivery vehicles to layover and turnaround in order to limit disturbances outside the site; and
- The diversion of the Boston Public Footpath No.14 (Macmillan Way) would be agreed as part of the TWAO and, where appropriate, information on arrangements would be distributed to local residents and businesses.

15.4.5 It is anticipated that the appointed contractor would supply the appropriate number of crew bus(es) throughout the construction period, to pick up 80% of workers (local and regional) and bring them to and from both construction compounds in order to reduce the number of additional private car trips that could be generated by the construction of the Project.
15.4.6 The framework CTMP would be used to monitor and assess mitigation measures across the whole construction period. On appointment of a contractor all information in the framework CTMP would be confirmed and agreed with LCC and BBC.

15.4.7 The contractor would produce a finalised CTMP which is to be approved by BBC prior to any works commencing on site.

15.4.8 To mitigate the impact of the proposed closure and diversion of the Boston Public Footpath No.14 (Macmillan Way), appropriate signage should be put in place and/or information regarding the diversion with details to be distributed to the local residents and businesses. It is intended that the Boston Public Footpath No.14 (Macmillan Way) would be returned to its existing route and improved after construction.

15.4.9 If any modifications or diversions are required to the highway, PRoW, cycle and access routes during the construction phase, they would be returned to their existing condition or better upon completion of the Project.

15.4.10 For all the key receptors identified above, none would experience significant temporary or permanent effects on traffic and transport as a result of the Project construction phase following the implementation of mitigation measures identified in this section.

15.4.11 The proposed mitigation measures would reduce the impact of construction related traffic movements on delays to journey times within the highway network peak hours and would also ensure that pedestrians are provided with alternative access for the periods that the footpath route are closed during the construction period. The production of a framework CTMP would be a key mitigation measure that would ensure that the construction process for the Project is carried out in agreement with BBC and LCC and contributes to the reduction of impacts on key receptors including local businesses, residents, road users and pedestrians.

**Significant residual effects**

15.4.12 No significant residual adverse effects are envisaged for traffic and transport during Project construction and operation.

**Enhancement**

15.4.13 The Environment Agency would work with BBC to erect 1.2m high wrought iron (or similar) fencing to fill in the gaps along the boundary of the recreation area adjacent to St John’s Road. This would enhance the safety for the users of the recreation area by reducing the risk associated with traffic travelling along St John’s Road both during construction of the Project and the continued operation of PoB Estate.
15.5 **Summary**

15.5.1 The traffic and transport impacts associated with the Project would be temporary in nature. The following five receptors have the potential to be significantly adversely affected during the construction phase before implementation of mitigation measures:

- Residential properties on South Terrace (Bath Gardens);
- The recreation area and businesses located on St John’s Road;
- Residential properties on Wyberton Low Rd and Marsh Lane concerning capacity;
- Residential properties on Wyberton Low Rd concerning access; and
- Public footpath along the Haven bank Boston Public Footpath No.14 (Macmillan Way).

15.5.2 A framework CTPM (see ES (Volume 2d) Traffic and Transport Technical Report: Appendix B) has been prepared and submitted as part of this ES. This outlines the mitigation required to reduce the anticipated adverse effects. This would be developed by the appointed contractor and agreed with BBC and LCC prior to commencement.

15.5.3 It is concluded that there would be no significant residual effects during the construction of the Project concerning traffic and transport impacts following mitigation.
This page has been left intentionally blank.
16 Air quality

This Chapter has been left intentionally blank as there were no likely significant effects identified by the assessment during construction or operation. Please see the ES (Volume 2d) Air Quality Technical Note for the detailed assessment.
17 Community

17.1 Introduction

17.1.1 This Chapter characterises the socio-economic profile of the community and community assets in the vicinity of the Project. It assesses only the potential significant effects identified in the Project’s Updated Scoping Report (2014) and proposes management and mitigation to minimise predicted significant impacts.

17.1.2 Potential significant effects arising from environmental aspects already assessed (particularly Chapter 7: Landscape and Visual Impact Assessment, Chapter 9: Noise and Vibration Impact Assessment, Chapter 14: Navigational Impact Assessment, and Chapter 15: Traffic and Transport Impact Assessment within this Report), have been addressed in detail in these Technical Chapters and Technical Reports.

17.2 Assessment methodology

17.2.1 The community assessment involved desktop research and appraisal of feedback from community consultation.

Study area

17.2.2 The study area is the wider Borough of Boston. However, due to their proximity to the Project, residential areas and assets immediate to the site boundary (see Appendix A; Figure 1.1 of this Report) were considered more relevant to this assessment.

Desktop research

17.2.3 A desktop study was informed by relevant demographic data and local planning documents to characterise the socio-economic profile and strategic aspirations of the area.

Consultation

17.2.4 Knowledge of Boston has been gained over a considerable period of time to inform this assessment. Feedback from the community was informed by public open forum events (2011 and 2012) and from the Environmental Agency Project’s community hub that was opened in August 2015.

17.2.5 A summary of the community consultation carried out to date can be found in Section 5.3. For a more in-depth appraisal of consultation please see Appendix C and D of this Report.

Impact assessment methodology

17.2.6 The methodology used to assess the significance of impacts follows the EIA industry standard approach as described in Section 3.2 of this Report.
17.2.7 The sensitivity of receptors is governed by their capacity to cope with change, which ultimately reflects their vulnerability; that is their access to, or control over, additional or alternative resources of a similar nature. High, medium and low sensitivity are defined in Chapter 5; Table 17.1.

Table 17.1: Sensitivity of receptors

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>A vulnerable receptor with very little capacity and means to absorb changes</td>
</tr>
<tr>
<td>Medium</td>
<td>A non-vulnerable receptor with limited capacity and means to absorb changes</td>
</tr>
<tr>
<td>Low</td>
<td>A non-vulnerable receptor with sufficient capacity and means to absorb changes</td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016

17.2.8 The level of significance is a product of the magnitude of an effect and the sensitivity of the receptor that is experiencing the impact. The level of significance matrix adopted for this ES is applicable for this community assessment (see Table 17.2).

Table 17.2: Significance matrix

<table>
<thead>
<tr>
<th>Magnitude of impact (adverse or beneficial)</th>
<th>Sensitivity of receptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016

17.2.9 Major and moderate effects (adverse and beneficial) identified during Project construction and operations were classed as significant.

17.3 Baseline

17.3.1 This section summarises the baseline conditions against which the impacts of the Project were assessed.

Socio-economic profile

17.3.2 The population of Boston in 2014 is estimated to be 66,500 which represents an increase of 600 people (0.9%) from 2013-2014, and an increase of 8,400 people (14.5%) from 2004-2014 (LRO, 2015). This level of population growth over 10 years (2004-2014) is significantly higher than seen across North Lincolnshire (7%), the East Midlands region (8.1%) and England (8.2%).
17.3.3 The black and minority ethnic (BME) population of Boston accounts for nearly 9% of the total population in 2014, up from 1.5% in 2001.

17.3.4 There are relatively high levels of deprivation in Boston. The wards of Witham, Central and Skirbeck have been ranked within the top 20% of the most deprived wards in England based on the Index of Multiple Deprivation. These wards are located within the area currently at risk from flooding.

17.3.5 Long term unemployed in Boston is currently at 7.5% which is above the national average of 5.2% (ONS 2015).

**Tourism and recreation**

17.3.6 Boston has many historical and tourist attractions. The town has a historic centre which is a designated conservation area (See Chapter 6 of this Report) and serves as an important tourist attraction for the area.

17.3.7 Tourism in the wider area includes the Freiston Shore RSPB reserve and the newly opened navigation link from Black Sluice through to the SFFD, as part of the Fens Waterways Link.

17.3.8 Moorings for recreational boats are available on the Lower Witham, a short distance upstream of Grand Sluice. The Witham Sailing Club is based on this part of the river. Stretches of The Haven are also used by anglers for recreational fishing and tourists can take leisure cruises up the River Witham or out to sea from Boston.

17.3.9 The Boston Public Footpath No.14 (Macmillan Way) follows the crest of the embankment along the right bank of the Haven, downstream of Black Sluice. This forms part of the wider Macmillan Way long distance route, from Boston to Dorset. This footpath serves as a high value local community asset and the Boston Public Footpath No.14 (Macmillan Way) is of medium regional value. National Cycle Network Route number 1 is a long distance route connecting Dover and the Shetland Islands. It passes through Boston along both Wyberton Low Road and London Road. The route follows Wyberton Low Road on the south side of the Haven before turning onto Marsh Lane and then London Road.

17.3.10 In this area, the cycle route is accommodated as part of shared use footways. There is a segregated cycle lane at the junction from London Road onto Wyberton Low Road. This cycleway serves as a high value local community asset and is of medium regional value. A disused hoist sits along the right bank and is not open to the public. Local stakeholders advised that this structure posed a risk to community safety as older children and young adults trespass the structure to dive into the Haven. The disused hoist is of low local value.
Residential

17.3.11 The following residential areas immediate to the site boundary have been considered in the baseline (an average household size of 2.2 persons per dwelling for Boston has been used to estimate approximate population numbers):

- Wyberton Low Road – has approximately 78 properties (172 residents) situated at the rear of the right embankment which has a mixture of terrace, semi-detached and detached properties;
- Marsh Lane – has approximately 10 residential (22 residents) properties, but primarily facilitates access to other residential streets, such as Wyberton Low Road, and large industrial estates to the east. As a result the road has a high volume of traffic, for residential users, but also for HGVs visiting the industrial site area to the east; and
- St John’s Road, Skirbeck Road, South Terrace junction – has approximately 17 residential properties (38 residents) situated around the on the left bank adjoining the Project.

17.3.12 These areas were significantly affected by the Boston floods of 2010 and 2013 and have high value sensitivity.

Community health

17.3.13 Research has shown that flooding events can have damaging impacts upon people’s health and general well-being many months after the event and are considered more significant than financial losses, which can potentially be recovered through household insurance policies (Tapsell et al., 2002).

17.3.14 After a flood event, local capacity to support victims (General Practitioners’ practice and receiving support services) are quite often stretched with long waiting times. Therefore, the severity of the impact represents the degree to which the coping and support capacity are insufficient to cope with the challenge and the costs of responding. Research suggests that psychological effects from flooding can continue for many month or years after the event with many people finding it difficult to cope with another flood and the associated impacts it would have on them and their households (Boscarino, 1997 and Tapsell et al., 2002).

17.3.15 The extreme storm tide in 2013 was the largest since 1953 and 70cm higher than the 1953 event. Approximately 720 homes and businesses were flooded (mainly in Boston) and 1,700 hectares of agricultural land were inundated. There was £8.1m worth of damage to infrastructure (East Midlands Councils, 2015). Drawing on examples from flooding events in the UK, leading issues raised post-flood include:

- The loss of irreplaceable and sentimental personal items;
- Poor physical health conditions due to contact with contaminated water and living in damp and water logged environments;
- Poor mental health conditions, such as increased stress;
- Individuals taking time off to recover and therefore the associated loss of income; and
People having to fight for any advice and assistance in the recovery process.

17.3.16 Therefore, the effects of the 2013 flood had significant implications for people’s health and well-being.

17.3.17 Since 2013, BBC and LCC have worked with the Environment Agency, Internal Drainage Boards and local communities around the Wash on a Defra-funded Coastal Change Adaptation Pathfinder (2009) which included a project to improve information and communication with communities at risk of coastal flooding \(^{21}\). The awareness campaign continues annually, recently modified to take account of the 2013 extreme tide event.

17.3.18 The capacity of response authorities to better respond to the December 2013 extreme tide was in part informed by detailed research undertaken through the coastal pathfinder to understand better the diverse nature of coastal communities and the most effective ways of establishing and maintaining dialogue with them. The key conclusions were that Lincolnshire was:

- Better protected (by and large the defences and drainage system did their job);
- Better prepared (responders got ahead of the extreme tide and responded well to a late developing threat); and
- Better informed (households, businesses and key partners benefited from accurate forecasting and flood warnings). (East Midlands Councils, 2015).

17.3.19 Many lessons were learned from the event, which tested the capacity and resilience of partners to the limit. However, the Project is seen as a vital piece of missing infrastructure in terms of flood protection works.

17.3.20 Residential properties on Wyberton Low Road, business premises off Lealand Way and grain storage silos at the PoB are all in close proximity to the proposed construction site, and may be sensitive to any increase in dust and air pollution. However, no information is available on baseline dust levels in the study area. Air quality was not considered a topic scoped in during the scoping stage and therefore, is not considered to result in significant adverse effects.

17.3.21 BBC has one Air Quality Management Area (AQMA) in close proximity to the Project and this relates to traffic on the main route through Boston. Results of the air quality monitoring carried out in 2013 conclude that all sites outside of the existing two AQMAs declared in Boston are still below the NO\(_2\) annual mean objective. Also, the results from 2011 to 2013 generally show stable concentrations at all monitoring sites with no clear trend over the three years (BBC, 2014).

---

17.4 Impact assessment

17.4.1 This section outlines the potential predicted significant effects during Project construction and operation on the community and assets. Non-significant effects which are considered important or in the interest of the public have also been included in this section.

Construction effects

17.4.2 The Boston Public Footpath No.14 (Macmillan Way) would be closed during the construction period. This would affect local and regional users, especially local users, who do frequent the footpath due to its close proximity and is a value community asset. The impact on local and regional users of the closure of the Boston Public Footpath No.14 (Macmillan Way) has been assessed as temporary major negative which results in a temporary moderate adverse effect, which is considered to be significant.

17.4.3 Cyclist access would be maintained on Wyberton Low Road during the diversion of the three 11kv electrical cables to reduce disruption to users of the National Cycle Network Route 1. The construction works would negatively alter the relative pleasantness of the cyclists’ journey along this section of the route and therefore it is anticipated to result in a minor adverse effect for these receptors.

17.4.4 The disused hoist would be deconstructed and removed potentially via barge to a local recycling centre. Material would be recycled where possible. The impact of the removal of the disused hoist on local and regional users of the Boston Public Footpath No.14 (Macmillan Way) footpath has been assessed as permanent moderate positive which results in a permanent minor beneficial effect, which is not considered significant. However, it would remove the risk to safety posed to young children and adults in the area.

17.4.5 The construction programme is anticipated to be approximately 2 years. It is anticipated that the contractor would source local labour during the construction and would also provide training and/or apprenticeships to upskill the local labour market. This would be considered to be a medium magnitude of impact for the local workforce which has a high sensitivity, resulting in a moderate positive significant effect.

Community Health

17.4.6 The Contractor would ensure that construction workers are made aware of the flood risk on site and that an evacuation plan is in place to ensure the safety of workers in the event of a flood. However, it would be necessary to maintain the current flood warning for Boston residents during the construction period because the upper Haven remains at risk from overtopping during a tidal flood event until the Boston Barrier is operational.
Air quality

17.4.7 There is the potential for an increase in odour levels during construction as part of the drying of the dredged materials across the four phases of the construction programme and from the decommissioning of spoil from dredging stockpiles. The impact of air quality on local residents has been assessed as temporary minor adverse, which results in a temporary minor adverse effect, this is not considered significant.

Operational effects

17.4.8 The barrier structure would connect to existing flood risk management measures downstream of the town and would improve existing flood risk management measures immediately around the barrier structure. Also, the reduction in flood risk would reduce the potential for permanent damage to residential dwellings and streetscapes. It would reduce the temporary impacts in areas from the immediate aftermath of flood events (such as mud and debris left by the flood water), and building activities related to the repair of houses and streetscapes. The impact on local residential areas has been assessed as permanent major beneficial, which would result in a permanent moderate beneficial effect; this is considered to be significant.

17.4.9 The Project would improve flood protection for many residents surrounding the Project. If a flood event of 2013 was to occur again for the town of Boston, the Project would be able to prevent such event and many future events. The impact on the health and well-being on local residents has been assessed as permanent major beneficial which would result in a permanent major beneficial effect, which is considered to be significant.

17.4.10 No further significant effects from construction or operation are envisaged for the community, people and community assets during the Project operation.

Mitigation measures

17.4.11 The following mitigation measures are proposed for the Project.

Construction

17.4.12 The Boston Public Footpath No.14 (Macmillan Way) would be diverted during the construction period to allow local and regional users to continue to access the adjoining sections of the Boston Public Footpath No.14 (Macmillan Way). The proposed diversion route would be finalised in consultation with BBC.

17.4.13 The effects of the construction works on local air quality and dust would be managed through good site practice, including following the Environment Agency’s own Pollution Prevention Guidance and implementation of the EAP. Also, stockpiles from dredged materials would be covered with a membrane and adoption of further best practice construction measures subject to further liaison with BBC and LCC council officers.
17.4.14 Mitigation to further reduce impacts shall be provided and is summarised in section 9.4. However, to improve communication between the Environment Agency, the contractor and residents, a community liaison officer would be appointed by the contractor.

17.4.15 The appointed contractor would develop a local recruitment policy and administer a local contractor register to assess and maximise employment and business opportunities for the local community. Interpretation boards would provide information to the public on the barrier and its progress during construction. This would be agreed by BBC prior to construction and would enhance the local employment and business opportunities and community engagement.

Operation

17.4.16 The Boston Public Footpath No.14 (Macmillan Way) within the Project area would be improved to allow access for all users (including wheelchair users and pushchairs).

17.4.17 Interpretation boards would be erected along the Boston Public Footpath No.14 (Macmillan Way) and London Road to provide information on the barrier during the operational phase of the Project. These would also be translated into various languages to ensure a wide reaching audience.

Significant residual effects

17.4.18 Following the implementation of the mitigation measures there would be no significant adverse residual effects during construction.

17.4.19 There would be a moderate positive significant effect for the local workforce due to the provision of construction jobs and upskilling the workforce.

17.4.20 There are significant beneficial operational residual effects for the community resulting from the flood protection provided by the operation of the Barrier during extreme tidal events and improved community asset resulting from the Boston Public Footpath No.14 (Macmillan Way) reinstatement works.

17.5 Summary

17.5.1 The Project would result in a long term significant beneficial effect for the community and local assets due to the reduction in flood risk and the resulting potential damage to houses, streetscapes and community health.

17.5.2 Project construction would have a temporary significant negative impact by closing the Boston Public Footpath No.14 (Macmillan Way) for local and regional users, to allow construction along the right bank. However, a suitable diversion of the Boston Public Footpath No.14 (Macmillan Way) would be installed in consultation with BBC.
17.5.3 The appointed contractor to construct the Project would develop a local recruitment policy and local business register to assess and maximise local employment and business opportunities for the local community.

17.5.4 Best practice measures would be adopted to mitigate the effects of the construction works on local air quality and dust, noise and vibration and traffic, for example, stockpiles from dredged materials would be covered with a membrane.

17.5.5 The Boston Public Footpath No.14 (Macmillan Way) would be reinstated and improved public access to the river for all users (including wheelchair users and pushchairs) would be provided.
18 Summary significant residual effects

18.1 Introduction

18.1.1 This section summarises the temporary and permanent significant residual effects of the Project from the environmental aspects identified in Chapters 6 to 17.

18.1.2 Significant residual effects are defined as moderate or major. These are listed in Table 18.1 (Project construction) and Table 18.2 (Project operation).
### 18.2 Construction effects

Table 18.1: Summary of predicted residual effects during Project construction

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Description of impact</th>
<th>Significant effect without mitigation</th>
<th>Mitigation measures</th>
<th>Significant residual effect after mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cultural heritage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prehistoric fen deposits (MM10) and wooden structures in tidal mud banks (MM12)</td>
<td>In-channel excavation and capital dredging activities could potentially expose deposits which would be permanently removed</td>
<td>(Potential) permanent moderate adverse</td>
<td>An archaeological project design along with supporting archaeological and site management activity and methodologies for investigation would be developed and agreed with relevant stakeholders prior to construction. This may propose investigation and recording both before and during construction. The results of any investigation and recording would be made publicly accessible.</td>
<td>Moderate adverse</td>
</tr>
<tr>
<td>St Nicholas Church (MM03) and the Skirbeck Conservation Area (MM04)</td>
<td>Interruption of key views downstream through the Project by construction activity and increased level of construction noise. This would reduce the quiet character of St Nicholas Church (MM03) and its churchyard</td>
<td>Moderate adverse</td>
<td>Applying in-design mitigation to the right bank during the design process</td>
<td>Moderate adverse</td>
</tr>
<tr>
<td><strong>Landscape and visual amenity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LLCA 1 – Estuary Corridor</td>
<td>Piling activity, presence of plant on the right bank and works within the channel associated with the barrier would introduce new prominent elements into the LLCA that would be at variance with the existing character</td>
<td>Moderate adverse</td>
<td>N/A</td>
<td>Moderate adverse</td>
</tr>
<tr>
<td>Residents in properties on Wyberton Low Road between London Road and Marsh Lane</td>
<td>Presence of construction plant in an elevated location on the flood embankment</td>
<td>Moderate adverse</td>
<td>Additional mitigation measures are not considered feasible as screen fencing along the right bank would be visually intrusive and planting would not be sufficiently established to create a screen in the project timescale</td>
<td>Moderate adverse</td>
</tr>
<tr>
<td>Recreational users of</td>
<td>The construction works would be a noticeable</td>
<td>Moderate adverse</td>
<td>N/A</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

---

22 It should be noted that this work is no longer classed as mitigation under paragraph 141 of the NPPF and therefore has no impact on the level of residual effect. However, as also outlined in paragraph 141, developers should record and advance understanding of heritage assets to be lost, partly or wholly.
### Receptor

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Description of impact</th>
<th>Significant effect without mitigation</th>
<th>Mitigation measures</th>
<th>Significant residual effect after mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>the Boston Public Footpath No.14 (Macmillan Way) along the right bank of the Haven on flood embankment</td>
<td>feature of the view but the Project would only be prominent for a relatively short section of the footpath</td>
<td><strong>Significant</strong></td>
<td></td>
<td>adverse</td>
</tr>
<tr>
<td>River users of the Haven</td>
<td>The construction works would be a noticeable feature of the view but the Project would only be prominent for a relatively short reach of the river and a small part of the whole sailing experience towards and from the Wash</td>
<td><strong>Moderate adverse</strong></td>
<td>The construction works for the piling would move sequentially down the bank so construction activity would not be present in one location for the whole of the construction period. Likewise, the barrier works would not be present for the whole construction period</td>
<td><strong>Moderate adverse</strong></td>
</tr>
</tbody>
</table>

### Land use

- No permanent significant residual impacts are expected due to construction, after mitigation has been implemented

### Noise and vibration

- No permanent significant residual impacts are expected due to construction, after mitigation has been implemented

### Ecology and nature conservation

- No permanent significant residual impacts are expected due to construction, after mitigation has been implemented

### Surface Water and Flood Risk

- No permanent significant residual impacts are expected due to construction, after mitigation has been implemented

### Estuarine and Geomorphology Process

- No permanent significant residual impacts are expected due to construction, after mitigation has been implemented

### Contaminated land

- No permanent significant residual impacts are expected due to construction, after mitigation has been implemented

### Navigational risk

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Description of impact</th>
<th>Significant effect without mitigation</th>
<th>Mitigation measures</th>
<th>Significant residual effect after mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>River users, including the PoB</td>
<td>Increased risks of collision with construction plants and other users</td>
<td><strong>Major/Moderate Adverse</strong></td>
<td>Maintain clearance between the bypass and the first moored ship along the riverside quay. Clearance approximately 50m but to be further assessed for suitability. Notice to mariners to be issued advising the presence of additional ships along the river quay walls.</td>
<td><strong>Moderate adverse</strong></td>
</tr>
</tbody>
</table>
## Receptor

<table>
<thead>
<tr>
<th>Description of impact</th>
<th>Significant effect without mitigation</th>
<th>Mitigation measures</th>
<th>Significant residual effect after mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relocation of all PoB traffic to riverside berth during the closure of the WDE would impact PoB’s operation and require all commercial vessels to be turned outside the WDE</td>
<td>Major adverse/Moderate adverse</td>
<td>Schedule/methodology of the works to mitigate duration of closure.</td>
<td>Moderate adverse</td>
</tr>
<tr>
<td><strong>Significant residual effect after mitigation</strong></td>
<td></td>
<td>Sufficient tugs for turning vessels within a tight turning circle and to assist with holding waiting vessels</td>
<td></td>
</tr>
</tbody>
</table>

### Traffic and transport

No permanent significant residual impacts are expected due to construction, after mitigation has been implemented

### Air quality

No permanent significant residual impacts are expected due to construction, after mitigation has been implemented

### Community

<table>
<thead>
<tr>
<th>Local Workforce</th>
<th>Contractor would source local labour during the construction phase and would also provide training and/or apprenticeships to upskill the local labour market</th>
<th>Moderate Beneficial</th>
<th>N/A</th>
<th>Moderate Beneficial</th>
</tr>
</thead>
</table>

Source: Mott MacDonald 2016
18.3 Operational effects

Table 18.2: Summary of predicted residual effects during Project operation

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Description of impact</th>
<th>Significant effect without mitigation</th>
<th>Mitigation measures</th>
<th>Significant residual effect after mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cultural heritage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>St Botolphs Church (MM02)</td>
<td>The reduction in flood risk would reduce the potential for permanent damage to historic buildings and streetscapes</td>
<td>Moderate beneficial</td>
<td>N/A</td>
<td>Moderate beneficial</td>
</tr>
<tr>
<td>Swing Bridge, gatehouse and controls cabin (MM07)</td>
<td>Potential for increased investment in historical building stock</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston Conservation Area and associated 226 listed buildings (MM08 and MM09)</td>
<td>Would reduce immediate aftermath of flood events (such as mud and debris left by the flood water), and building activities related to the repair of buildings and streetscapes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Landscape and visual amenity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational users of the Boston Public Footpath No.14 (Macmillan Way)</td>
<td>The presence of new elements of the Project including the barrier and new floodwall partly screening views of the river would result in a noticeable deterioration in the view</td>
<td>Moderate adverse</td>
<td>Additional sheet piling along right flood wall to soften engineering appearance of flood wall. Implementation of landscape plan (including lighting) along the Boston Public Footpath No.14 (Macmillan Way) near barrier structure</td>
<td>Moderate adverse</td>
</tr>
<tr>
<td>Residents in properties on Wyberton Low Road</td>
<td>Presence of the new barrier structure and floodwall would introduce new prominent elements in the direct line of the view and close to residential properties resulting in a noticeable deterioration in the existing view</td>
<td>Moderate adverse</td>
<td>Mitigation measures to reduce the ‘engineered appearance’ of the right bank crest and the new floodwall have been incorporated into the Project such as the establishment of a native wildflower meadow seed mix adjacent to the wall to soften the appearance from the footpath and the creation of a sinuous path along the grassed crest of the embankment. Creating an accessible footpath with viewing areas at the barrier and looking towards St Nicholas church for residents and tourists would encourage greater use of the footpath</td>
<td>Moderate adverse</td>
</tr>
<tr>
<td>River users of the Haven</td>
<td>The barrier would be a large scale element in the view and the floodwalls would be noticeable features for a relatively short section of the river</td>
<td>Moderate adverse</td>
<td>Mitigation measures to reduce the ‘engineered appearance’ of the right bank crest and the new floodwall have been incorporated into the Project</td>
<td>Moderate adverse</td>
</tr>
<tr>
<td><strong>Land use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

190
## Receptor

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Description of Impact</th>
<th>Significant effect without mitigation</th>
<th>Mitigation measures</th>
<th>Significant residual effect after mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No permanent significant residual impacts are expected due to Project operation, after mitigation has been implemented</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Noise and vibration</strong></td>
<td>No permanent significant residual impacts are expected due to Project operation, after mitigation has been implemented</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ecology</strong></td>
<td>No permanent significant residual impacts are expected due to Project operation, after mitigation has been implemented</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Surface Water and Flood Risk</strong></td>
<td>No permanent significant residual impacts are expected due to Project operation, after mitigation has been implemented</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Estuarine processes and geomorphology</strong></td>
<td>No permanent significant residual impacts are expected due to Project operation, after mitigation has been implemented</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Contaminated land</strong></td>
<td>No permanent significant residual impacts are expected due to Project operation, after mitigation has been implemented</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Navigation risk</strong></td>
<td>PoB Reduction of the riverside berth quay length including a minimum clearance between the barrier and any moored vessel on the Starch Berth</td>
<td>Moderate Adverse Change to berthing practice. Widening and other improvements to the WDE</td>
<td>Moderate Adverse</td>
<td></td>
</tr>
<tr>
<td><strong>Traffic and transport</strong></td>
<td>No permanent significant residual impacts are expected due to construction, after mitigation has been implemented</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Air quality</strong></td>
<td>No permanent significant residual impacts are expected due to construction, after mitigation has been implemented</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Community</strong></td>
<td>Boston residents Reduction in impacts caused by flooding N/A Moderate beneficial Local residents/users of the Boston Public Footpath No.14 (Macmillan Way) Reinstatement of the Boston Public Footpath No.14 (Macmillan Way) N/A Moderate beneficial</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source: Mott MacDonald 2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
19 Cumulative effects and climate change

19.1 Introduction

19.1.1 This Chapter addresses the assessment of cumulative effects that may arise during the construction and operation of the Project. The assessment follows the methodology outlined in Section 3.2.

19.1.2 The Rules (Schedule 1, Paragraph 4) imposes a general requirement on an applicant to assess cumulative effects.

19.1.3 The European Commission’s ‘Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions’ provides the following guidance on cumulative effects:

“The extent of the assessment in terms of how far into the past and into the future would be dependent upon the availability and quality of information…”

19.1.4 The methodology adopted within this Chapter draws upon the Institute of Environmental Impact Assessment (IEMA, 2004) guidance.

Assumptions and limitations

19.1.5 This assessment has been produced using professional judgement and is based on the most up to date publicly available information applicable to the Project.

19.2 Types of cumulative effects

19.2.1 Two types of cumulative effects are addressed for the Project:

- Inter-project effects – effects due to interactions between the Project with past, present and future (reasonably foreseeable) developments in the locality which have not been included in the baseline; and
- In-combination project effects – effects due to interactions between different elements (resources and receptors) within the same project.

19.3 Scope of cumulative assessment

19.3.1 The first stage of the cumulative assessment is to establish the scope of the assessment.

Scope of in-combination cumulative effects

19.3.2 The potential for in-combination cumulative effects has been determined by defining the residual effects (both significant and non-significant) for each identified environmental receptor and considering these against the residual effects of other environmental topics assessed as part of the EIA. Table G1 and G2 in Appendix G determine the potential for cumulative in-combination effects during construction and operation.
19.3.3 Through the scoping exercise undertaken in Appendix G; Table G.1, it has been determined that there is the potential for in-combination cumulative effects for the following topics and receptors during construction:

- Landscape and visual amenity, noise and community for local residential receptors:
  - London Road;
  - Wyberton Low Road;
  - The Featherworks;
  - Marsh Avenue; and
  - Marsh Lane.

- Community and Landscape and visual amenity:
  - Local residents/users of the Boston Public Footpath No.14 (Macmillan Way)

19.3.4 Through the scoping exercise undertaken in Appendix G; Table G.2, it has been determined that there is the potential for in-combination effects for the following topics and receptors during operation:

- Cultural heritage and community receptors:
  - MM02 – Parish Church of St Botolph;
  - MM03 – St Nicholas Church;
  - MM04 – Skirbeck Conservation Area;
  - MM06 – Maud Foster Sluice;
  - MM07 – Swing Bridge, gatehouse and signals cabin;
  - MM08 – Boston Conservation Area; Character Areas 12a and 12b and associated listed buildings;
  - MM09 – Boston Conservation Area Character Areas 1 – 11 and associated listed buildings;
  - MM13 – Port of Boston and associated structures; and
  - MM14 – The Black Sluice and pump house.

- Landscape and visual amenity and community receptors:
  - Residents in properties on Wyberton Low Road between London Road and Marsh Lane;
  - Workers at the Riverside Industrial Estate;
  - Residents in properties in River Way, Fishtoft Road and Maple Road;
  - Users of green area within the churchyard of St Nicholas Church;
  - Residents in properties within The Featherworks and Rectory Road Windsor Bank and Alfred Street;
  - Residents of properties on London Road; and
  - Users of commercial units on London Road.

19.3.5 The potential for in-combination cumulative effects during construction has been assessed further in Section 19.4.
Scope of inter-project cumulative effects

19.3.6 Projects were identified through liaison with Environment Agency, BBC, and review of the ‘Assessment of 5-year housing land supply as at 31st March 2016’ and the ‘Core Strategy and Development Management Policies (CSDMP) (2016)’. The projects considered included: those currently under construction; those with planning permission; those at the planning application stage which are considered favourable by BBC Planning Department; and those within the confirmed Environment Agency project plan. Projects within the ‘Assessment of 5-year housing land supply as at 31st March 2016’ and the ‘Core Strategy and Development Management Policies (CSDMP) (2016)’ where only considered if there was certainty of the adoption of a particular site.

19.3.7 At this stage none of the sites within the ‘Core Strategy and Development Management Policies (CSDMP) (2016) are considered near certain and therefore it has not been considered further.

19.3.8 The geographical scope of the cumulative effects assessment for residential developments was 500m from the Project boundary. This was determined sufficient to capture those developments within the study areas of the Technical Chapters. There was no geographical extent set for the Environment Agency schemes and all Environment Agency schemes within the vicinity of the Project were included in the scope of the assessment.

19.3.9 The identification of potential developments to include within the cumulative effects assessment was based upon the criteria in Table 19.1, with the cumulative effects assessment considering only those developments which were ‘near certain’ or ‘more than likely’.

Table 19.1: Certainty of outcome for development and development status

<table>
<thead>
<tr>
<th>Certainty of Outcome</th>
<th>Development Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Near certain: The outcome would happen or there is a high probability of it occurring.</td>
<td>Intent announced by developer to regulatory agencies; Approved development proposals; and, Projects under construction.</td>
</tr>
<tr>
<td>More than likely: The outcome is likely to happen but some uncertainty.</td>
<td>Development application within the consent process and in accordance with development plan but a decision has yet to be made.</td>
</tr>
<tr>
<td>Possible: The outcome may happen but significant uncertainty.</td>
<td>Identified within a development plan but it is uncertain whether firm proposals would materialise.</td>
</tr>
<tr>
<td>Hypothetical: There is considerable uncertainty whether the outcome would ever happen.</td>
<td>Conjecture based upon currently available information; Discussed on a conceptual basis; and, One of a number of possible inputs in an initial consultation process.</td>
</tr>
</tbody>
</table>

Source: Town and Country Planning (EIA) Regulations 2011
The projects that were considered as part of the cumulative effects assessment are provided in Table 19.2. The location of the residential developments is shown on Figure 19.1. The Environment Agency schemes have not been mapped as the exact locations have not been determined at this stage.
Table 19.2: List of future developments

<table>
<thead>
<tr>
<th>ID</th>
<th>Development/planning reference</th>
<th>Location</th>
<th>Brief description</th>
<th>Certainty</th>
<th>Scoped in/out and justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Residential development (B/15/0213)</td>
<td>Broadfield Lane; Approx. 500m west of site boundary</td>
<td>Erection of 75 dwellings</td>
<td>Near certain</td>
<td>Scoped in to assessment.</td>
</tr>
<tr>
<td>2</td>
<td>Residential development (B/15/0009)</td>
<td>London Road; Approx. 250m south west of site boundary</td>
<td>Erection of 60 dwellings</td>
<td>More than likely</td>
<td>Scoped in to assessment.</td>
</tr>
<tr>
<td>3</td>
<td>Residential development (B/15/0100)</td>
<td>Boston College De Montfort Campus, Mill Road, approx. 450m north east of site boundary</td>
<td>Demolition of university campus and erection of 108 dwellings and associated infrastructure</td>
<td>Near certain</td>
<td>Scoped in to assessment.</td>
</tr>
<tr>
<td>4</td>
<td>Residential development (B13/0162)</td>
<td>Sir Isaac Newton Drive approx. 250m north of site boundary</td>
<td>Erection of 32 detached, semi-detached and terraced dwellings</td>
<td>Near certain</td>
<td>Scoped in to assessment.</td>
</tr>
<tr>
<td>5</td>
<td>Residential development (B/15/0196)</td>
<td>St Thomas Drive, approx. 250m south west of site boundary</td>
<td>Construction of 26 dwellings plus roads, recreation area, footpaths, parking areas and associated works</td>
<td>More than likely</td>
<td>Scoped in to assessment.</td>
</tr>
<tr>
<td>6</td>
<td>Left bank piling</td>
<td>Downstream Grand Sluice approx. 150m north west of site boundary</td>
<td>Work to install a piled toe revetment to a few hundred metres of bank toe that has been subject to repeated slippage over the last 20 years</td>
<td>More than likely</td>
<td>Scoped in to assessment.</td>
</tr>
<tr>
<td>7</td>
<td>Upstream general maintenance</td>
<td>Black Sluice and Lower Witham within the site boundary</td>
<td>Generally routine maintenance comprises bank mowing and small scale top up of rock toe armour. Both sluices are subject to regular M&amp;E maintenance.</td>
<td>More than likely</td>
<td>Scoped out of assessment. This would comprise annual bank mowing in summer time only and mechanical and electrical maintenance which is minor works with local staff in small vehicles with hand tools. Base on the type of work no cumulative effects are anticipated and the works have been scoped out of the assessment.</td>
</tr>
<tr>
<td>ID</td>
<td>Development/planning reference</td>
<td>Location</td>
<td>Brief description</td>
<td>Certainty</td>
<td>Scoped in/out and justification</td>
</tr>
<tr>
<td>----</td>
<td>--------------------------------</td>
<td>----------</td>
<td>------------------</td>
<td>-----------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>8</td>
<td>Armouring of low spots in the catchment embankments to reduce the risk of defence breaches</td>
<td>Black sluice; and SFFD at various locations up to several km’s from the site boundary</td>
<td>Armouring of low spots in the catchment embankments to reduce the risk of defence breaches. A topographic survey of the S40’ channel is being undertaken at present to determine the need for desilting activities.</td>
<td>Possible</td>
<td>Scoped out of assessment. The majority of the low spots are several km from the Project site and therefore not considered to result in cumulative effects. In addition, this project is still in the inception stage and there is no certainty on which areas would be taken forward. Therefore a reliable and robust assessment cannot be undertaken and it has been scoped out of the assessment.</td>
</tr>
<tr>
<td>9</td>
<td>Maintaining Standard of Protection – as part of the Flood Defence Grant in Aid (FDGIA) scheme</td>
<td>Haven Banks - Both sides of Haven, immediately downstream of the project boundary</td>
<td>The Haven Banks scheme is looking to design and maintain existing tidal defences at a minimum crest level of 6.35m AOD by filling in a number of low spots on both banks downstream of the barrier. The average depth of soil infill will be between 100mm to 300mm in isolated locations over a 5km section, downstream of the Project to Hob Hole Drain. The works are currently programmed for completion by March 2018; however, the works have not been designed yet and the description is based Environment Agency assumptions.</td>
<td>Near certain</td>
<td>Scoped in to assessment.</td>
</tr>
<tr>
<td>10</td>
<td>Flood Defence Works - Western Power Distribution</td>
<td>Western Power Distribution to work in partnership with the Environment Agency for a funding contribution to the above mentioned Haven Banks scheme to increase the defence height to protect a major electricity sub-station by an additional 500mm (up to 6.85m AOD), directly in front of their premises over a 500 metre maximum length. The works are likely to comprise of earthworks to achieve both the increase in footprint and the height required between the Project and the substation’s eastern boundary. The existing surveyed embankment crest levels range between 6.20 – 6.60m AOD. The works are currently programmed for completion by March 2020; however, the works have not been designed yet and the description is based Environment Agency assumptions.</td>
<td>Near certain</td>
<td>Scoped in to assessment.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Flood Defence Works - Metsa Wood</td>
<td>As part of the FDGIA scheme, as item 9 above, the Environment Agency are also in the early stages of negotiation with Metsa Wood to work in partnership for a funding contribution as they have approached the Environment Agency to increase defence heights to protect their premises by 500mm (up to 6.80m AOD), directly in front of their premises over an 800 metre maximum length. The works are likely to comprise of earthworks to achieve</td>
<td>Possible</td>
<td>Scoped out of assessment. No negotiations have been undertaken between Metsa and the Environment Agency at this time and the project is still in the inception stage. Therefore, as the scheme is only classified as ‘Possible’ at this stage it has</td>
<td></td>
</tr>
<tr>
<td>ID</td>
<td>Development/planning reference</td>
<td>Location</td>
<td>Brief description</td>
<td>Certainty</td>
<td>Scoped in/out and justification</td>
</tr>
<tr>
<td>----</td>
<td>--------------------------------</td>
<td>----------</td>
<td>------------------</td>
<td>-----------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the increase in defence height required. The existing surveyed embankment crest levels range between 6.20 – 6.60m AOD.</td>
<td></td>
<td>been scoped out of the cumulative assessment.</td>
</tr>
</tbody>
</table>

19.3.11 All the future developments and projects were carried through to the cumulative assessment apart from ID7 – Upstream general maintenance, ID8 – Armouring of low spots in the catchment embankments to reduce the risk of defence breaches and ID11 – Metsa Wood.

19.4 **Cumulative effect assessment**

**In-combination effects during construction**

19.4.1 Professional judgement, in line with the impact assessment methodology outlined in Section 3.2, has been used to determine if the in-combination effect would result in a significant cumulative effect for the identified receptors see Table 19.3.
Table 19.3: Potential in-combination effects during construction

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Description of potential in-combination cumulative effect</th>
<th>Sensitivity of receptor</th>
<th>Residual Significance of Effect determined through EIA</th>
<th>Cumulative Significant Residual Effects</th>
<th>Additional mitigation required (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Landscape and visual amenity and noise</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>London Road</td>
<td>The presence of construction plant in the vicinity of these residential receptors would reduce the visual amenity experienced. In addition construction activities have the potential to increase noise levels above those that are currently experienced for these receptors. The combination of these impacts has the potential to result in significant adverse cumulative effects.</td>
<td>High</td>
<td>Noise [Landscape and visual amenity] [Community]</td>
<td>Moderate adverse— the noise impact associated with potential increased noise levels on residential receptors are considered to be a minor significance of effect and would not result in a disturbance to the local community. Therefore, it is considered that the in-combination effect would not increase the significance of effect for these receptors and it would remain as a moderate adverse significant effect for landscape and visual amenity.</td>
<td>No additional mitigation proposed.</td>
</tr>
<tr>
<td>Wyberton Low Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Featherworks Marsh Avenue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marsh Lane</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Landscape and visual amenity and community</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Users of Boston Public Footpath No.14 (Macmillan Way)</td>
<td>There would be no access along the Boston Public Footpath No.14 (Macmillan Way) during construction as the footpath would be closed, resulting in a loss of this community asset for local residents. The closure would require the footpath to be diverted through Riverside Industrial Estate which would adversely affect the existing view that the users of the footpath would experience.</td>
<td>High</td>
<td>Community [Landscape and visual amenity]</td>
<td>Moderate — the loss of the footpath as a community asset is not considered to be significant as a diversion would be provided and therefore there are no severance effects. Therefore, it is considered that the in-combination effect would not increase the significance of effect for these receptors and it would remain as a</td>
<td>No additional mitigation proposed.</td>
</tr>
<tr>
<td>Receptor</td>
<td>Description of potential in-combination cumulative effect</td>
<td>Sensitivity of receptor</td>
<td>Residual Significance of Effect determined through EIA</td>
<td>Cumulative Significant Residual Effects</td>
<td>Additional mitigation required (if any)</td>
</tr>
<tr>
<td>----------</td>
<td>---------------------------------------------------------</td>
<td>------------------------</td>
<td>------------------------------------------------------</td>
<td>-------------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td></td>
<td>moderate adverse significant effect for landscape and visual amenity.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016
In-combination effects during operation

19.4.2 Table 19.4 provides the assessment to determine the potential in-combination effects resulting from the Project during operation. Using the impact assessment methodology outlined in Section 3.2 and professional judgement the potential for in-combination effects that may result in a significant cumulative effect for receptors have been identified.
Table 19.4: Potential in-combination effects during operation

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Description of potential in-combination cumulative effect</th>
<th>Sensitivity of receptors</th>
<th>Residual Significant of Effect</th>
<th>Cumulative Significant Residual Effects</th>
<th>Additional mitigation required (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cultural heritage and community</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM02 – Parish Church of St Botolph</td>
<td>The Project would result in a long term beneficial effect for community assets and the historic core of the town of Boston and its associated buildings and streetscapes with the reduction of flood risk. This would protect historic materials, features and structures as well as increasing the potential for longer term investment in Boston.</td>
<td>High</td>
<td>Cultural Heritage</td>
<td>Community</td>
<td>Moderate positive – the Project has the potential to result in permanent moderate positive effects through the protection of cultural and community assets. Therefore this is considered to be a permanent in-combination cumulative significant effect.</td>
</tr>
<tr>
<td>MM03 – St Nicholas Church</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM04 – Skirbeck Conservation Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM06 – Maud Foster Sluice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM07 – Swing Bridge, gatehouse and signals cabin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM08 – Boston Conservation Area; Character Areas 12a and 12b and associated listed buildings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM09 – Boston Conservation Area Character Areas 1 – 11 and associated listed buildings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM13 – Port of Boston and associated structures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM14 – The Black Sluice and pump house</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Landscape and visual amenity and community</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residents in properties on Wyberton Low Road between London Road and Marsh Lane</td>
<td>The Project would result in a long term beneficial effect for community assets and the historic core of the town of Boston and its associated buildings and streetscapes with the reduction of flood risk. This would</td>
<td>High</td>
<td>Community</td>
<td>Landscape and visual amenity</td>
<td>Moderate positive – the adverse effects associated with the landscape effects are considered significant for those receptors which are directly affected;</td>
</tr>
<tr>
<td>Workers at the Riverside Industrial Estate;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


### Table: Receptor Sensitivity and Cumulative Effects

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Description of potential in-combination cumulative effect</th>
<th>Sensitivity of receptors</th>
<th>Residual Significant of Effect</th>
<th>Cumulative Significant Residual Effects</th>
<th>Additional mitigation required (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents in properties in River Way, Fishtoft Road and Maple Road;</td>
<td>protect residential properties, assets within Boston, as well as increasing the potential for longer term investment Boston.</td>
<td>Moderate positive</td>
<td>Minor adverse</td>
<td></td>
<td>however, mitigation has been recommended to reduce these effects as far as possible.</td>
</tr>
<tr>
<td>Users of green area within the churchyard of St Nicholas Church, residents</td>
<td>The Project is anticipated to have a moderate adverse effect on the residents in properties on Wyberton Low Road between London Road and Marsh Lane due changes in their existing views. The remainder of the receptors are anticipated to experience minor adverse effects due to changes in their views.</td>
<td>Moderate positive</td>
<td>Minor adverse</td>
<td></td>
<td>The Project has the potential to result in permanent moderate positive effects through the protection of resident’s homes and other community assets. This would benefit a significant number of receptors and therefore is considered to be the resultant in-combination cumulative effect.</td>
</tr>
<tr>
<td>Residents in properties within The Featherworks and Rectory Road</td>
<td>Windsor Bank and Alfred Street</td>
<td>Moderate positive</td>
<td>Minor adverse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residents of properties on London Road; and</td>
<td>Users of commercial units on London Road</td>
<td>Moderate positive</td>
<td>Minor adverse</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016
This page has been left intentionally blank.
19.5 **Inter-project effects**

19.5.1 An assessment of potential inter-project cumulative effects has been undertaken for the Project in relation to the residential developments and schemes scoped into the assessment as identified in Table 19.2.

19.5.2 Table 19.5 provides a summary of the potential inter-project cumulative effects. The table has been divided into Environment Agency schemes and residential developments. This was done as the cumulative effects identified were similar between each of the different Environment Agency schemes and, separately, the different residential developments.

19.5.3 The cumulative effects assessment has been based on the current information available and a number of assumptions for the Environment Agency schemes. Should the final designs be different from the assumptions made, the relevant project/scheme would revise the potential cumulative effects, as necessary.
Table 19.5: Inter-Project cumulative effects

<table>
<thead>
<tr>
<th>Environmental Topic</th>
<th>Residential development (ID1 to ID5)</th>
<th>Environment Agency schemes (ID 6; ID9, ID10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultural heritage</td>
<td>None of the residential developments are located within either the Boston (MM08 and MM09) or Skirbeck (MM04) Conservation Areas or the footprint of any other heritage assets. There are also no locations where all or any one of the developments and the Project would cumulatively affect the setting of any heritage assets. This is because heritage assets affected by the Project are heavily screened in views from the housing sites by modern housing and commercial development. Combined road traffic movements would be using already busy main routes through Boston where there are limited heritage assets and the setting of these has already been compromised by the construction of the modern road infrastructure and the associated heavy traffic movement. Therefore, there would be no cumulative effects of the Project with the identified housing developments during construction and operation.</td>
<td>The FDGiA improvement of the existing flood defences downstream of the Project along the Haven Banks to Hobhole Pumping Station has the potential to further affect the setting of the Maud Foster Sluice (MM09) St Nicholas Church (MM03) and the Skirbeck Conservation Area (MM04). The proposals for the FDGiA Haven Bank scheme would involve raising the crest levels of the existing green bank to achieve the required flood defence height where low spots have been identified. This is not anticipated to change the views to and from the assets and the semi-natural green embankment character of the setting of the conservation area and St Nicholas Church would be retained, and as such there would be no cumulative effect. The WPD scheme is likely to be undertaken at the same time as the construction of the Project and would connect to the Project flood defence work along the right bank. The works would run along the Old Fen Bank (MM18) joining the Project works before tapering down within the WPD site to 6.85m AOD. The flood defence works would be earthworks. Placement of material in the intertidal area may be used where the existing embankment narrows with little or no space to expand the embankment on the landward back face. There may be the potential for the embedded sheet pile design of the Project to be continued for this portion of the WPD flood defence works for efficiencies and discounted benefits by delivering improvement early. For the remaining approximately 300m the works are likely to comprise earthworks with materials being placed on the back face of the embankment to allow for the increase in height to 6.85m AOD. These works have the potential to detrimentally affect the setting of the St Nicholas Church (MM03) and the conservation area (MM04) as the semi industrial character of the flood defences would be brought closer to the setting of the heritage assets. However the construction of the Project would not result in a worsening of effect as it is the proximity of the flood defences on the WPD site to the assets which causes the detrimental impact, rather than the overall extent of the flood defences. It would also potentially involve disturbance to a larger extent of the Old Fen Bank (MM18), depending on the construction method. However, the construction of the Project would not result in a worsening of effect to the Old Fen bank as the overall extent of the earthwork which would be disturbed by the works would still be small in comparison to the total length of the structure. Therefore, it is not anticipated that the works would result in a cumulative effect. It is not anticipated that these schemes would result in cumulative effects during operation.</td>
</tr>
<tr>
<td>Landscape and visual amenity</td>
<td>There is no visibility of the Project from these developments as they are screened by residential and business developments, therefore no cumulative effects predicted during construction or operation.</td>
<td>The WPD scheme would fall within LLCA 1 Estuary Corridor in an area that already has ‘soft’ flood defences, the substation and electricity pylons. Despite these urban elements, the character of the estuary becomes more rural and extensive moving downstream with a wider river channel, the absence of vertical river defences and a variable margin of grass gently sloping away from the toe of the existing embankment towards the mud banks exposed at low</td>
</tr>
</tbody>
</table>
The presence of construction activity for the WPD scheme particularly downstream of the substation would introduce urbanising elements into the more rural areas of the LLCA. The permanent elements of the WPD works, if extensive areas of sheet piles are implemented, would change the existing soft appearance of the right bank. The cumulative effects of increasing the extent of sheet piles on the right bank into the more rural areas of the LLCA would alter existing key features and extend the proportion of the overall LLCA affected. Consequently – as a worst case – assuming mainly sheet piles are incorporated, the potential overall cumulative magnitude of change to the LLCA would be medium as a result of the alteration to key landscape elements. The sensitivity of the LLCA is medium and therefore overall, the cumulative effect during operation would be moderate adverse and permanent. It is assumed that the design of this scheme would consider the potential effect on the landscape and introduce soft landscaping measures to reduce the potential effects. With the introduction of the soft landscaping measures it is not anticipated that the works would result in significant cumulative effects.

In terms of potential effects on visual amenity for key receptors, the flood defences associated with the WPD scheme have assumed – as a worst case – to incorporate sheet piles at full height 7.55m AOD at the Project boundary and tapering down to 6.85m AOD in front of the substation on the Haven right bank and then an small increase in height in the existing flood embankment downstream of the substation. The increase in height of a grass flood embankment from most viewpoints would be a minimal change to the view once the grass is established. Cumulatively, extending the length of sheet pile floodwall would result in a discernible deterioration in the existing view from the Boston Public Footpath No.14 (Macmillan Way) and for the river users of the Haven resulting in a moderate adverse effect. It is anticipated that the WPD works would include best practice measures to reduce the potential effects on the visual receptors. With the introduction of best practice measures for the WPD scheme it is not anticipated that the works would result in significant cumulative effects.

The increase in length of a piled floodwall elements would be perceptible for the users of the footpath on the left bank of the Haven. The soft river edge has been assumed to be retained. The cumulative effects would remain as a minor adverse effect through partial removal of some of the green embankment in the view but seen against the backdrop the industrial estate. There is no inter-visibility expected between the Project and the left bank piling works and therefore it is considered not to result in cumulative effects for the Project during construction and operation. The FDGiA improvement on both banks downstream of the barrier is unlikely to give rise to cumulative effects during construction and operation.
Environmental Topic | Residential development (ID1 to ID5) | Environment Agency schemes (ID 6; ID9, ID10)
--- | --- | ---
land ownership within or adjacent to the Project area. In addition, the Project and the residential developments would affect different land use classes and therefore there would be no cumulative effects. | would result in cumulative effects with the Project.

Noise and vibration | The nearest development is located approximately 230m away from the Project boundary to the south west. Given the distance it is unlikely that cumulative effects would be experienced. In addition, the sites are separated by a major arterial road and industrial areas from the Project. Therefore, noise cumulative effects would be negligible during Project construction and operation and, therefore, cumulative effects would be avoided. | At this stage specific information relating to the timing or duration of the proposed construction works to the proposed Environment Agency schemes is not known therefore it is not possible to quantify the potential significance of cumulative effects.
However, based on the proposed construction plan for the Project there is the potential for limited overlap of some construction activities. Calculations of construction noise have been made using a worst case approach so that noise levels from each activity are calculated from the nearest point of the construction works to the location of the receptor. It is considered that where there is the potential for construction activities to overlap, it is likely that noise from the nearest construction activity to the respective receptor would be dominant therefore any additional noise from construction works further away from the receptor would have a limited impact on the total noise level and therefore no cumulative effects are anticipated.
As these schemes and the Project would generate very little traffic and operational noise it is not anticipated that there would be any cumulative effects during operation.

Ecology and nature conservation | No significant cumulative effects are anticipated, provided best practice measures are followed during the construction of these developments. During operation, no significant cumulative effects are anticipated. | WPD flood bank work downstream of the Boston Barrier footprint would include impacts to the Haven embankment, including a likely permanent loss of terrestrial habitat. Impacts on reptiles are possible as there is suitable grassland and scrub habitat at this location for reptiles, and this works location coincides with the area where further surveys for reptiles were completed for the Project. Impacts from the WPD flood bank may include temporary and/or permanent loss of habitat, including refuges and hibernacula, and risk of injury or death for reptiles. These are similar impacts already described for reptiles from the Project and would occur at the same time as the WPD works are expected to take place concurrently for cost-effectiveness. It is assumed that best practice would be put in place for the protection of reptiles which would prevent significant cumulative effects from occurring.
The WPD scheme may also include impacts on nesting birds if vegetation removal is undertaken during the breeding bird season (March-August), impacts on hedgehog including risk of killing or injuring and permanent and temporary loss of suitable habitat and impacts on the linear habitats along the bank suitable for commuting and foraging bats. In addition, these works may cause noise and light disturbance. It is assumed that best practice would be put in place for the protection of nesting birds which would prevent significant cumulative effects from occurring.
The WPD works may involve sheet piling. Sheet piling as part of the Project would be completed using methods to reduce the impact on fish. It is assumed that best practice mitigation measures would be adopted for the WPD scheme would prevent significant cumulative effects from occurring.
### Environmental Topic

**Residential development (ID1 to ID5)**

- The proposed residential developments would not affect the same receptors as the Project and therefore there are no cumulative effects during construction and operation.

**Environment Agency schemes (ID 6; ID9, ID10)**

- These schemes would require work within the water environment, potentially at the same time as the construction of the Project. However, providing that the works follow best practice, there is unlikely to be any significant cumulative effect as they should not require significant excavation within the water environment.

- It is not anticipated that the schemes would result in cumulative effects during operation.

### Surface water and flood risk

- The proposed residential developments would not affect the same receptors as the Project and therefore there are no cumulative effects during construction and operation.

- These schemes would require work within the water environment, potentially at the same time as the construction of the Project. However, providing that the works follow best practice, there is unlikely to be any significant cumulative effect as they should not require significant excavation within the water environment.

- It is not anticipated that the schemes would result in cumulative effects during operation.

### Estuarine process and geomorphology

- The proposed residential have no relevance to this topic and so are excluded from this assessment as no cumulative effects are anticipated.

- This Project has not identified any significant construction effects resulting from piling activities and therefore, it is not anticipated that the works related to the schemes would result in any significant impacts or cumulative effects with the Project during construction.

- The presence of additional hard bank features as a result of the schemes would further constrain the morphology of the Haven although not to the extent that there would be any major change to current morphological processes as they are already altered as a result of existing artificial modifications. To this end, schemes are unlikely to result in significant cumulative effects when considered in combination with the Project during operation.

### Contaminated land

- Construction activities associated with the residential developments may overlap with construction of the Project. There is the potential for cumulative effects on off-site users associated with dust creation. However, it is assumed that the developments would undertake dust suppression as part of best practice and therefore the effects are not considered to be significant.

- Construction activities associated with the schemes may overlap with construction of the barrier. There is the potential for cumulative effects on off-site users associated with dust creation. However, it is assumed that the schemes would undertake dust suppression as part of best practice and therefore the effects are not considered to be significant.

### Navigation impact

- It is not anticipated that the proposed residential developments would result in cumulative effects during operation.

- There is no information available regarding the use of the Haven during the construction of these
## Environmental Topic

### Residential development (ID1 to ID5)

- Developments would have any deliveries by boat during construction and given the location of the developments no other cumulative effects are anticipated during construction or operation.

### Environment Agency schemes (ID 6; ID9, ID10)

- Developments and therefore, no assessment has been made of the potential cumulative effects these developments would have on the Project during construction. However, should deliveries be required by boat, it is assumed that the Environment Agency schemes would implement best practice measures which would reduce any potential cumulative effects.

- It is not anticipated that these schemes would alter navigation within the Haven and therefore there are no cumulative effects predicted during operation.

## Traffic and transport

### Construction dates for these developments are currently unknown; however, due to the relatively small number of dwellings which are proposed to be completed by September 2020 for each of these developments it is assumed that construction traffic flows would not have a significant impact on the surrounding highway network. This is supported by the details included in the planning application for each development with no data related to construction traffic impacts being included, which suggests it has been scoped out in agreement with the Local Highway Authority.

- The majority of construction related movements would occur on the A16 and A52 and it is anticipated that consideration would be given by the contractor for each development on arranging construction related deliveries outside of peak network hours in line with considerate construction good practise.

- In addition, the traffic model has been based on future forecast flows which taken into account future growth including new developments. Therefore, it is considered that the assessment undertaken and mitigation provided as part of this assessment has considered any cumulative effects.

### Traffic and transport

- There is limited construction traffic information available for the left bank pilling works; however, it is expected that this potential work would not require a significant number of construction vehicles to be on the highway network and therefore, it is not anticipated that it would result in cumulative effects.

- The works to the WPD substation, which is adjacent to Project, is likely to be undertaken at the same time as the Project construction works. There is no additional need for dredging and no traffic forecasts for construction materials and associated vehicle movements have been calculated. There is potential for efficiencies to be introduced in terms of delivering construction material to supply both schemes during this period; however, due to the current stage of the WPD scheme it is not possible to define these at this stage.

### Air quality

- No traffic assessments were submitted with the planning applications for the residential developments. It can therefore be assumed that traffic impacts associated with these developments are sufficiently small as to not require individual assessment. The location of the De Montfort Campus development indicates that construction

### Air quality

- The FDGiA improvement works and WPD schemes may be undertaken at the same time as the Project and by the same contractor to maximise efficiencies; therefore, cumulative effects could occur due to construction traffic associated with the WPD scheme and the Project. Given the location of the WPD scheme we assume that construction traffic would access the site from the south via Marsh Lane and would therefore not affect the Boston AQMA to the north. The Environment Agency have confirmed that no additional dredging would be undertaken for the WPD scheme and therefore we expect construction traffic impacts to be minimal. As no further
Traffic access routes could overlap with the Project’s access routes for a small section of John Adams Way and South End. The construction programme of De Montfort Campus is not known and it is therefore not possible to comment on whether cumulative construction traffic effects would occur in combination with the Project. However, given that the Project’s impacts are negligible and existing pollutant concentrations are well below the air quality objectives, the cumulative effects if construction were to occur at the same time are not expected to be significant. The locations of the remaining four residential developments are such that no significant cumulative effects from construction traffic are expected.

### Environmental Topic

<table>
<thead>
<tr>
<th>Residential development (ID1 to ID5)</th>
<th>Environment Agency schemes (ID 6; ID9, ID10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic access routes could overlap with the Project’s access routes for a small section of John Adams Way and South End. The construction programme of De Montfort Campus is not known and it is therefore not possible to comment on whether cumulative construction traffic effects would occur in combination with the Project. However, given that the Project’s impacts are negligible and existing pollutant concentrations are well below the air quality objectives, the cumulative effects if construction were to occur at the same time are not expected to be significant. The locations of the remaining four residential developments are such that no significant cumulative effects from construction traffic are expected.</td>
<td></td>
</tr>
</tbody>
</table>

The exact details (such as phasing, construction activities, and construction traffic routes) of the other schemes have not been confirmed and therefore it is not possible to quantify their cumulative effects in combination with the Project. However, it is considered unlikely that significant volumes of construction traffic associated with these schemes would be generated at the same time and on the same access routes as the construction traffic associated with the Project. Given that the Project’s impacts are negligible and existing pollutant concentrations are well below the air quality objectives, the cumulative effects are not expected to be significant even if some of these schemes were to be constructed at the same time and using the same construction routes as the Project. Therefore, cumulative effects from these schemes are not anticipated.

Source: Mott MacDonald 2016
19.6 Climate change

19.6.1 Within the context of this assessment, climate change is only relevant during the operational phase of the barrier (assumed to be 100 years).

19.6.2 Climate change may result in changes to both long term average variables, such as temperature and precipitation, as well as changes to extreme conditions. Changes to long-term mean sea level and the frequency and intensity of extreme storm tides may increase the frequency of barrier closure. It is believed that by 2115 the level of protection offered by the barrier would reduce to a 1 in 200 year scenario (0.5% AEP) (see Volume 2c: Flood Risk Assessment).

19.6.3 Climate change may alter future river flows, including velocity which could lead to changes in erosion and deposition. These changes may have positive and negative effects.

19.6.4 Effects on the ecological receptors described as a result of climate change are considered unlikely (see the ES (Volume 2b): Ecology and Nature Conservation Technical Report). Principal contaminated land considerations relate to the potential mobilisation of contaminants as a result of climatically induced rising surface water levels. However in this location the presence of sheet piled walls along the river would reduce this impact.

19.6.5 Aside from the points identified, climate change is unlikely to have any other effects on the Project’s operation. However, it must be noted that the level of uncertainty in the evolution of the climate is such that it is not possible to predict exact changes.
Environmental Action Plan

20.1 Overview

20.1.1 The EAP sets out the mitigation measures that would be implemented by the Environment Agency, and its appointed contractors, during each stage of the Project. It is split into two Sections: The first (Section 20.7) covers general construction principles to be implemented to minimise environmental impacts and the effects of construction; and the second (Tables 20.2 to 20.7) covers the environmental mitigation and outcomes contained within the ES of the Project.

20.1.2 The EAP sets out specific measures to ensure that, as far as possible, the ES and its relevant findings are addressed during the implementation phase of the project (detailed design, construction and post-construction phases). It also details the roles and responsibilities of those involved in the proposal and refer to both temporary and permanent works.

20.1.3 This EAP has been produced to support the design and build contract. This EAP sets out the specific mitigation requirements which underpin the conclusions of the EIA which has been undertaken. With the purpose of ensuring these measures are implemented to manage the environmental risks identified.

20.2 Contractual status

20.2.1 The EAP forms part of the contract or work documentation and would be incorporated within the specification and/or as Works Information where required, it would be retained by the Environment Agency following construction. These actions form part of the contract documentation and must be adhered to by the Environment Agency’s appointed contractors.

20.3 EIA implementation summary

Introduction

20.3.1 The EAP details how the EIA process would continue through to the completion of the project and longer if necessary; how the projection, conservation, mitigation and enhancement measures for this project would be delivered by the Environment Agency and its appointed contractors. It forms part of the published ES objectives, and as such forms the Environment Agencies commitment to deliver environmental outputs in the form specified.

20.3.2 Each action in the tables below has one named person who is responsible for ensuring that the action is implemented. Where it is not possible to assign an action at present, these actions have been assigned to the Environment Agency Project Manager, until that role is filled.
Design changes and changes to work processes or implementation

20.3.3 Any potential changes in design, work processes or implementation must be communicated immediately to the Environment Agency’s National Environmental Assessment Service (NEAS) Environmental Project Manager (EPM) who would assess the significance of any change and decide whether consultation and/or an ES or EAP Addendum is required.

EAP communication

20.3.4 Prior to the commencement of construction works the Environment Agency’s NEAS EPM would explain the EAP to the implementation team. Regular monitoring and programme arrangements would be advised. An up to date copy of the EAP would be held in the Site Office and referenced by Site staff as appropriate.

Environmental audits

20.3.5 Audits do not replace the regular checks undertaken by the Environment Agency during the works. No set template has been provided for these; however, audits would be undertaken by the Environmental Clerk of Works (ECoW) to assess for;
  ▪ Non-compliance by the Contractor with the EAP;
  ▪ Non-compliance with the Contractor’s own Environmental Management System; and
  ▪ Non-compliance with environmental legislation, Pollution Prevention Guidelines (PPGs) and the Environment Agency’s Water and Environment Management (WEM) Framework requirements (including the Environmental Minimum Technical Requirements).

20.4 Role of environmental staff and specialists

20.4.1 The Environment Agency’s ECW reports to the NEAS EPM who would specify roles, competencies and staff to carry out environmental responsibilities according to the relevant Work Instructions.

20.5 Environmental incident reporting system

20.5.1 An environmental incident is defined as an occurrence of a failure of an environmental objective or the occurrence of an environmental impact that was not identified during the ES. Failures must be reported by the Contractor to the Environment Agency’s National Capital Programme Management Service (NCPMS) Project Manager and NEAS EPM who, if necessary, would complete the Environmental Incident Report Form and advice on appropriate measures to limit impact. This procedure does not preclude the requirement to report relevant incidents in accordance with the requirements of the National Incident Reporting System (NIRS).
20.5.2 Environmental incidents must be reported by the contractor to the Site Supervisor. The Site Supervisor must then report the incident to the Environment Agency Project Manager, who is responsible for:
- Ensuring the Environmental Incident Report Form is filled out;
- Advising on whether the incident is to be reported to the Environment Agency’s Incident Hotline (0800 80 70 60);
- Advising on appropriate measures to limit adverse impacts with input from the Project team as required; and
- Reporting the incident to the NEAS EPM.

20.5.3 Initial reports for such incidents and near misses must be followed by a written report using the contractor’s in-house forms. This must include the following information (project/location, date, contractor, NIRS reference number, details of what happened, cause of incident, lessons learned). This final and comprehensive investigation report is to be provided by the Contractor to the ECC Project Manager (subject to appointment), Environment Agency Project Manager and Safety, Health and Environment Manager within 14 days.

20.6 EAP implementation

20.6.1 Tables 20.2, 20.4 and 20.6 outline the various EAP commitments by speciality, provide targets which are to be met and describe those individuals who are responsible for ensuring these are completed. Nevertheless, it is ultimately the contractor’s responsibility for ensuring the EAP commitments, which may include planning conditions, are delivered under the provisions of their contract with the Environment Agency.

20.6.2 The NEAS EPM is responsible for agreeing any changes to the EAP and for signing off, or agreeing to the signing off, of the actions.

20.6.3 The contractor and Project Manager are responsible for advising NEAS on any changes to method statements or the planned construction work as these may result in changes to the EAP or additional consultation with statutory consultees. NEAS would assess the significance of these changes and determine the appropriate course of action.

20.6.4 The contractor is also responsible for implementing good environmental practice on site, in line with their own Environmental Management System (EMS) and/or standard industry practice. An ECW would monitor adherence to the EMS, the EAP and the Water and Environmental Management Contract’s Environmental Minimum Technical Requirements and ensure that working methods provide adequate environmental protection, in so far as is achievable through standard industry practices. Typical checks that the ECW would make include:
- Any working hour restrictions;
- Dust suppression measures;
- Traffic management;
20.7 General construction principles

Adherence to Environment Agency guidelines

All works should adhere to the Environment Agency guidance outlined in:
- Pollution Prevention PPG01 (general guide to the prevention of water pollution);
- PPG05 (works and maintenance in or near water);
- WEM Schedule 5; and
- Minimum Technical Requirements.

General Health and Safety

20.7.1 The Environment Agency and appointed Contractor would ensure that health and safety matters are held at the highest priority. Current EU and UK Legal Standards would be treated as a minimum requirement that should be exceeded at all times.

20.7.2 The appointed contractor would demonstrate that all activities on site comply with the Environment Agency's code of practice (Please see Schedule 5 of the WEM Contract) and ensure that all records of health and safety matters are stored on site and available on request.

Working hours

20.7.3 Construction work would only take place within Core Working Hours (07:30 to 18:30) (unless otherwise agreed with BBC) subject to the following exceptions:
- Capital dredging works;
- Works to construct WDE;
- Completion of operations commenced during the Core Working Hours which cannot safely be stopped;
- Completion of works delayed or held up by severe weather conditions which disrupted or interrupted normal construction activities;
- Highway works which the local highway authority requests be undertaken on a Saturday or a Sunday or outside the Core Working Hours; and
Works required to be undertaken in the case of an emergency (provided that BBC be notified in writing within 24 hours of such works taking place).

20.7.4 Deliveries would predominantly be off peak so as to minimise impact on the road system as far as reasonably practicable. The loading and unloading of material would normally take place during Core Working ours. However, deliveries may be required at times outside of these hours, for instance during the 24/7 working activities and for the removal of dredged material.

Site layout and appearance

20.7.5 The appointed contractor would ensure that, as far as reasonably practicable, the site layout and appearance would be designed using the following principles:
- The site(s) would be appropriately screened and fully secured;
- Storage sites, fixed plant, machinery, equipment and temporary offices would be located to limit environmental effects, as far as reasonably practicable, and having due regard to neighbouring accommodation, as far as allowed by the constraints of the site(s); and
- Site lighting would be located and directed so as not to intrude into occupied residential properties or disturb wildlife on sensitive areas or constitute a road hazard.

20.7.6 The appointed contractor would promote and enforce a policy on the construction site that ensures that they are clean, tidy and safe.

20.7.7 The appointed contractor would ensure that welfare facilities are provided for construction workers including showers, toilets, locker rooms and first aid posts.

20.7.8 The above would be documented in the Construction Method Statement and no stage of the development shall commence until the Construction Method Statement has been submitted and approved by BBC.

Site security

20.7.9 The appointed contractor would ensure that the construction site(s) are secure and staffed to a sufficient level to ensure that the opportunity for unauthorised entry is minimised. If agreed between the local authority and appointed contractor the boundary would be monitored by CCTV and through manned patrols carried out by the Contractor/Contractor’s security team. Should the site boundary suffer damage then it would be immediately repaired by the appointed contractor.

Site lighting

20.7.10 Site lighting and signage would be provided to ensure the safety and security of the construction sites and would be at the minimum luminosity necessary.
Waste management

20.7.11 The appointed contractor, Environment Agency, BBC and LCC would communicate to produce a Site Waste Management Plan (SWMP) which would detail the procedures for removing waste safely, as well as outline recycling activities and appropriate waste management procedures. To aid this, an OSWMP has been produced as part of this ES submission (see ES (Volume 2d): OSWMP).

20.7.12 No stage of the development shall commence until the Site waste Management Plan has been submitted and approved by BBC.

Emergency planning and response procedures

20.7.13 The Environment Agency and appointed contractor would ensure that emergency procedures for the site are developed.

20.7.14 As far as reasonably practicable, the Environment Agency and appointed contractor would ensure the requirements of BBC/LCC Fire Planning service are met for the provision of access points. The emergency services would be notified of the provision of access onto the site, and notified of any changes/deviations to this during construction, if this occurs.

20.7.15 Individual staff members would be informed of the procedure for contacting the emergency services and the sites health and safety would be overseen by an appropriate qualified Health and Safety Manager whose responsibility would be to enforce any health and safety matters.

Community liaison

20.7.16 The Environment Agency and appointed contractor would engage stakeholders and provide avenues for the public to find out about the Project. This may include, but is not limited to, including information boards on the hoardings surrounding the site, updating local stakeholders and community via letter, leaflets and emails, as well as holding community consultation events at key points during construction.

20.7.17 The Environment Agency currently has a community hub which is open every Wednesday between noon and 19.00 hours. It provides an opportunity for the local community and organisations to meet Project representatives, to seek further Project information and to provide feedback.

Details of plans to be developed in due course

20.7.18 As the Project is not at the detailed design and build stage, Tables 20.2, 20.4 and 20.6 may be updated should any changes in requirements/mitigation be observed or communicated.
The following construction management plans would be developed during detailed design and build phase:

- Construction Method Statement – sets out details relating to the working practices to be employed during construction, including measures relating to dust management, pollution control, emergency procedures and pollution response plans, local employment and business opportunities, community liaison and complaint procedures and details of temporary construction compound (including site layout arrangements and restoration arrangements);
- Construction Traffic Management Plan - sets out details of construction site boundaries, pedestrian and cycling routes and hauls roads to be employed during construction and details of the proposed times during which construction materials or equipment may be delivered to the site;
- Noise and Vibration Management Plan – sets out procedures for the management of noise and vibration arising from the construction of the Project, including working practices for protecting nearby residential dwellings (particularly in the case of any works planned to take place outside of Core Working Hours) and measures to control and monitor noise and vibration;
- Ecological Management Plan – provides details of measures to be taken in connection with the Project to protect wildlife and habitats; and
- Site Waste Management Plan – provides details for the removal of waste safely from site, as well as outline recycling activities and appropriate waste management procedures during construction.

No stage of development shall commence until the above plans and method statements have been submitted to and approved by BBC.

In addition to the above management plans, it is anticipated that method statements would be prepared and submitted to the MMO for the following activities within the marine environment:

- Construction of the cofferdams;
- Works associated with the temporary by-pass channel;
- Sheet piling;
- Installation of temporary and permanent scour protection;
- Capital dredging
- Works associated barrier structure and gate
- Works associated WDE and gate

All works undertaken in the marine environment would be undertaken in accordance with the above method statements.
20.8 **Relevant contact details**

Table 20.1: Relevant contact details

<table>
<thead>
<tr>
<th>Project sponsor</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Executive</td>
<td>TBC</td>
</tr>
<tr>
<td>Project Manager</td>
<td>TBC</td>
</tr>
<tr>
<td>NEAS</td>
<td>TBC</td>
</tr>
<tr>
<td>ECW</td>
<td>TBC</td>
</tr>
<tr>
<td>Contractor</td>
<td>TBC</td>
</tr>
<tr>
<td>Site Supervisor</td>
<td>TBC</td>
</tr>
</tbody>
</table>

Source: Mott MacDonald 2016
### Table 20.2: EAP pre-construction phase

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Objective</th>
<th>Action</th>
<th>Target</th>
<th>Responsibility</th>
<th>Further information</th>
<th>Further action required</th>
<th>Sign off and date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Pre-construction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>A1. Generic, legislation and community involvement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1.1</td>
<td>Ensure works are carried out in line with EAP requirements</td>
<td>Appoint an Environmental Clerk of Works (ECW) to supervise environmental aspects throughout the duration of works</td>
<td>Appointment of ECW</td>
<td>Environment Agency Project Manager (PM)</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1.2</td>
<td>Engage stakeholders and provide avenues for the public to find out about Project</td>
<td>Appoint a community liaison officer</td>
<td>Appointment of community liaison officer</td>
<td>Environment Agency PM</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hold stakeholder consultation events</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meet with statutory consultees to discuss potential impacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Identify location(s) within vicinity of Project to locate public information centre(s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hold events and record details of meetings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1.3</td>
<td>Meet legal requirements</td>
<td>Discharge any pre-commencement conditions arising from the TWAO/Deemed Planning Permission/ Listed Building Consent (LBC) / Marine Licence.</td>
<td>Discharge conditions</td>
<td>Environment Agency PM</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Draft Planning Conditions relate to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Landscape</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Archaeology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Preparation of management plans</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Construction working hours (refer to Section 20.7.3 of this EAP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Land contamination</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The detail of the above conditions are provided in the relevant sections of the EAP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Any coatings and treatments used within the marine environment would be approved by the Health and Safety Executive (HSE) as suitable for use</td>
<td>Approval from HSE</td>
<td>Environment Agency PM</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ref.</td>
<td>Objective</td>
<td>Action</td>
<td>Target</td>
<td>Responsibility</td>
<td>Further information</td>
<td>Further action required</td>
<td>Sign off and date</td>
</tr>
<tr>
<td>------</td>
<td>------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>------------------</td>
<td>---------------------</td>
<td>------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>A1.5</td>
<td>Avoid excessive lighting</td>
<td>Prepare a lighting scheme which details any external lighting proposed to be installed permanently as part of the Project, including details of siting, uniformity, glare rating and illumination level. This plan is to be approved by BBC prior to any works commencing on site</td>
<td>Lighting scheme</td>
<td>Environment PM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2.1</td>
<td>Ensure that impacts on unknown archaeology are avoided/minimised</td>
<td>Prepare a written scheme of investigation for submission and approval to BCC prior to any works being undertaken</td>
<td>Written Scheme of Investigation</td>
<td>Environment PM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2.2</td>
<td>Ensure that building recording of WDE is undertaken</td>
<td>Prepare a written scheme of investigation for submission and approval to BCC prior to any works being undertaken at the WDE</td>
<td>Written Scheme of Investigation</td>
<td>Environment PM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2.3</td>
<td>Ensure impacts to Maud Foster Sluice are minimised</td>
<td>Ensure LBC for works to tie in defence to the Maud Foster Sluice is obtained and agree specifics of the materials which are likely to be conditioned as part of any approval</td>
<td>LBC Granted</td>
<td>Environment PM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A3.1</td>
<td>Minimise effects on landscape character</td>
<td>In conjunction with detailed design produce a detailed landscape scheme which includes details of existing vegetation to be retained and protected during the course of the works; details of the existing embankment/mudflats to be retained during the course of the works; proposals for soft landscape works above and below the new sheet piling; proposals for hard works to include paving and surface treatments; boundary treatments, fencing and handrails details; street furniture details; floodwall details and finishes; and</td>
<td>Landscape scheme</td>
<td>Environment PM</td>
<td>ES Chapter 7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Environmental Action Plan (EAP) - Boston Barrier Project

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Objective</th>
<th>Action</th>
<th>Target</th>
<th>Responsibility</th>
<th>Further information</th>
<th>Further action required</th>
<th>Sign off and date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**A4. Land use**

**A4.1 Minimise impact on land take**

To ensure the effects to the PoB’s operation are minimised, a plan would be developed in discussion with the PoB

Prepare appropriate management plans

Environment Agency PM

**A5. Noise and vibration**

**A5.1 Minimise noise and vibration impacts from construction**

Develop a construction noise and vibration management plan prior to the commencement of construction to ensure appropriate construction methodologies are selected. This plan is to be approved by BBC prior to any works commencing on site

Prepare a noise and vibration management plan

Environment Agency PM

ES Chapter 9

**A5.2 Minimise noise and vibration impacts from construction**

The Contractor would be required to apply for ‘Prior consent’ (Section 61), this ensures the management of noise and vibration using best practicable means

Prepare a Section 61

Environment Agency PM

ES Chapter 9

**A5.3 Minimise noise and vibration impacts from construction**

Undertake pre-construction noise monitoring to determine baseline noise environment

Undertake noise monitoring

Environment Agency PM

ES Chapter 9

**A5.2 Inform local stakeholders of future operations which may have a noise/vibratory impact upon them**

Define ongoing local stakeholder consultation methodologies for the effective dissemination of this information (for instance, letter drops/stakeholder events)

Initial plans developed prior to construction

Environment Agency PM

ES Chapter 9

**A6. Ecology and nature conservation**

**A6.1 Avoid damage to flora and fauna**

Prepare an ecological management plan which for review and approval by BBC. Plan is to include but not limited to:

- Reptile mitigation and management;
- Measure to avoid changes in erosion and accretion;

Ecological management plan

Environment Agency PM

ES Chapter 10
### Environmental Action Plan (EAP) - Boston Barrier Project

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Objective</th>
<th>Action</th>
<th>Target</th>
<th>Responsibility</th>
<th>Further information</th>
<th>Further action required</th>
<th>Sign off and date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A6.2</td>
<td>Avoid impacts to local reptiles</td>
<td>Reptiles to be relocated safely outside of the works area</td>
<td>Mitigation plans to be produced during winter 2016, implemented in spring 2017</td>
<td>Environment Agency PM</td>
<td>ES Chapter 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A6.3</td>
<td>Avoid impacts to local hedgehogs</td>
<td>Prior to the start of works, ecologists to conduct hand search of suitable hedgehog habitat prior to vegetation removal; Those found would be released in suitable habitat outside of the works area. Hedgehogs with young or in a nest, would be left undisturbed and monitored until no longer present</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A6.4</td>
<td>Avoid impacts to breeding birds</td>
<td>Vegetation to be cut back and removed from site during the pre-construction phase to deter birds from nesting. Buoy shop to be dismantled outside of bird nesting season if not possible an Ecologist/ECW would conduct a check for any active birds nests, if found works would need to stop until nests are cleared by ecologist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### A7. Surface water and Flood Risk

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Objective</th>
<th>Action</th>
<th>Target</th>
<th>Responsibility</th>
<th>Further information</th>
<th>Further action required</th>
<th>Sign off and date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A7.1</td>
<td>Impact on water quality</td>
<td>Prepare a water quality monitoring programme that identifies significant changes to turbidity levels and contaminants</td>
<td>Terms of reference for the programme brief</td>
<td>Environment Agency PM</td>
<td>ES Chapter 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Undertake pre-construction water quality monitoring to determine baseline water quality</td>
<td>Undertake water quality</td>
<td>Environment Agency PM</td>
<td>ES Chapter 11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A7.2</td>
<td>Sediment dispersion</td>
<td>Define sediment sampling to confirm sediment quality, as part of the risk assessment for on-land disposal of dredged material</td>
<td>Terms of reference for sampling</td>
<td>Environment Agency PM</td>
<td>ES Chapter 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ref.</td>
<td>Objective</td>
<td>Action</td>
<td>Target</td>
<td>Responsibility</td>
<td>Further information</td>
<td>Further action required</td>
<td>Sign off and date</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>--------</td>
<td>--------</td>
<td>----------------</td>
<td>---------------------</td>
<td>----------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>A7.3</td>
<td>Sediment Quality</td>
<td>Undertake sediment sampling to determine quality for dredging material disposal</td>
<td>Undertake sediment sampling</td>
<td>Environment Agency PM</td>
<td>ES Chapter 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A8.1</td>
<td>Minimise the effects of the barrier structure on the Haven</td>
<td>Ensure the construction plan formulated during detailed design incorporates adequate scour protection as outlined in the FRA and allows for softer measures to reduce the morphological impact from sheet piles</td>
<td>Adequate scour protection included in detailed design</td>
<td>Environment Agency PM</td>
<td>ES Chapter 12 and FRA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A9.1</td>
<td>Minimise the possibility of the contamination of land/the movement of contaminated material.</td>
<td>A method statement would be produced during detailed design, which would detail methods of excavation, appropriate storage, testing and treatment/disposal options in the event that contamination is encountered</td>
<td>Method statement produced</td>
<td>Environment Agency PM</td>
<td>ES Chapter 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A10.1</td>
<td>Reduce the impact of the works to in-channel navigation</td>
<td>Communicate the impact of the forthcoming works to local river users prior to the commencement of works</td>
<td>Stakeholder consultation plan</td>
<td>Environment Agency PM</td>
<td>ES Chapter 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A10.2</td>
<td>Reduce the impact of construction on local fishing fleet</td>
<td>Develop an effective navigation traffic management plan for the relocation of the Boston fishing fleet to a suitable location which should offer similar access to The Wash, berthing facilities and loading/unloading facilities PoB has agreed in principal that a quayside in the PoB Estate would be available to the fishing fleet for the duration of the barrier construction works</td>
<td>Prepare appropriate navigation traffic management plan</td>
<td>Environment Agency PM</td>
<td>ES Chapter 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A10.3</td>
<td>Reduce the impact of construction on the Witham Sailing Club and recreational river users</td>
<td>Witham Sailing Club and recreational river users to be relocated approximately 1.5km downstream of the barrier</td>
<td>No incidents related to these receptors</td>
<td>Environment Agency PM</td>
<td>ES Chapter 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A10.4</td>
<td>Reduce impact on fishing fleet</td>
<td>Secure alternative berthing for fishing fleet</td>
<td>No incidents related to these</td>
<td>Environment Agency PM</td>
<td>ES Chapter 14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Environmental Action Plan (EAP) - Boston Barrier Project

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Objective</th>
<th>Action</th>
<th>Target</th>
<th>Responsibility</th>
<th>Further information</th>
<th>Further action required</th>
<th>Sign off and date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>receptors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>A11. Traffic, transport and air quality</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A11.1</td>
<td>Reduce the impact of road based transport on local infrastructure</td>
<td>Produce a finalised construction traffic management plan which sets out details of construction site boundaries, pedestrian and cycling routes and hauls roads to be employed during construction and details of the proposed times during which construction materials or equipment may be delivered to the Project. This plan is to be approved by BBC prior to any works commencing on site</td>
<td>CTMP</td>
<td>Environment Agency PM</td>
<td>ES Chapter 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A11.2</td>
<td>Reduce the impact of construction on pedestrian footfall</td>
<td>Disseminate information regarding the preferential route for the Boston Public Footpath No.14 (Macmillan Way) diversion to local residents and stakeholders</td>
<td>Effective communication</td>
<td>Environment Agency PM</td>
<td>ES Chapter 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A11.3</td>
<td>Ensure severance issues arising during construction are remediated</td>
<td>Prepare a management plan to ensure that access to residential properties and businesses are not impacted. This would include the planning and introduction of alternative access routes; for instance re-routing the Boston Public Footpath No.14 (Macmillan Way) temporarily and the temporary diversion of the power cables along Wyberton Low Road</td>
<td>Prepare appropriate management plans</td>
<td>Environment Agency PM</td>
<td>ES Chapter 15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### A12. Community

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Objective</th>
<th>Action</th>
<th>Target</th>
<th>Responsibility</th>
<th>Further information</th>
<th>Further action required</th>
<th>Sign off and date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A12.1</td>
<td>See A1 through A5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A12.2</td>
<td>Ensure maximising local employment and business opportunity for local community</td>
<td>Prepare local recruitment policy and administer local contractor register within the construction method statement to be agreed by BBC prior to construction</td>
<td>Local population</td>
<td>Environment Agency PM</td>
<td>ES Chapter 17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### A13. Waste and Resources

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Objective</th>
<th>Action</th>
<th>Target</th>
<th>Responsibility</th>
<th>Further information</th>
<th>Further action required</th>
<th>Sign off and date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A13.1</td>
<td>Reduce the amount of waste being produced and ensure it is treated appropriately</td>
<td>Produce a finalised Site Waste Management Plan (SWMP) which would detail the procedures for removing waste safely, as well as outline recycling activities and appropriate waste management procedures. This plan is to be approved by BBC prior to any works commencing on site</td>
<td>SWMP produced</td>
<td>Environment Agency PM</td>
<td>ES Chapter 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### A14. General
### Environmental Action Plan (EAP) - Boston Barrier Project

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Objective</th>
<th>Action</th>
<th>Target</th>
<th>Responsibility</th>
<th>Further information</th>
<th>Further action required</th>
<th>Sign off and date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.14.1</td>
<td>Design change</td>
<td>During the detailed design process, any changes in design must be checked alongside the ES to ensure the change is design keeps within the remit of the agreed works.</td>
<td>Environmental Statement</td>
<td>Environment Agency NEAS</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A14.2</td>
<td>Design Change</td>
<td>Works relating to the following aspects of the Project must not commence until details of the siting, layout, scale and external appearance, including details of external materials, of the aspects of the Project concerned have been submitted to, and approved by, BBC: - Barrier control building; and - WDE control building and gate. The Project must be carried out in accordance with the approved details or any amendments to those details as may be approved by BBC.</td>
<td>Detailed Design</td>
<td>Environment Agency</td>
<td>Draft Planning Conditions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Table 20.3: Pre-construction sign-off**

<table>
<thead>
<tr>
<th>Organisation/Role</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment Agency NEAS Officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site Supervisor/Environmental Clerk of Works</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contractor’s Project Manager</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 20.4: EAP construction phase

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Objective</th>
<th>Action</th>
<th>Target</th>
<th>Responsibility</th>
<th>Further information</th>
<th>Further action required</th>
<th>Sign off and date</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Construction phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1. Generic, legislation and community involvement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1.1</td>
<td>Communicate information regarding works progress on a regular basis</td>
<td>Provide information about the progress of the works, particularly to the site landowners, nearby residents in Boston and Wyberton and other interested parties</td>
<td>Up-to-date information made available for the public</td>
<td>Contractor</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1.2</td>
<td>Ensure legal compliance in respect of EIA regulations and development rights</td>
<td>To ensure which EIA regulations and development rights apply and manage this change to ensure on-going legal compliance.</td>
<td>No trespass of the regulations</td>
<td>Contractor</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1.3</td>
<td>Meet legal requirements</td>
<td>Discharge any conditions required by the TWAO/Deemed Planning Permission</td>
<td>Discharge conditions</td>
<td>Contractor</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discharge any conditions of the LBC</td>
<td>Discharge LBC conditions</td>
<td>Contractor</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discharge any conditions of the Marine Licence</td>
<td>Discharge MMO conditions</td>
<td>Contractor</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1.4</td>
<td>Good working practices</td>
<td>Undertake works in line with the agreed Construction Method Statement</td>
<td>Compliance with Construction Method Statement</td>
<td>Contractor</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Undertake works in line with the agreed lighting scheme</td>
<td>Compliance with lighting scheme</td>
<td>Contractor</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1.5</td>
<td>To preserve privacy and security during construction</td>
<td>If fences/barriers that contribute to the security are removed/damaged, provision of temporary secure fences until permanent replacement barriers is provided.</td>
<td>Site safety</td>
<td>Contractor</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1.6</td>
<td>To maintain services and essential access during construction works</td>
<td>Consultation with Fire, Ambulance and Police to agree access arrangements to affected properties and providing affected property owners, businesses and residents with alternative service diversion and access plan and programs.</td>
<td>Access agreed with all parties.</td>
<td>Contractor</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2. Cultural heritage and archaeological</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2.1</td>
<td>No work affecting the structure of WDE shall commence prior to assessing heritage</td>
<td>Ensure that the implementation of a programme of archaeological works has been secured in accordance with a written scheme of investigation which has been submitted to and approved by</td>
<td>Local planning authority</td>
<td>Contractor</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ref.</td>
<td>Objective</td>
<td>Action</td>
<td>Target</td>
<td>Responsibility</td>
<td>Further information</td>
<td>Further action required</td>
<td>Sign off and date</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>--------</td>
<td>--------</td>
<td>----------------</td>
<td>---------------------</td>
<td>------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2.1</td>
<td>Ensure that the existing Wet Dock structure has been recorded in its entirety, identifying the structure's significance as a local heritage asset.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2.2</td>
<td>Ensure impacts on (potential) archaeological deposits are avoided/minimised</td>
<td>Ensure that the implementation of a programme of archaeological works has been secured in accordance with a written scheme of investigation which has been submitted to and approved by BBC. Implement measures in the archaeological project design for investigation, recording and publication programme.</td>
<td>Terms of reference for programme of investigation, recording and publication.</td>
<td>Contractor</td>
<td>ES Chapter 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2.3</td>
<td>Ensure construction noise impacts on St Nicholas Church and Skirbeck Conservation area heritage assets are minimised</td>
<td>Implement best practice measures associated with noise impacts (see B5).</td>
<td>Heritage receptors and immediate users</td>
<td>Contractor</td>
<td>ES Chapter 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B3.1</td>
<td>Minimise impacts of Project on landscape and visual amenity</td>
<td>Ensure management of works to be carried out by a competent contractor, working where appropriate to an approved landscape scheme; Including lighting, noise measures, finishing of the barrier structure in galvanised steel (above water level) and black (below water level), retaining/protecting existing trees where necessary. CTMP and noise and vibration management plan to be implemented especially near residential areas.</td>
<td>Minimise impact on landscape and visual amenity</td>
<td>Contractor</td>
<td>ES Chapter 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B4.1</td>
<td>Minimise impact on land take</td>
<td>To ensure the effects to the PoB's operation are minimised, ensure the developed plan is implemented</td>
<td>Implement plan</td>
<td>Environment Agency PM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B5. Noise and vibration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Environmental Action Plan (EAP) – Boston Barrier Project

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Objective</th>
<th>Action</th>
<th>Target</th>
<th>Responsibility</th>
<th>Further information</th>
<th>Further action required</th>
<th>Sign off and date</th>
</tr>
</thead>
<tbody>
<tr>
<td>B5.1</td>
<td>Minimise noise and vibration impacts from construction</td>
<td>Implementation of mitigation measures (for instance screening) to ensure the construction adheres to construction noise and vibration that are detailed in the noise and vibration mitigation and the management plan and requirements as defined under “Section 61” application. This process enables the management of noise and vibration using “best practicable means”</td>
<td>No noise complaints from residents</td>
<td>Contractor</td>
<td>ES Chapter 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Undertake construction noise monitoring to establish construction noise levels and ensure these are not significantly above the current baseline.</td>
<td>No noise complaints from residents</td>
<td>Contractor</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| B 5,2| Minimise noise and vibration from construction compounds                  | Erection of temporary noise barriers where there are sensitive receptors close to the proposed works  
Location of appropriate ingress and egress points  
Implementation of appropriate traffic management plan for the construction compound to minimise standing traffic | No noise complaints from residents  | Contractor     | ES Chapter 9         |                         |                    |
| B5.3 | Minimise noise and vibration impacts from construction on fish            | Use of soft start piling techniques/reduced blow energy to reduce the impact of construction on residential receptors and fish          | No fish deaths associated with construction works | Contractor     | ES Chapter 9 and 10 |                         |                    |
| B5.2 | Inform local stakeholders of operations which may have a noise/vibratory impact upon them | Ongoing local stakeholder consultation to effectively dissemination information (for instance, letter drops/stakeholder events) regarding works and construction activities | Initial plans developed prior to construction | Contractor     |                      |                         |                    |

### B6. Ecology and nature conservation

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Objective</th>
<th>Action</th>
<th>Target</th>
<th>Responsibility</th>
<th>Further information</th>
<th>Further action required</th>
<th>Sign off and date</th>
</tr>
</thead>
</table>
| B6.1 | Minimise impacts to fish                                               | The use of softer alternatives to hammering (e.g. silent sheet piling, vibratory sheet piling) where ground conditions allow. Where not possible, soft start piling procedures should be utilised. The soft-start duration must be a period of not less than 20 minutes, and should piling cease for a period greater than 20 minutes, the soft start procedure must be repeated  
Dredging activities undertaken outside the no-go period (generally between Oct to mid-March and | No fish deaths as a result of construction works | Contractor     | ES Chapter 10      |                         |                    |
<table>
<thead>
<tr>
<th>Ref.</th>
<th>Objective</th>
<th>Action</th>
<th>Target</th>
<th>Responsibility</th>
<th>Further information</th>
<th>Further action required</th>
<th>Sign off and date</th>
</tr>
</thead>
<tbody>
<tr>
<td>B6.2</td>
<td>Minimise impacts on fauna and flora</td>
<td>Undertake works as per the approved ecological management plan</td>
<td>No adverse impacts on flora and fauna</td>
<td>Contractor</td>
<td>ES Chapter 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B6.3</td>
<td>Minimise impacts to local breeding birds/waterbirds</td>
<td>Construction compounds, stockpiles, and welfare areas to be located away from mudflat areas; limit use of noisy plant machinery; mufflers to be fit where possible; machinery to be turned off when not in use; ecologist to deliver toolbox talks to all staff to brief them on these measures</td>
<td>No adverse effects on local breeding birds/waterbirds</td>
<td>Contractor</td>
<td>ES Chapter 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B6.4</td>
<td>Minimise impacts to commuting bats</td>
<td>Lighting to be installed low and at a minimum brightness as practical to reduce light spill; hoods or cowls to be fit to focus light to where it is needed; Motion sensors to be installed to reduce duration of illumination for any security lighting; illuminating of features suitable for commuting of foraging bats to be avoided</td>
<td>No adverse effects on local bats</td>
<td>Contractor</td>
<td>ES Chapter 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B 6.5</td>
<td>Minimise impacts to</td>
<td>Ecologist to conduct hand search of suitable</td>
<td>Reduce habitat loss</td>
<td>Contractor</td>
<td>ES Chapter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ref.</td>
<td>Objective</td>
<td>Action</td>
<td>Target</td>
<td>Responsibility</td>
<td>Further information</td>
<td>Further action required</td>
<td>Sign off and date</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>----------------</td>
<td>---------------------</td>
<td>-------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>hedgehogs</td>
<td>hedgehog habitat prior to any vegetation removal during construction phase. Any hedgehogs found would be moved to pre-determined release location in suitable habitat outside of the works area. If a hedgehog is found with young or in a nest, the area would be left undisturbed and monitored until the hedgehog is no longer present. Ecologist to deliver toolbox talks to all staff on hedgehogs and procedures if hedgehog is found during construction</td>
<td>and the risk of killing or injuring hedgehog during site enabling works</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B 6.6</td>
<td>Minimise impacts to local reptiles</td>
<td>Reptiles to be relocated out of the works area during construction as required and released in a suitable receptor area. Receptor area to be located as close to the works area as possible in area of suitable habitat. Habitats in receptor area to be improved for reptiles. Reptile mitigation and management plan would be produced prior to any enabling works. The plan would be produced during winter 2016 with a view to implementing the mitigation by spring 2017.</td>
<td>To reduce Habitat loss and the risk of killing or injuring reptiles during site enabling works.</td>
<td>Contractor</td>
<td>ES Chapter 10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>B6.7</td>
<td>Ensure no spread or introduction of invasive/non-native species</td>
<td>Biosecurity measures to be in place to avoid the spread of these species into other water bodies; Ecologist to deliver toolbox talks to all staff on the effects of the potential spread of invasive species and biosecurity techniques. Check-clean and dry methods to be used as appropriate</td>
<td>No introduction of invasive species / non-native species as a result of construction works</td>
<td>Contractor</td>
<td>ES Chapter 10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>B7.</td>
<td>Surface water and flood risk</td>
<td>Comply with agreed method statement for pollution prevention and emergency procedures. Incident reporting system to be in place and a copy of the procedure to be available on site during all works. Spill kits to be provided onsite and water monitoring to be conducted periodically</td>
<td>Ensure adequate procedures are in place</td>
<td>Contractor</td>
<td>ES Chapter 11</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>B7.1</td>
<td>Avoid pollution of watercourses</td>
<td>Undertake water quality monitoring to ensure construction works are not adversely affecting</td>
<td>Undertake water quality sampling</td>
<td>Contractor</td>
<td>ES Chapter 11</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Ref.</td>
<td>Objective</td>
<td>Action</td>
<td>Target</td>
<td>Responsibility</td>
<td>Further information</td>
<td>Further action required</td>
<td>Sign off and date</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>--------</td>
<td>--------</td>
<td>----------------</td>
<td>---------------------</td>
<td>------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>B8.1</td>
<td>Monitor the rates of erosion and deposition to avoid impacts</td>
<td>Bathymetric surveys would be carried out during the construction period, to determine the rate of erosion and deposition.</td>
<td>Undertake bathymetric surveys</td>
<td>Contractor</td>
<td>ES Chapter 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B9.1</td>
<td>Reduce the possibility of the interaction of construction workers and contaminants</td>
<td>Construction workers would wear PPE during intrusive works; dust suppression (including in sediment storage) and suitable construction methodologies; Tool box talks given to workers prior to commencement of works</td>
<td>Tool box talks and communication of risk</td>
<td>Contractor</td>
<td>ES Chapter 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B9.2</td>
<td>Reduce the possibility of ground gas exposure to the workforce</td>
<td>When working in excavations at the site, monitoring of ground gas levels would be completed and appropriate protective equipment used based on the monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B9.3</td>
<td>Stop contaminated water reaching the watercourse</td>
<td>Effective drainage and water management would be used during the sediment drying process</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B9.4</td>
<td>Avoid contamination</td>
<td>Prepare a method statement in the event that significant contamination in encountered.</td>
<td>Method statement</td>
<td>Contractor</td>
<td>ES Chapter 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B9.5</td>
<td>Reduce potential for contamination</td>
<td>Use dust suppression Ensure adequate storage of fuels on site as detailed within the Construction Method Statement including use of bunded tanks and spill kits</td>
<td>Construction Method statement</td>
<td>Contractor</td>
<td>ES Chapter 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B9.6</td>
<td>Ensure safety of onsite workers</td>
<td>Tool box talks would be given to all construction workers at the site on potential presence of contamination including hydrocarbons and asbestos cement. Construction workers would be trained to identify these contaminants and any significant contamination would be reported Where significant hydrocarbon or asbestos contamination is identified, a watching brief during construction by a suitably qualified specialist would also be implemented, if required</td>
<td>Tool box talks/Method Statement</td>
<td>Contractor</td>
<td>ES Chapter 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B9.7</td>
<td>Safe handling of materials</td>
<td>Risk assessment and subsequent preparation of a materials management plan for proposed reuse</td>
<td>Risk assessment</td>
<td>Contractor</td>
<td>ES Chapter 13</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Environmental Action Plan (EAP) – Boston Barrier Project

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Objective</th>
<th>Action</th>
<th>Target</th>
<th>Responsibility</th>
<th>Further information</th>
<th>Further action required</th>
<th>Sign off and date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>location based on the results of made ground and sediment chemical analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B10. Navigation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B10.1</td>
<td>Reduce the impact of the works to in-channel navigation</td>
<td>The Authority should be in constant daily communication with riverine users to ensure users are aware of the impact of the works and safety measures. Information should be circulated daily between contractors/PoB/river users</td>
<td>No incidents within the Haven as a result of construction</td>
<td>Environment Agency PM</td>
<td>ES Chapter 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>All plant, exclusion zones and construction work areas are to be clearly marked and lit in accordance with standard. Lighting to be placed upstream and downstream of the barrier</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Install leading guides or buoys upstream and downstream of the cofferdam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Safe mooring areas to be provided next to Black Sluice Quay and Maud Foster Sluice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Daily communication between the marine contractors, the PoB and the Harbour Authority would be carried out to ensure vessel manouvres and construction barges movements are appropriately scheduled.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B10.2</td>
<td>Reduce the impact of construction on local fishing fleet</td>
<td>Relocation of the fish fleet to the PoB during works in the Haven. Ensure communication is on-going between the fishing fleet and Environment Agency to confirm the relocation is not adversely affecting the fleet</td>
<td>No complaints</td>
<td>Environment Agency PM</td>
<td>ES Chapter 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B10.3</td>
<td>Reduce the impact of construction on the Witham Sailing Club and recreational river users</td>
<td>Monitor the relocation of the Witham Sailing Club and recreational river users</td>
<td>No incidents related to these receptors</td>
<td>Contractor</td>
<td>ES Chapter 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B10.4</td>
<td>Traffic management system (VTS) to be implemented at the harbour</td>
<td>Implement the traffic system to manage the navigation through the barrier</td>
<td>No incidents within the Haven as a result of construction</td>
<td>The Harbour Authority and the Navigation Authority to manage the traffic in agreement with</td>
<td>ES Chapter 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ref.</td>
<td>Objective</td>
<td>Action</td>
<td>Target</td>
<td>Responsibility</td>
<td>Further information</td>
<td>Further action required</td>
<td>Sign off and date</td>
</tr>
<tr>
<td>------</td>
<td>-----------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>-------------------------</td>
<td>------------------</td>
<td>---------------------</td>
<td>-------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>B10.5</td>
<td>Reduce pollution in the event of a collision</td>
<td>Include proposed containment methods within the construction method statement.</td>
<td>No pollution events</td>
<td>Contractor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B11.1</td>
<td>Reduce the impact of road based transport on local infrastructure</td>
<td>Ensure the CTMP is being carried out in accordance with the rules stipulated within the document</td>
<td>CTMP</td>
<td>Contractor</td>
<td>ES Chapter 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B11.2</td>
<td>Reduce the impact of construction on pedestrian footfall</td>
<td>Ensure adequate signage is in place and that the diversion is recognised within the community. Temporary fencing to be erected on the boundary of the recreation area with St John’s Road to minimise impact of safety risks associated with construction traffic. Appropriate signage to be put in place regarding diversion of the Boston Public Footpath No. 14 (Macmillan Way)</td>
<td>CTMP</td>
<td>Contractor</td>
<td>ES Chapter 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B11.3</td>
<td>Reduce the impact of construction on cyclists</td>
<td>Temporary suitable separation between construction works and cyclists during the enabling works Appropriate signage to be put in place regarding enabling works</td>
<td>CTMP</td>
<td>Contractor</td>
<td>ES Chapter 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B11.4</td>
<td>Reduce the effect of construction traffic (particularly HGV’s) on the local area</td>
<td>Ensure exclusion times for the delivery of materials, such that HGV deliveries are occurring at non-peak times and within the site compound</td>
<td>CTMP</td>
<td>Contractor</td>
<td>ES Chapter 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B11.5</td>
<td>Ensure severance issues arising during construction are remediated</td>
<td>Implement CTMP</td>
<td>No complaints from residents</td>
<td>Contractor</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**B12. Community**

B12.1 See B1 – B5 and B11

**B13. Waste and resources**

B13.1 Minimise the effects of inert waste Ensure waste is being kept separate and clear of cross contamination Outlined in the SWMP Contractor

B13.2 Minimise the effects of hazardous waste Ensure hazardous material, both from excavated wastes and other arisings is kept in a designated Outlined in the SWMP Contractor
### Environmental Action Plan (EAP) – Boston Barrier Project

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Objective</th>
<th>Action</th>
<th>Target</th>
<th>Responsibility</th>
<th>Further information</th>
<th>Further action required</th>
<th>Sign off and date</th>
</tr>
</thead>
<tbody>
<tr>
<td>B13.3</td>
<td>Reduce the need to dispose of organic waste</td>
<td>Secure environment separate to other materials</td>
<td>Outlined in the SWMP</td>
<td>Contractor</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**B14. General**

| A.14.1 | Design change                                                             | During the construction process, any changes in must be checked alongside the ES to ensure the change is design keeps within the remit of the agreed works. | Environmental Statement | Contractor | N/A                  |                        |                     |
| A14.2  | Design Change                                                             | The Project must be carried out in accordance with the approved details or any amendments to those details as may be approved by BBC. | Construction to conform to agreed design | Contractor | Draft Planning Conditions |                        |                     |

### Table 20.5: Construction Phase signoff

<table>
<thead>
<tr>
<th>Organisation/Role</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment Agency NEAS Officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site Supervisor/Environmental Clerk of Works</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contractor’s Project Manager</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Environmental Action Plan (EAP) - Boston Barrier Project

#### Table 20.6: EAP post construction phase

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Objective</th>
<th>Action</th>
<th>Target</th>
<th>Responsibility</th>
<th>Further information</th>
<th>Further action required</th>
<th>Sign off and date</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. Post-construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1. Generic, legislation and community involvement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1.1</td>
<td>Communicate completion of the works</td>
<td>Inform local residents, landowners and other interested parties about the completion of the works</td>
<td>Effective communication to stakeholders</td>
<td>Environment Agency PM</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2. Cultural heritage and archaeological</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2.1</td>
<td>Disseminate cultural history of area for locals and visitors</td>
<td>Implement interpretation measures in-line with local stakeholders and heritage agencies</td>
<td>Locals, community groups</td>
<td>Environment Agency PM</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C3. Landscape and visual amenity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C3.1</td>
<td>Ensure that any affected areas are re-instated</td>
<td>Ensure management of works associated with the Boston Public Footpath No.14 (Macmillan Way) landscape improvements and vertical margins are carried out by a competent contractor, working where appropriate to an approved landscape plan</td>
<td>Landscape scheme</td>
<td>Environment Agency PM</td>
<td>ES Chapter 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plant seed mix to encourage vegetation growth on embankment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Appropriate (saline tolerant) grasses to be introduced along the right bank to soften views</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>New street furniture including robust benches along the Haven would be introduced to create a more inviting space for residents and tourists</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contractor to be responsible for a 5-year landscape maintenance period</td>
<td>Landscape scheme</td>
<td>Contractor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Implement measures as required from landscape scheme</td>
<td>Landscape scheme</td>
<td>Contractor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C4. Land use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C4.1</td>
<td>No action required</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C5. Noise and vibration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C5.1</td>
<td>No action required</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C6. Ecology and nature conservation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C6.1</td>
<td>Replace lost trees</td>
<td>Trees lost during construction would be replaced with native species of local provenance which are</td>
<td>-</td>
<td>Environment Agency PM</td>
<td>Landscape master plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ref.</td>
<td>Objective</td>
<td>Action</td>
<td>Target</td>
<td>Responsibility</td>
<td>Further information</td>
<td>Further action required</td>
<td>Sign off and date</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>--------</td>
<td>--------</td>
<td>----------------</td>
<td>---------------------</td>
<td>------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>C6.2</td>
<td>Boston Horsetail Enhancement</td>
<td>Plant Boston Horsetail within areas deemed suitable during surveys to assess suitable habitat</td>
<td>-</td>
<td>Environment Agency PM</td>
<td>Landscape master plan</td>
<td>Environment Agency PM</td>
<td>-</td>
</tr>
<tr>
<td>C6.3</td>
<td>Avoid impacts on reptiles</td>
<td>Bank mowing would only be undertaken in accordance with the Reptile Habitat Management Handbook</td>
<td>-</td>
<td>Environment Agency PM</td>
<td>Landscape master plan</td>
<td>Environment Agency PM</td>
<td>-</td>
</tr>
<tr>
<td>C6.5</td>
<td>Maintain soft landscaping</td>
<td>Agree and implement a scheme of soft landscape maintenance</td>
<td>Updated Environment Agency Landscape Maintenance Plan</td>
<td>Environment Agency PM</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**C7. Surface water and flood risk**

- **C7.1** No action required

**C8. Estuarine processes and geomorphology**

- **C8.1** Ensure barrier is not affecting channel processes
  
  Carry out bathymetric surveys in conjunction with Harbour Master /PoB to identify any requirement for channel maintenance
  
  Bathymetric surveys | Environment Agency PM | ES Chapter 12

**C9. Contaminated land**

- **C9.1** Control building users
  
  Carry out routine checks of ground gas levels in control building and building to have appropriate ground gas management measures
  
  Employees and visitors | Environment Agency PM | ES Chapter 13

**C10. Navigation**

- **C10.1** Reduce the possibility of in-channel collisions due to the barrier
  
  Prepare a traffic management system in conjunction with the Harbour Master/PoB
  
  Traffic management system | Environment Agency PM to delegate to relevant Authority | ES Chapter 14

- **C10.2** Procedures in place for safe maintenance work to the barrier
  
  Regular hydrographic surveys carried out to monitor the bed level
  
  Programme of maintenance works produced every 6 months and disseminated to river users
  
  Survey results and dissemination of information | Environment Agency PM | ES Chapter 14

**C11. Traffic, transport and air quality**

- **C11.1** Reinstatement of
  
  Reinstall Boston Public Footpath No.14
  
  All routes reinstated | Contractor | ES Chapter 15
## Environmental Action Plan (EAP) - Boston Barrier Project

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Objective</th>
<th>Action</th>
<th>Target</th>
<th>Responsibility</th>
<th>Further information</th>
<th>Further action required</th>
<th>Sign off and date</th>
</tr>
</thead>
<tbody>
<tr>
<td>C11.2</td>
<td>Maintain footpaths and public highways</td>
<td>Ensure Boston Public Footpath No.14 (Macmillan Way) is maintained and any damage to public highways are repaired.</td>
<td>All routes</td>
<td>Contractor</td>
<td>ES Chapter 15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### C12. Community

C12.1 See C1.1 – C1.2

### C13. Waste and resources

C13.1 No action is required

### C14. General

C14.1 No action is required

---

### Table 20.7: Post construction sign-off

<table>
<thead>
<tr>
<th>Post construction sign-off</th>
<th>Organisation/Role</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Environment Agency NEAS Officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Site Supervisor/Environmental Clerk of Works</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contractor’s Project Manager</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This page has been left intentionally blank.
21 Conclusion

21.1 Introduction

21.1.1 This Report presents the findings of the work carried out within the EIA to support an application for consent by way of a Transport and Works Act Order for the Boston Barrier Project and an associated request for a direction deeming planning permission pursuant to Section 90(2A) of the Town and Country Planning Act 1990. The Report would also be used to support a separate application for a Marine Licence pursuant to the Marine and Coastal Access Act 2009 and a separate application for a Listed Building Consent.

21.1.2 The Environment Agency is seeking to manage the flood risk from the tidal River Witham (the Haven) in Boston, Lincolnshire. Defences immediately downstream of the barrier structure would be improved to a 1 in 300 standard of protection as a part of the barrier structure works. This level of protection is to ensure protection against a 0.33% (1 in 300) annual probability of flooding over the 100 year Project life.

21.1.3 The Project is located within and adjacent to the Haven, approximately 100m downstream of Black Sluice. The barrier structure is located adjacent to the Starch Berth (on the PoB Estate - left bank) and existing residential properties (along Wyberton Low Road - right bank) (National Grid Reference TF 32836 42826). The flood defences extend from Black Sluice to the WPD site on the right bank, and from the barrier structure to Maud Foster Sluice on the left bank.

21.1.4 This ES (Volume1 and Volumes 2a – 2d) addresses the key issues and assessment requirements identified in the Original Scoping Report (2011) and the Updated Scoping Report (2014).

21.2 Summary of the Environmental Statement

21.2.1 This Report includes an assumed description of the Project design, a summary of the environmental assessment process, general legislation and planning policy relevant to the Project (each of the ES (Volume 2a – 2d): Technical Reports include a summary of legislation and policy relevant to the discipline), and a summary of the consultation carried out to date to inform the Project. The Technical Chapters within this Report (Chapters 6 – 17) provide a summary of the associated Technical Reports which are located in Volumes 2a – 2d. These Chapters assessed the potential significant issues identified in the Updated Scoping Report (2014) and proposed management and mitigation measures to minimise the predicted significant impacts.

21.2.2 Each of the Technical Chapters within the ES includes a summary of the major and moderate effects which are considered significant, and in some cases minor effects which require further explanation.

21.2.3 A summary of the significant residual effects are discussed in Chapter 18 of this Report.
21.2.4 The current risk of flooding in Boston is constraining regeneration, business investment and confidence in the town, which would be significantly improved when the barrier is in place. Therefore, the Project would have beneficial significant residual effects for the wider community due to the reduced level of flood risk that would improve community resilience and well-being and protect historic assets.

21.2.5 This ES satisfies all requisite statutory requirements relevant to the Project. The Project would have significant environmental, economic and social benefits for Boston. Any significant disbenefits have been considered and mitigated for accordingly.

21.2.6 It is considered that the construction and operation of the Project is justified, taking into account environmental and economic considerations and is in accordance with the principles of sustainability.


Construction Industry Research and Information Association (CIRIA), (2002a) Control of water pollution from construction sites. Technical guidance (C648).

Construction Industry Research and Information Association (CIRIA), (2002b) Control of water pollution from linear construction projects. Site guide (C649).

Construction Industry Research and Information Association (CIRIA), (2010), Environmental Good Practice on Site.


England and Wales Environmental Permitting Regulations (2010), Department for the Environment, Food and Rural Affairs (Defra).


Environment Agency (2014), Pollution Prevention Guidelines.


Maritime Journal (MJ) (2003), Land & Waters jack-up mounted long reach excavator loads a split barge at Caversham.


Mott MacDonald (2014b). Boston Barrier Extended Phase 1 Habitat Survey Report. (IMAN001472).

Mott MacDonald (2014d), Ground Investigation Report.

Mott MacDonald (2015b) Boston Barrier Preliminary terrestrial Habitat Appraisal.


UK, Agriculture Act (1986), London, UK.


UK, Environmental Protection (Duty of Care) Regulations (1991) (as amended 2003), London UK.


### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEP</td>
<td>Annual Exceedance Probability</td>
</tr>
<tr>
<td>AL1, AL2</td>
<td>Action Level 1, Action Level 2</td>
</tr>
<tr>
<td>AOD</td>
<td>Above Ordnance Datum</td>
</tr>
<tr>
<td>BAP</td>
<td>Biodiversity Action Plan</td>
</tr>
<tr>
<td>BBC</td>
<td>Boston Borough Council</td>
</tr>
<tr>
<td>BGS</td>
<td>British Geological Survey</td>
</tr>
<tr>
<td>BS</td>
<td>British Standard</td>
</tr>
<tr>
<td>CC</td>
<td>Climate Change</td>
</tr>
<tr>
<td>CCME</td>
<td>Canadian Council of Ministers of the Environment</td>
</tr>
<tr>
<td>CEFAS</td>
<td>Centre for Environment, Fisheries and Aquaculture Science</td>
</tr>
<tr>
<td>CLEA</td>
<td>Contaminated Land Exposure Assessment</td>
</tr>
<tr>
<td>CLR</td>
<td>Contaminated Land Report</td>
</tr>
<tr>
<td>CS</td>
<td>Characteristic Situation</td>
</tr>
<tr>
<td>CSM</td>
<td>Conceptual Site Model</td>
</tr>
<tr>
<td>dB</td>
<td>Decibel</td>
</tr>
<tr>
<td>DMRB</td>
<td>Design Manual for Roads and Bridges</td>
</tr>
<tr>
<td>Defra</td>
<td>Department for the Environment, Food and Rural Affairs</td>
</tr>
<tr>
<td>DWS</td>
<td>Drinking Water Standard</td>
</tr>
<tr>
<td>EA</td>
<td>Environment Agency</td>
</tr>
<tr>
<td>EAP</td>
<td>Environmental Action Plan</td>
</tr>
<tr>
<td>EH</td>
<td>English Heritage</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Act</td>
</tr>
<tr>
<td>EQS</td>
<td>Environment Quality Standards</td>
</tr>
<tr>
<td>ES</td>
<td>Environmental Statement</td>
</tr>
<tr>
<td>FRM</td>
<td>Flood Risk Management</td>
</tr>
<tr>
<td>GEP</td>
<td>Good Ecological Potential</td>
</tr>
<tr>
<td>GI</td>
<td>Ground Investigation</td>
</tr>
<tr>
<td>GQA</td>
<td>General Quality Assessment</td>
</tr>
<tr>
<td>GRP</td>
<td>Glass reinforced plastic</td>
</tr>
<tr>
<td>HAT</td>
<td>High Astronomical Tide</td>
</tr>
<tr>
<td>HE</td>
<td>Historic England</td>
</tr>
<tr>
<td>HDPE</td>
<td>High-density polyethylene</td>
</tr>
<tr>
<td>HER</td>
<td>Historic Environmental Record</td>
</tr>
<tr>
<td>HGV</td>
<td>Heavy Goods Vehicle</td>
</tr>
<tr>
<td>HMWB</td>
<td>Highly/Heavily Modified Water Body</td>
</tr>
<tr>
<td>IDB</td>
<td>Internal Drainage Board</td>
</tr>
<tr>
<td>IEMA</td>
<td>Institute of Environmental Management and Assessment</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Definition</td>
</tr>
<tr>
<td>--------------</td>
<td>------------</td>
</tr>
<tr>
<td>LA</td>
<td>Local Authority</td>
</tr>
<tr>
<td>LCC</td>
<td>Lincolnshire County Council</td>
</tr>
<tr>
<td>LDS</td>
<td>Local Development Scheme</td>
</tr>
<tr>
<td>LOAEL</td>
<td>Lowest Observed Adverse Effect Level</td>
</tr>
<tr>
<td>LQM</td>
<td>Land Quality Management</td>
</tr>
<tr>
<td>MAGIC</td>
<td>Multi-Agency Geographic Information for the Countryside</td>
</tr>
<tr>
<td>MCGA</td>
<td>Marine Coast Guard Agency</td>
</tr>
<tr>
<td>MCERTS</td>
<td>Environment Agency - Monitoring Certificate Scheme</td>
</tr>
<tr>
<td>MDL</td>
<td>Method Detection Limit</td>
</tr>
<tr>
<td>MHWS</td>
<td>Mean High Water Springs</td>
</tr>
<tr>
<td>MLWM</td>
<td>Mean Low Water Mark</td>
</tr>
<tr>
<td>MLWS</td>
<td>Mean Low Water Springs</td>
</tr>
<tr>
<td>MMO</td>
<td>Marine Management Organisation</td>
</tr>
<tr>
<td>MRV</td>
<td>Minimum Reporting Value</td>
</tr>
<tr>
<td>NCA</td>
<td>National Character Area</td>
</tr>
<tr>
<td>NCF</td>
<td>National Contractor Framework</td>
</tr>
<tr>
<td>NE</td>
<td>Natural England</td>
</tr>
<tr>
<td>NEAS</td>
<td>National Environmental Assessment Service</td>
</tr>
<tr>
<td>NERC</td>
<td>Natural Environment research Council</td>
</tr>
<tr>
<td>NGR</td>
<td>National Grid Reference</td>
</tr>
<tr>
<td>NIRS</td>
<td>National Incident Reporting System</td>
</tr>
<tr>
<td>NOEL</td>
<td>No Observed Effect Level</td>
</tr>
<tr>
<td>NPPF</td>
<td>National Planning Policy Framework</td>
</tr>
<tr>
<td>NPPG</td>
<td>National Planning Policy Guidance</td>
</tr>
<tr>
<td>NPSE</td>
<td>Noise Policy Statement for England</td>
</tr>
<tr>
<td>PAH</td>
<td>Polycyclic Aromatic Hydrocarbon</td>
</tr>
<tr>
<td>PEL</td>
<td>Probable Effect Level</td>
</tr>
<tr>
<td>PAR</td>
<td>Project Appraisal Report</td>
</tr>
<tr>
<td>PoB</td>
<td>Port of Boston</td>
</tr>
<tr>
<td>PPG</td>
<td>Pollution Prevention Guidelines</td>
</tr>
<tr>
<td>PPV</td>
<td>Peak Particle Velocity</td>
</tr>
<tr>
<td>PRoW</td>
<td>Public Right of Way</td>
</tr>
<tr>
<td>RBMP</td>
<td>River Basin Management Plan</td>
</tr>
<tr>
<td>RSPB</td>
<td>The Royal Society for the Protection of Birds</td>
</tr>
<tr>
<td>SAC</td>
<td>Special Area of Conservation</td>
</tr>
<tr>
<td>SFFD</td>
<td>South Forty Foot Drain</td>
</tr>
<tr>
<td>SG</td>
<td>Statutory Guidance</td>
</tr>
<tr>
<td>SGV</td>
<td>Soil Guidance Value</td>
</tr>
<tr>
<td>SI</td>
<td>Statutory Instrument</td>
</tr>
</tbody>
</table>
### Abbreviation Definitions

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOAEL</td>
<td>Significant Observed Adverse Effect Level</td>
</tr>
<tr>
<td>SPA</td>
<td>Special Protection Area</td>
</tr>
<tr>
<td>SPL</td>
<td>Significant Pollutant Linkages</td>
</tr>
<tr>
<td>SR</td>
<td>Science Report</td>
</tr>
<tr>
<td>SSSI</td>
<td>Site of Specific Scientific Interest</td>
</tr>
<tr>
<td>SWMP</td>
<td>Site Waste Management Plan</td>
</tr>
<tr>
<td>TEL</td>
<td>Threshold Effect Level</td>
</tr>
<tr>
<td>TPH</td>
<td>Total Petroleum Hydrocarbons</td>
</tr>
<tr>
<td>TR</td>
<td>Technical Report</td>
</tr>
<tr>
<td>TWAO</td>
<td>Transport and Works Act Order</td>
</tr>
<tr>
<td>UKBAP</td>
<td>United Kingdom Biodiversity Action Plan</td>
</tr>
<tr>
<td>VDV</td>
<td>Vibration Dose Value</td>
</tr>
<tr>
<td>WFD</td>
<td>Water Framework Directive</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organisation</td>
</tr>
<tr>
<td>WLM</td>
<td>Water Level Management</td>
</tr>
<tr>
<td>WPD</td>
<td>Western Power Distribution</td>
</tr>
<tr>
<td>WRAP</td>
<td>Waste Reduction Action Plan</td>
</tr>
<tr>
<td>ZTV</td>
<td>Zone of Theoretical Vulnerability</td>
</tr>
</tbody>
</table>
This page has been left intentionally blank.
Appendices

A. Maps and Figures ......................................................... 254
B. Topics scoped into Environmental Statement ............................................. 286
C. Original Scoping Report Consultation .............................................................. 290
D. Updated Scoping Report Consultation ............................................................. 300
E. Stakeholder comments on the draft Environmental Statement (January 2016) ......................................................... 312
F. Updated Scoping Opinion Response ................................................................. 326
G. Identification of potential in-combination cumulative effects ........................................ 360
This page has been left intentionally blank.
A. Maps and Figures
This page has been intentionally blank.
B. Topics scoped into Environmental Statement
This page has been left intentionally blank.
### Table B.1: Topics scoped into Environmental Statement

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction – in-channel works</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alterations to dock entrance from The Haven</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alterations within Wet Dock to create additional berth</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Temporary navigation and flow channel dredging</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Barrier structure cofferdam</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Upstream &amp; downstream, left and right bank barrier training walls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Barrier structure and piling to accommodate future fish and eel pass</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Upstream &amp; downstream moorings</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Right bank barrier tie-in walls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Backfill right bank tie-in structure</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Scour protection</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td><strong>Construction – land-based works</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wet Dock flood gate (outside dock)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Right bank piled flood wall</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
Boston Barrier Tidal Project
A17/1 – Environmental Statement: Volume 1: Main Report

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporary piled cell for navigation and flow channel</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left bank piled flood walls (dock flood gate to Maud Foster Sluice)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barrier control building</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left bank flood walls along quay (flood gate to barrier)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right bank access road</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete right bank flood wall finishes</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right bank landscaping</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Operation – in-channel works**

| Tidal barrier                                                   | ✓        | ✓               | ✓                     |                                 |                                             | ✓                  | ✓               |                             | ✓   | ✓                          | ✓                                     | ✓                           |
| Scour protection                                                | ✓        |                 |                       |                                 |                                             |                    | ✓               |                             |     |                            |                                   |                             |
| Maintenance dredging                                           | ✓        | ✓               | ✓                     |                                 |                                             | ✓                  | ✓               |                             |     |                            |                                   |                             |

**Operation – land-based works**

| Flood Walls and Control Building                                | ✓        | ✓               |                       |                                 |                                             |                    | ✓               |                             |     |                            |                                   |                             |
| Right bank access road                                          | ✓        |                 |                       |                                 |                                             |                    |                 |                             |     |                            |                                   |                             |
C. Original Scoping Report Consultation
This page has been left intentionally blank.
Table C.1: Original Scoping Report stakeholder consultation and location of responses

<table>
<thead>
<tr>
<th>Body / Organisation</th>
<th>Key matters raised</th>
<th>Location of response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anglian Water</td>
<td>Heightened surface water levels impacting on surface water outfalls and sewer overflows.</td>
<td>See ES (Volume 2c): Flood Risk Assessment.</td>
</tr>
<tr>
<td>Black Sluice IDB</td>
<td>Project influence on drainage of the Witham Catchment, including the South Forty Foot Catchment.</td>
<td>Given that the barrier will not significantly alter water levels, no consideration has been given to the influence on drainage elsewhere.</td>
</tr>
<tr>
<td></td>
<td>Barrier structure affecting levels of fluvial protection along the River Witham.</td>
<td>See ES (Volume 2c): Flood Risk Assessment.</td>
</tr>
<tr>
<td></td>
<td>Construction of cofferdam in the Haven causing increase flood levels upstream of Grand Sluice and in South Forty Foot Flood Catchment.</td>
<td>See ES (Volume 2c): Flood Risk Assessment.</td>
</tr>
<tr>
<td></td>
<td>The flow of water through the temporary by-pass channel could undermine temporary works.</td>
<td>Engineering design has looked at scour potential and temporary works designed with these considerations in mind.</td>
</tr>
<tr>
<td></td>
<td>Size of the by-pass channel should be dictated by Flood Risk Management requirements.</td>
<td>Engineering design has looked at scour potential and temporary works designed with these considerations in mind.</td>
</tr>
<tr>
<td>Fisheries and</td>
<td></td>
<td>See ES (Volume 1): Appendix A; Maps and Figures: Figure 1.1: Site Application Boundary for the Project Footprint</td>
</tr>
<tr>
<td></td>
<td>Confirm area affected by the Project works (19ha) refers to the ‘direct footprint’ of construction works or estimated overall affected area, including potential downstream effects.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The EIA to include an assessment of potential impacts relating to water quality and receptor habitats, as a result of capital and maintenance dredging and associated spoil disposal.</td>
<td>See ES (Volume 2b): Navigational Impact Assessment Technical Report.</td>
</tr>
<tr>
<td>Body / Organisation</td>
<td>Key matters raised</td>
<td>Location of response</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Commercial fishermen are an important component of the local community and potential impact pathways to be identified in the EIA</td>
<td>See ES (Volume 2a): Cultural Heritage Technical Report and ES (Volume 2d) Navigational Impact Assessment Technical Report</td>
</tr>
<tr>
<td></td>
<td>Cultural heritage of the town’s fishing fleet should be considered</td>
<td>See ES (Volume 2a): Cultural Heritage Technical Report</td>
</tr>
<tr>
<td></td>
<td>Waste and Resource Efficiency Clarification needed on which aspects of waste and resource efficiency are being scoped out of the EIA</td>
<td>See ES (Volume 1): Chapter 2</td>
</tr>
<tr>
<td></td>
<td>The Wash shellfish beds have been highlighted as key sensitive locations.</td>
<td>See ES (Volume 2b): Ecology and Nature Conservation Technical Report.</td>
</tr>
<tr>
<td></td>
<td>The Authority would expect the Agency to undertake long-term dialogue with commercial and recreational fishing representatives before and during construction, and during operation of the project to minimise impacts on these communities.</td>
<td>See ES (Volume 2c): Navigational Impact Assessment Technical Report.</td>
</tr>
<tr>
<td>Historic England</td>
<td>We would expect that the EIA examines the potential impacts upon all designated heritage assets and their settings together with potential impacts on non-designated features of historic or architectural interest and value, since these make an important contribution to the local distinctiveness of an area and its sense of place. This covers buildings, historic open spaces, historic features and the wider historic landscape including below-ground archaeology. English Heritage strongly advises that the local authority’s conservation and archaeology advisors are closely involved throughout the preparation of the EIA. They are best placed to advise on: local historic environment issues and priorities; how the policy or proposal can be tailored to minimise potential adverse impacts on the historic environment; the nature and design of any required mitigation measures; and opportunities for securing wider benefits for the future conservation and management of heritage assets.</td>
<td>See ES (Volume 2a): Cultural Heritage Technical Report.</td>
</tr>
<tr>
<td></td>
<td>A full version of the response from English Heritage can be provided on request.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Particular attention is drawn to: The impact of the proposed left bank flood wall on the Maud Foster Sluice</td>
<td>See ES (Volume 2a): Cultural Heritage Technical Report and ES (Volume 2a): Landscape and Visual</td>
</tr>
<tr>
<td>Body / Organisation</td>
<td>Key matters raised</td>
<td>Location of response</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>The impact of the scheme (flood walls and the barrier itself) on the setting of listed buildings (including the listed Maud Foster Sluice, Church of St Nicholas, and the Skirbeck Road conservation area).</td>
<td>Impact Assessment Technical Report.</td>
</tr>
<tr>
<td></td>
<td>The impact of changes to the tidal regime in The Haven on the historic character of the town.</td>
<td>See ES (Volume 2a): Cultural Heritage Technical Report</td>
</tr>
<tr>
<td></td>
<td>Impacts associated with the use of the new flood barrier once operational</td>
<td>See ES (Volume 2a): Cultural Heritage Technical Report</td>
</tr>
<tr>
<td></td>
<td>There will be a negative impact on the historic character and appearance of the town centre, including the conservation area and listed buildings from the reduced tidal range in the summer months; the changing tide which exposes the mud banks is a key part of the town’s historic character.</td>
<td>See ES (Volume 2a): Cultural Heritage Technical Report</td>
</tr>
<tr>
<td></td>
<td>The heritage assets and their settings (usually historic buildings, monuments, areas, landscapes, archaeological remains) that may be affected, whether designated or not. This should include reference to the anticipated geographical extent of the impacts</td>
<td>See ES (Volume 2a): Cultural Heritage Technical Report</td>
</tr>
<tr>
<td></td>
<td>At some stage in the EIA process we would expect to see details of proposed viewpoints for photomontages to be created so that setting impact on heritage assets can be properly assessed</td>
<td>See ES (Volume 2a): Landscape and Visual Impact Assessment Technical Report: Appendix B: Landscape Plan</td>
</tr>
<tr>
<td></td>
<td>The anticipated broad approach to mitigation and enhancement</td>
<td>Mitigation, where required, is incorporated across the entire ES.</td>
</tr>
<tr>
<td></td>
<td>The proposed structure of the historic environment component of the Environmental Statement and its relationship to other topics.</td>
<td>See ES (Volume 2a): Cultural Heritage Technical Report</td>
</tr>
<tr>
<td>Environment Agency:</td>
<td>The main issues for F&amp;B revolve around fish access both up and downstream and the relationship of water levels and fish access through the South Forty Foot lock/control gates.</td>
<td>See ES (Volume 2b): Ecology and Nature Conservation Technical Report. Provision for a fish pass has also been included; see ES (Volume 1): Chapter 2.</td>
</tr>
<tr>
<td>Biodiversity (F&amp;B)</td>
<td>Impact of water quality on surface water only mentions the Haven and should include downstream impact on The Wash and potential impact on Shellfish bed industry within The Wash.</td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>It is difficult to predict how benthic invertebrates “upstream” of the barrier will be affected by the barrier operations. Some species may flourish, while others will be knocked back. The altered tidal cycle, flow regimes, salinity etc. during summer will almost certainly affect the invertebrate communities in some way, either enriching them or reducing them further. It is an inevitable consequence of the project, which will hopefully be assessed and monitored once the barrier is operational.</td>
<td>See ES (Volume 2b): Ecology and Nature Conservation Technical Report and ES (Volume 2b): Surface Water and Flood Risk Technical Report; Appendix B: Preliminary Water Framework Directive Assessment.</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring, Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>and Research</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Boston Barrier Tidal Project

**A17/1 – Environmental Statement: Volume 1: Main Report**

<table>
<thead>
<tr>
<th>Body / Organisation</th>
<th>Key matters raised</th>
<th>Location of response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment Agency: Northern Area Development and Flood Risk</td>
<td>Flood Defence Consent will be needed for the barrier, the application for which will need to include a WFD assessment and details of the proposed fish / eel pass to ensure the Flood Defence Consent application complies with the relevant legislation.</td>
<td>No fish pass, just sheet piled provision for one. Please see ES (Volume 2b): Surface Water and Flood Risk Technical Report; Appendix B; Preliminary Water Framework Directive Assessment.</td>
</tr>
<tr>
<td>Environment Agency: Northern Area Environment and Performance Team</td>
<td>As part of the EIA, there should be a section on flood risk. It is clear that the proposed barrier will be an improvement to the current situation for Boston, but you also need to consider the residual risk. Where there is an increase in defence heights etc., the residual risk may also increase so further assessment on the impacts of a failure of the structure and a breach in the raised defences must be discussed and in particular the new flood gate crossing the Wet Dock. As part of the study it would be useful to consider overtopping as well as a breach both pre and post barrier. The Flood Risk section would also need to consider the operation of the barrier in flood conditions, especially the susceptibility of the control room.</td>
<td>See ES (Volume 2c): Flood Risk Assessment.</td>
</tr>
<tr>
<td>Environment Agency: Northern Area Environment and Performance Team</td>
<td>Long term impact of alteration of water level range on structural components of existing banks and defences e.g. accelerated corrosion of steel sheet piling should be considered.</td>
<td>See ES (Volume 2b): Surface Water and Flood Risk Technical Report.</td>
</tr>
<tr>
<td>Environment Agency: Northern Area Environment and Performance Team</td>
<td>Changes in silt erosion and deposition rates may be rapid (i.e. immediate rather than short, medium or long term) following commissioning and monitoring/contingency arrangements should be assumed as required rather than considered a risk.</td>
<td>See ES (Volume 2b): Estuarine and Geomorphology Processes Technical Report.</td>
</tr>
<tr>
<td>Environment Agency: Northern Area Environment and Performance Team</td>
<td>Generally, clear agreements on the long term funding of maintenance requirements are as essential as the design standards of the structure on both operational and environmental impacts.</td>
<td>See ES (Volume 1): Chapter 2.</td>
</tr>
<tr>
<td>Environment Agency: Northern Area Environment and Performance Team</td>
<td>This section should consider the long term impact of climate change associated with the reference to the steadily increasing usage described in your consultation letter.</td>
<td>See ES (Volume 2c): Flood Risk Assessment.</td>
</tr>
<tr>
<td>Environment Agency: Northern Area Environment and Performance Team</td>
<td>The long term impacts on and the responsibilities of riparian ownership should be clearly understood. Changes in natural processes could lead to structures becoming difficult to maintain leading to dereliction leading to environmental impacts.</td>
<td>See ES (Volume 2b): Surface Water and Flood Risk Technical Report.</td>
</tr>
<tr>
<td>Environment Agency: Waterways</td>
<td>Land Use The area protected will still be low lying and at flood risk and therefore not preferable under PPS25 for future development. It is essential that the residual flood risk is clearly understood from a holistic approach towards flooding from all sources.</td>
<td>See ES (Volume 2b): Surface Water and Flood Risk Technical Report.</td>
</tr>
<tr>
<td>Environment Agency: Waterways</td>
<td>Navigation receptors and pathways In-channel obstructions within The Haven etc. will also affect leisure craft including Boston Motor Yacht Club, Witham Sailing Club and other craft e.g. those registered with British Waterways and Environment Agency (cruisers, narrow boats etc.).</td>
<td>See ES (Volume 2d): Navigational Impact Assessment Technical Report.</td>
</tr>
<tr>
<td>Body / Organisation</td>
<td>Key matters raised</td>
<td>Location of response</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Would be helpful to differentiate between navigation on The Haven upstream of the barrier versus navigation downstream of the barrier out to The Wash, as the effects on each will differ.</td>
<td>See ES (Volume 2d) Navigational Impact Assessment Technical Report.</td>
</tr>
<tr>
<td></td>
<td>It is likely that the barrier will change siltation patterns in The Haven both upstream and downstream of the barrier (possibly also upstream of Black Sluice and Grand Sluice). It is important to understand this in some detail as it will affect navigation and long-term maintenance requirements/costs, dredging requirements etc.</td>
<td>See ES (Volume 2b): Estuarine and Geomorphology Processes Technical Report.</td>
</tr>
<tr>
<td></td>
<td>Archaeology and heritage assets receptors and pathways: Wrecks may be removed from The Haven upstream of the barrier to clear the navigation and improve visual amenity; this would have various effects/risks which must be considered.</td>
<td>See ES (Volume 2a): Cultural Heritage Technical Report.</td>
</tr>
<tr>
<td></td>
<td>Potential Opportunities identified include: There is an opportunity to create attractive facilities around/in association with the barrier, e.g. for boaters, cyclists, local residents, tourists etc.</td>
<td>See ES (Volume 2a): Landscape and Visual Impact Assessment Technical Report.</td>
</tr>
<tr>
<td></td>
<td>Waste and resource efficiency: There is an opportunity to incorporate energy efficient technologies into the barrier and its control facilities, as well as to install renewable energy sources such as wind turbines, solar panels and hydroelectric generation. This could reduce long-term management costs.</td>
<td>The provision of such devices was scoped out of the assessment on the basis of feasibility and practicality.</td>
</tr>
<tr>
<td>Environment Agency</td>
<td>The two main issues (set out below) have already been picked up in the scope of work. 1. Reduced effectiveness of drainage (outfalls/Combined Sewers Overflows) upstream of the barrier. 2 - Increased concentration of nutrients and eutrophication upstream of the barrier caused by in-channel obstructions within The Haven.</td>
<td>See ES (Volume 2b): Surface Water and Flood Risk Technical Report and ES (Volume 2b): Estuarine and Geomorphology Processes Technical Report.</td>
</tr>
<tr>
<td>Water Quality</td>
<td>For water resources there does not appear to be any issues however, it will be important to account for the impact raised water levels may have on abstraction licence holders and any other protected rights both upstream and downstream of the barrier (i.e. any lawful but unlicensed use of water). Although the impact may not be negative the users should be aware of any changes that could take place</td>
<td>Water Level Management is no longer considered for the Project.</td>
</tr>
<tr>
<td>Lincolnshire Wildlife</td>
<td>We believe you have identified the major issues and we have no others to add at this stage, although further investigation may lead to other concerns being raised, e.g. in the context of effects upstream due to changes in salinity, sediment, etc. Of particular concern are impacts on</td>
<td>See ES (Volume 1): Chapter 10 and ES (Volume 2b): Surface Water and Flood Risk Technical Report; Appendix B Preliminary Water Framework Directive</td>
</tr>
</tbody>
</table>
## Key matters raised

<table>
<thead>
<tr>
<th>Body / Organisation</th>
<th>The Wash and the need to identify a suitable site(s) for the establishment of replacement habitat, which must function in advance of the construction works.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural England</td>
<td>The ES should take into account all aspects of nature conservation interest. Reference to the national, regional and local planning context should be made, where applicable, for the consideration of any impacts on nature conservation. Potential impacts on designated nature conservation sites, habitats and species subject to UK and EU legislation, UK and local BAP habitats and species, and other features of importance to biodiversity need to be properly addressed.</td>
</tr>
<tr>
<td></td>
<td>The ES should seek ways to enhance biodiversity and contribute to green infrastructure as part of the project. Where applicable, it should identify opportunities for the creation and restoration of habitats appropriate to the locality and include plans to retain existing important landscape features such as mature trees and hedgerows. In particular, the scheme should seek opportunities to implement habitat creation that contribute to local and regional biodiversity targets as set out in the <em>Biodiversity Action Plan for Lincolnshire</em>.</td>
</tr>
<tr>
<td></td>
<td>Protected species are a material consideration in planning matters. The ES should detail the impacts that the proposed development might have on protected species. Surveys should be carried out for all protected species that might be affected. Details of mitigation required to prevent or minimise adverse impacts should be provided.</td>
</tr>
<tr>
<td></td>
<td>A visual and landscape character appraisal should be undertaken, based on good practice guidelines. The detailed proposals for the development should reflect this work.</td>
</tr>
<tr>
<td></td>
<td>A traffic and Access Assessment should be undertaken which identifies any existing roads, public transport, rights or way, cycle routes and pedestrian provisions in the vicinity of the development. This should take account of any negative and positive impacts upon these facilities and highlight improvements that will be included as part of the development. It should also take into account the Lincolnshire County Council’s Rights of Way Improvement Plan.</td>
</tr>
<tr>
<td></td>
<td>We expect applications to identify and maximise opportunities to add to multifunctional green infrastructure.</td>
</tr>
<tr>
<td>Port of Boston</td>
<td>The scale of capital dredging associated with the works, and how this can be minimised, due to increased dredging and the possible need for a new licensed dump site within the EMS, SAC, SPA, and SSSI.</td>
</tr>
<tr>
<td></td>
<td>The likely change to sediment accretion, leading to a future increase in maintenance dredging requirements, not only in the immediate vicinity of the barrier, but also further afield down river (up river issues dependent upon who ends up with navigational jurisdiction).</td>
</tr>
<tr>
<td></td>
<td>The separation of the fishing fleet from commercial shipping traffic in order to reduce the risk of collisions (thereby reducing the risk of accidental spillage of oils, etc. into the watercourse).</td>
</tr>
<tr>
<td></td>
<td>Given that The Haven is already a highly managed and modified water course, and that the barrier works are effectively located within an urban semi-industrial zone, I suggest that your assessment needs to give much greater weight to the impacts on ‘navigation’ and ‘estuarine processes and geomorphology’.</td>
</tr>
</tbody>
</table>

## Location of response

### Key matters raised

**The position of the barrier structure within the channel is influential on the scale of dredging (capital and maintenance).** We believe that locating the barrier structure adjacent to the right bank would minimise the scale of dredging required for the temporary by-pass channel, and once completed might reduce the accretion of materials immediately downstream of Black Sluice Lock (currently a problem).

**Indicative Timescale** - you show in your letter all of the construction occurring within the 2016-2018 period. In fact, I think it has already been acknowledged that we would be seeking completion of the Wet Dock crossing prior to any in-channel works commencing on the barrier. This is likely to require some advanced works, which would at the very least commence during 2015. I suggest that future descriptions of timescale incorporate an appropriate caveat to this possibility.

**Witham Fourth Internal Drainage Board**

The proposed barrier should present no increased fluvial flood risk to our District. The barrier and bank raising works are upstream of both any Witham Fourth IDB discharges and the outfall of the Maud Foster. Therefore the only remaining risk is presented by the project’s impact on the River Witham.

A failure to allow the fluvial Witham to function correctly has the potential to increase flood risk to a vast area, creating a significant environmental threat. Therefore, the project should be shown to make no increase in the fluvial flood risk posed by the River Witham (both from temporary works or the finished project).

The proposals to incorporate a fish and eel pass seem ill-founded as the structure is intended to provide normal flow for much of the day.

Dredged materials, once dry, could provide a valuable resource for future bank raising, therefore a practical location near to existing defences should be considered for disposal.

Of concern would be changes to the sediment deposition / erosion regime in The Haven, in particular adjacent to the Board’s Hobhole Pumping Station. Is this likely to change at this location? If so, in what way?

---

**Location of response**


See ES (Volume 1): Chapter 2.


See ES (Volume 2c): Flood Risk Assessment.

See ES (Volume 1): Chapter 2.

D. Updated Scoping Report Consultation
This page has been left intentionally blank.
<table>
<thead>
<tr>
<th>Organisation</th>
<th>Summary of Matters Raised</th>
<th>Location of response within the ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Sluice IDB</td>
<td>Page 74, Conclusion; temporary navigation and flow channel information is required.</td>
<td>See ES (Volume 1): Chapter 14 and (Volume 2d) Navigational Risk Assessment Technical Report.</td>
</tr>
<tr>
<td>Canal and River Trust</td>
<td>The Canal and River Trust is owner and operator of the River Witham north of the Grand Sluice. It does not appear likely that the proposed works to deliver the barrier will have any direct impact on our assets. However, it will be important to ensure that the scheme does not prevent the continued navigation of boats at the Grand Sluice in either direction, and would ask that this is taken into account when considering any changes in water levels which may occur as a result of the proposed works.</td>
<td>See ES (Volume 1): Chapter 14 and (Volume 2d) Navigational Risk Assessment Technical Report.</td>
</tr>
<tr>
<td>Eastern Inshore Fisheries and Conservation Authority</td>
<td>The non-inclusion of any reference to the Boston Pirates Small Boat Angling Club in the scoping report and the extent to which their operations will be affected by the potential works. The Authority has previously provided the contact details of representative but the updated scoping document does not refer to any consultation with this group.</td>
<td>The Boston Pirates Small Boat Angling Club were consulted and it was determined that no further mitigation was required than what is currently proposed.</td>
</tr>
<tr>
<td>Environment Agency</td>
<td>A statutory EIA should, according to the EIA Directive (and of course, the various EIA Regulations that have been transposed from it into UK law), only cover those topics that are considered to have a significant impact/effect on the environment. As explained in the body of the scoping report for the Boston Barrier, we do not consider that air quality effects, either on the structure and WLM, or resulting from the structure and WLM during both during construction and operation, to be significant. We are therefore of the opinion that this topic should not be considered further for this particular scheme. Due to changes in the construction of the Barrier, please see the ES (Volume 2d): Air Quality Technical Note, (Volume 2d): and the ES (Volume 1): Chapter 16.</td>
<td></td>
</tr>
<tr>
<td>Historic England</td>
<td>The impact of the proposed barrier and associated structures including the proposed new moorings (and secondary effects such as wash) should be examined in detail in respect of sediments likely to contain archaeological and palaeo-environmental remains. Such remains are of importance in both the understanding of the port of Boston and the wider context of Coastal, North Sea and Baltic commerce. This matter should be treated through the detailed specification of an intrusive sampling and analysis strategy. Also requiring detailed treatment (cf section 5.4.3 of the scoping report) are issues of the setting impacts of the proposed flood walls and gates upon the significance of the Grade II* listed Church of St Nicholas, the Conservation Area and the Grade II listed Maud Foster Sluice. English Heritage have published guidance on the analysis of heritage setting issues which should be referenced and used in this context. <a href="https://www.english-heritage.org.uk/publications/setting-heritage-assets/">https://www.english-heritage.org.uk/publications/setting-heritage-assets/</a> Work on setting impacts should inform options assessment for the design, detailing and finishing of the new structures.</td>
<td>See ES (Volume 1): Chapter 6 and the ES (Volume 2a): Cultural Heritage Technical Report. See ES (Volume 1): Chapter 6 and 7 and the ES (Volume 2a): Cultural Heritage Technical Report and Landscape and Visual Impact Assessment Technical Report. See ES (Volume 1): Chapter 6 and 7 and the ES (Volume 2a): Cultural Heritage Technical Report and Landscape and Visual Impact Assessment Technical Report.</td>
</tr>
<tr>
<td>Lincolshire CC</td>
<td>This Authority would recommend that the work is updated by use of the County Historic Environment</td>
<td>See ES (Volume 1): Chapter 6 and 7 and the ES (Volume 2a): Cultural Heritage Technical Report and Landscape and Visual Impact Assessment Technical Report.</td>
</tr>
<tr>
<td>Organisation</td>
<td>Summary of Matters Raised</td>
<td>Location of response within the ES</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>MCGA</td>
<td>A navigation risk assessment should be undertaken to supply detail on possible impacts to commercial and recreational craft, namely collision risk, risk management, emergency response, lighting and marking of the site and information to mariners. It may also have affect the Class V passenger vessels that work out of the Port of Boston and leave the port by the river for maintenance and out of water surveys at Fosdyke. The EA should therefore consult, and liaise with, with the Port of Boston harbourmaster, Capt Richard Walker (<a href="mailto:harbourmaster@portofboston.co.uk">harbourmaster@portofboston.co.uk</a>). He may be able to provide contact details for fishermen using the river who should also be consulted for their collective views.</td>
<td>See ES (Volume 1): Chapter 14 and (Volume 2d) Navigational Risk Assessment Technical Report.</td>
</tr>
<tr>
<td>MMO</td>
<td>The applicant is seeking a deemed marine licence through the TWAO for those applicable activities in the marine environment. Therefore, the MMO is not making a regulatory decision that will require a consent under the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended). [Note: it is no longer proposed to seek a deemed marine licence through the TWAO application in light of correspondence received from Defra requesting that a separate marine licence application is made to the MMO and accordingly the MMO will require to make a regulatory decision.] The MMO advise that due to the location of the proposed works, the ES will need to have regard to the Eastern Inshore Marine Plan Area. The report highlights that the Boston Barrier scheme also has the potential to increase tourism opportunities (for example, linked to boating and the town’s maritime history). However, the report makes no mention of any intention to assess or quantify the effects that the Project could potentially have. MMO recommend that the ES includes a detailed assessment of the potential tourism-related socio-economic impacts of the development both for the town of Boston and the immediate surrounding area. Recommendation that, in addition to the local harbour authority, EA consult both the Maritime and Coastguard Agency and the Corporation of Trinity House regarding the preparation and content of the proposed Navigational Risk Assessment. This assessment should inform and be included within ES. MMO identified the following activities which would require consent under the Marine and Coastal Access Act 2009: 1. Construction and installation of the tidal barrier plus fish and eel passes; installation of scour protection; dredging and disposal of dredge material to sea; piling works; installation of a new gate at the Wet Dock Lock; temporary and permanent moorings; construction of a new quay facilities; and cofferdam and temporary bypass channel construction.</td>
<td>See ES (Volume 1): Section 1.4.</td>
</tr>
<tr>
<td>Organisation</td>
<td>Summary of Matters Raised</td>
<td>Location of response within the ES</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>MMO (Conti...)</td>
<td>It is possible that other aspects of the land-based works will require a marine licence. For example, it is not clear from the scoping report whether any of the new or upgraded flood defence structures will require access through or works below MHWS.</td>
<td>See ES (Volume 1): Chapter 5.</td>
</tr>
<tr>
<td>MMO (Conti...)</td>
<td>The MMO notes EA’s intention to transport materials and machinery for the Project primarily by barge and to liaise closely with interested parties (such as Boston Sailing Club) in relation to any potential effects and possible mitigation measures arising from the Barrier scheme.</td>
<td>See ES (Volume 1): Chapter 5.</td>
</tr>
<tr>
<td>MMO (Conti...)</td>
<td>The commercial navigational impacts are included separately under the Commercial Navigation section of the report and we welcome EA’s intention to prepare a detailed Navigational Risk Assessment for inclusion with the ES. The Assessment should include any prospective implications for recreational navigation.</td>
<td>See ES (Volume 1): Chapter 14 and ES (Volume 2d): Navigational Risk Assessment Technical Report.</td>
</tr>
<tr>
<td>MMO (Conti...)</td>
<td>The MMO would also recommend that EA consult the RYA, as the national body for all forms of recreational boating, on that aspect.</td>
<td>See ES (Volume 1): Chapter 5.</td>
</tr>
<tr>
<td>MMO (Conti...)</td>
<td>MMO welcome EA’s plans to further assess the noise and vibration impacts of the proposed scheme within the EIA – including the impacts on sensitive marine receptors from the construction activities. The ES will need to include details of proposed pile diameters, pile depths and piling methodology. We also recommend that the ES includes an assessment of ongoing impacts on sensitive marine receptors and possible mitigation measures arising from the ongoing operation of the barrier structure.</td>
<td>See ES (Volume 1): Chapter 9 and the ES (Volume 2a): Noise and Vibration Technical Report.</td>
</tr>
<tr>
<td>MMO (Conti...)</td>
<td>The MMO notes that EA has undertaken previous hydrodynamic sediment modelling in relation to the Project and their intention to undertake further flow and sediment modelling as part of the EIA. The ES will need to include all relevant technical reports to enable the MMO to determine their appropriateness and to review the validation and calibration techniques.</td>
<td>See ES (Volume 1): Chapter 12 and the ES (Volume 2b): Estuarine Process and Geomorphology Technical Report.</td>
</tr>
<tr>
<td>MMO (Conti...)</td>
<td>If the design of the project has changed since the 2011 modelling was undertaken, a new modelling exercise should be performed to inform of potential changes to the hydrodynamics and sediment dynamics. Modelling should be undertaken for all aspects of the construction and possible stages of the Barrier throughout its operation to provide a realistic scenario of the potential impacts which may occur. Where the design and construction methodology is still to be determined, the modelling will need to be based on a worst case scenario.</td>
<td>See ES (Volume 1): Chapter 12 and the ES (Volume 2b): Estuarine Process and Geomorphology Technical Report.</td>
</tr>
<tr>
<td>MMO (Conti...)</td>
<td>Section 5.9.1 of the report indicates that some accretion may occur in small, localised areas (such as the river quay wall opposite Black Sluice) as a result of the Project. However, the Project may also have implications for erosion (which is not mentioned in the report). The ES will need to include full details of any potential accretion and erosion impacts - including both anticipated rates and locations.</td>
<td>See ES (Volume 1): Chapter 12 and the ES (Volume 2b) Estuarine Process and Geomorphology Technical Report.</td>
</tr>
<tr>
<td>MMO (Conti...)</td>
<td>The MMO notes and agrees with the potential impacts identified. The ES should include an assessment of the potential impacts on physical processes from dredging the channel as well as any impacts from dredge material disposal to a designated disposal site and the potential increase in maintenance dredging from the presence of the barrier.</td>
<td>See ES (volume 1): Chapter 12 and the ES (Volume 2b): Estuarine Process and Geomorphology Technical Report.</td>
</tr>
<tr>
<td>MMO (Conti...)</td>
<td>The ES should also detail the amount, type and location of the scour protection and include an assessment of how the Project will impact channel width and the potential impacts on the physical processes of the area.</td>
<td>See ES (Volume 1): Chapter 14 and the ES (Volume 2d): Navigational Risk Assessment Technical Report.</td>
</tr>
<tr>
<td>MMO (Conti...)</td>
<td>The report presents some basic maps of the nature of the habitats that fall within the region of potential impacts (e.g., saltmarsh, mud-flats) and is appropriate to provide a basic framework for the</td>
<td>See ES (volume 1): Chapter 10 and the ES (Volume 2b): Ecology and Nature</td>
</tr>
<tr>
<td>Organisation</td>
<td>Summary of Matters Raised</td>
<td>Location of response within the ES</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>MMO (Conti…)</td>
<td>The report acknowledges the limitations of the fisheries surveys that have been carried out between 2011 and 2014 in that they can only provide a snapshot of habitat and species in the study area. We recommend that EA use other potential sources of information to supplement the survey data to support any impact assessment in the ES.</td>
<td>See ES (volume 1): Chapter 10 and the ES (Volume 2b): Ecology and Nature Conservation Technical Report.</td>
</tr>
<tr>
<td>MMO (Conti…)</td>
<td>We note that smelt are present in all the surveys carried out and these are a UK BAP priority species. There are other UK BAP priority species that also need to be highlighted for their conservation status (specifically, eels) within the ES along with an appropriate impact assessment.</td>
<td>See ES (volume 1): Chapter 10 and the ES (Volume 2b): Ecology and Nature Conservation Technical Report.</td>
</tr>
<tr>
<td>MMO (Conti…)</td>
<td>We note also that Flora and Fauna Biodiversity is scoped out of the temporary piled cell for alterations within the Wet Dock to create additional berth and navigation and flow channel. However, it is not clear why the effect of noise produced from these activities is thought to have no effect on aquatic animal communities in surrounding areas. This location is likely to be a herring nursery area and herring are sensitive to the impacts of noise. This will need to be assessed and considered as part of the impact assessment.</td>
<td>See ES (volume 1): Chapter 10 and the ES (Volume 2b): Ecology and Nature Conservation Technical Report.</td>
</tr>
<tr>
<td>MMO (Conti…)</td>
<td>Although there are no mollusc fisheries within the immediate vicinity of the Project, there are several substantial stocks in the western area of the Wash. The impacts from the scheme on these beds should be assessed. There is scope for potential impacts from the initial capital and ongoing maintenance dredging that will be required to maintain the channel. These will need to be fully assessed within the ES once the volumes, frequency and duration of such dredging are known.</td>
<td>See ES (volume 1): Chapter 10 and the ES (Volume 2b): Ecology and Nature Conservation Technical Report.</td>
</tr>
<tr>
<td>MMO (Conti…)</td>
<td>We recommend that the ES includes a separate Habitats Regulations Assessment Chapter detailing and/or signposting to the supporting evidence and information (including any plans/projects that could have an in-combination effect on the designated sites) that will enable the MMO to undertake that assessment.</td>
<td>See the ES (Volume 2b): Ecology and Nature Conservation Technical Report.</td>
</tr>
<tr>
<td>MMO (Conti…)</td>
<td>The MMO notes that some of the information with regards to the potential impacts from the construction and operational works are included within the Water Framework Directive (WFD) appraisal and this is referenced throughout the report. We would recommend that the ES includes a WFD appraisal as a separate chapter along with details of all potential impacts.</td>
<td>See the ES (Volume 2b): Surface Water and Flood Risk Technical Report (volume 2b): Appendix B: Water Framework Directive.</td>
</tr>
<tr>
<td>MMO (Conti…)</td>
<td>The MMO also recommends that the ES identifies the likely level of sediment accumulation that may occur on the barrier and suspended sediment concentration levels from the regular disturbance and redistribution of sediment arising from its operation. These should be assessed, in particular, against those fish species highlighted above as well as any wider impacts.</td>
<td>See ES (Volume 2b): Ecology and Nature Conservation Technical Report and the Estuarine and Geomorphology Technical Report.</td>
</tr>
<tr>
<td>MMO (Conti…)</td>
<td>The report acknowledges that the removal of sediment material needs to be treated as waste and, as such, needs to be handled, transported, treated and/or disposed of in line with the Environmental Permitting Regulations 2010 and the Environmental Protection (Duty of Care) Regulations 1991 (as amended). The removal of dredged sediment material is also classified as waste under the Waste Framework Directive (Directive 2008/98/EC) (WaFD) and its disposal within the marine environment is also governed by the London and OSPAR conventions, both of which are concerned with protecting the marine environment from human activities, notably the pollution arising from those activities.</td>
<td>See the ES (Volume 1): Chapter 2. It is to be noted that the composition of the material to be dredged from the Haven is not yet confirmed; therefore, the end use of the dredged sediment is still unknown.</td>
</tr>
</tbody>
</table>
| MMO (Conti…) | There is a presumption in the report that dredged material will be disposed of either to sea or landfill. | See the ES (Volume 1): Chapter 2. It is to
<table>
<thead>
<tr>
<th>Organisation</th>
<th>Summary of Matters Raised</th>
<th>Location of response within the ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMO (Conti...) Natural England</td>
<td>The EA will also need to consider whether this scheme will require a formal Site Waste Management Plan</td>
<td>See the ES (Volume 2d): Outline Site Waste Management Plan.</td>
</tr>
<tr>
<td></td>
<td>The MMO recommends that, in addition to considering the impacts of the Project in combination with the impacts of other projects that have been granted planning consent by Boston Borough Council, EA also investigate the potential cumulative and in-combination effects of other marine schemes within the vicinity. In particular, for example, the ES should take account of the Port of Boston’s regular maintenance dredging campaigns.</td>
<td>See ES (Volume 1): Chapter 19.</td>
</tr>
<tr>
<td></td>
<td>We would also recommend that EA regularly review the MMO’s Public Register (<a href="https://marinelicensing.marinemanagement.org.uk/mmo/fox/live/MMO_PUBLIC_REGISTER/">https://marinelicensing.marinemanagement.org.uk/mmo/fox/live/MMO_PUBLIC_REGISTER/</a>) for any other developments/licence applications within the vicinity of the Barrier scheme whose impact may additionally need to be considered.</td>
<td>See ES (Volume 1): Chapter 19.</td>
</tr>
<tr>
<td></td>
<td>The MMO advise that due to the location of the proposed works, the ES will need to have regard to the Eastern Inshore Marine Plan Area. There is no reference in the Report to these plans and, therefore, it is not clear to what extent, if any, these have been considered. This will need to be made explicit in the proposed ES. The Eastern Inshore Marine Plan was originally published in April 2014 and is available on the MMO website at <a href="https://www.gov.uk/government/publications/east-inshore-and-east-offshore-marine-plans">https://www.gov.uk/government/publications/east-inshore-and-east-offshore-marine-plans</a>.</td>
<td>See Section ES (Volume 1): Chapter 4.</td>
</tr>
<tr>
<td></td>
<td>Natural England advises that the potential impact of the proposal upon features of nature conservation interest and opportunities for habitat creation/enhancement should be included within this assessment in accordance with appropriate guidance on such matters. Guidelines for Ecological Impact Assessment (EcIA) have been developed by the Chartered Institute of Ecology and Environmental Management (CIEEM) and are available on their website.</td>
<td>See ES (volume 1): Chapter 10 and the ES (Volume 2b): Ecology and Nature Conservation Technical Report.</td>
</tr>
<tr>
<td></td>
<td>The ES should thoroughly assess the potential for the proposal to affect designated sites. European sites (e.g. designated Special Areas of Conservation and Special Protection Areas) fall within the scope of the Conservation of Habitats and Species Regulations 2010. In addition paragraph 118 of the National Planning Policy Framework requires that potential Special Protection Areas, possible Special Areas of Conservation, listed or proposed Ramsar sites, and any site identified as being necessary to compensate for adverse impacts on classified, potential or possible SPAs, SACs and Ramsar sites be treated in the same way as classified sites.</td>
<td>See ES (volume 1): Chapter 10 and the ES (Volume 2b): Ecology and Nature Conservation Technical Report.</td>
</tr>
<tr>
<td></td>
<td>Under Regulation 61 of the Conservation of Habitats and Species Regulations 2010 an appropriate assessment needs to be undertaken in respect of any plan or project which is (a) likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and (b) not directly connected with or necessary to the management of the site.</td>
<td>See ES (volume 1): Chapter 10 and the ES (Volume 2b) Ecology and Nature Conservation Technical Report.</td>
</tr>
<tr>
<td>Organisation</td>
<td>Summary of Matters Raised</td>
<td>Location of response within the ES</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Natural England (Conti…)     | The development site is approximately 4 kilometres upstream from the following designated nature conservation sites:  
- The Wash and North Norfolk Coast Special Area of Conservation (SAC)  
- The Wash Special Protection Area (SPA)  
- The Wash Ramsar  
- The Wash Site of Special Scientific Interest (SSSI)  
Further information on The Wash SSSI and its special interest features can be found at www.magic.gov . The Environmental Statement should include a full assessment of the direct and indirect effects of the development on the features of special interest within this site and should identify such mitigation measures as may be required in order to avoid, minimise or reduce any adverse significant effects.  
Natural England has already provided advice on Habitats Regulations Assessment (HRA) to the Environment Agency which has resulted in the identification of no likely significant effect on The Wash and North Norfolk Coast SAC, The Wash SPA and The Wash Ramsar. This is on the basis of the information currently available to Natural England and this assessment is documented within Appendix 7 of the scoping report consultation document.  
In order to assist DEFRA and the Marine Management Organisation with Habitats Regulations Assessments, we provide the following advice.  
The proposal is not directly connected with, or necessary to, the management of a European site. In our view there is potential for the proposal to have a significant effect on internationally designated sites and therefore will require assessment under the Conservation of Habitats and Species Regulations 2010. We recommend that there should be a separate section of the Environmental Statement to address impacts upon European and Ramsar sites entitled ‘Information for Habitats Regulations Assessment’. This will allow a Habitats Regulations Assessment to be undertaken easily by both competent authorities.  
The EIA will need to consider any impacts upon local wildlife and geological sites. Local Sites are identified by the local wildlife trust, geoconservation group or a local forum established for the purposes of identifying and selecting local sites. They are of county importance for wildlife or geodiversity. The Environmental Statement should therefore include an assessment of the likely impacts on the wildlife and geodiversity interests of such sites. The assessment should include proposals for mitigation of any impacts and if appropriate, compensation measures. The Lincolnshire Wildlife Trust and Greater Lincolnshire Nature Partnership can be contacted for further information.  
The ES should assess the impact of all phases of the proposal on protected species (including, for example, great crested newts, reptiles, birds, water voles, badgers and bats).  
<table>
<thead>
<tr>
<th>Organisation</th>
<th>Summary of Matters Raised</th>
<th>Location of response within the ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural England (Conti…)</td>
<td>Natural England advises that survey, impact assessment and mitigation proposals for Habitats and Species of Principal Importance should be included in the ES. Consideration should also be given to those species and habitats included in the relevant Local BAP. Natural England advises that a habitat survey (equivalent to Phase 2) is carried out on the site, in order to identify any important habitats present. In addition, ornithological, botanical and invertebrate surveys should be carried out at appropriate times in the year, to establish whether any scarce or priority species are present. The Environmental Statement should include details of: Any historical data for the site affected by the proposal (e.g. from previous surveys); Additional surveys carried out as part of this proposal; - The habitats and species present; - The status of these habitats and species (e.g. whether priority species or habitat); - The direct and indirect effects of the development upon those habitats and species - Full details of any mitigation or compensation that might be required</td>
<td>See ES (volume 1): Chapter 10 and the ES (Volume 2b): Ecology and Nature Conservation Technical Report. See ES (volume 1): Chapter 10 and the ES (Volume 2b): Ecology and Nature Conservation Technical Report.</td>
</tr>
<tr>
<td>Need to see details of local landscape character areas mapped at a scale appropriate to the development site as well as any relevant management plans or strategies pertaining to the area.</td>
<td>EIA should include assessments of visual effects on the surrounding area and landscape together with any physical effects of the development, such as changes in topography. [The European Landscape Convention places a duty on Local Planning Authorities to consider the impacts on landscape when exercising their functions]. The EIA should include a full assessment of the potential impacts of the development on local landscape character using landscape assessment methodologies. All new development to consider the character and distinctiveness of the area, with the siting and design of the proposed development reflecting local design characteristics and, wherever possible, using local materials. In order to foster high quality development that respects, maintains, or enhances, local landscape character and distinctiveness. EIA to detail the measures to ensure building design will be of a high standard, as well as detail of layout alternatives together with justification of the selected option in terms of landscape impact and benefit. Cumulative effect of the development with other relevant existing or proposed developments in the area. This should include other proposals currently at Scoping stage. Due to the overlapping timescale of their progress through the planning system, cumulative impact of the proposed development with those proposals currently at Scoping stage would be likely to be a material consideration at the time of determination of the planning application. Natural England encourages any proposal to incorporate measures to help encourage people to access the countryside for quiet enjoyment. Measures such as reinstating existing footpaths together</td>
<td>See the ES (Volume 2a): Landscape and Visual Impact Assessment Technical Report. See the ES (Volume 1): Chapter 7 and the Landscape and Visual Impact Assessment Technical Report (volume 2a). See the ES (Volume 1): Chapter 7 and Es (Volume 2a): Landscape and Visual Impact Assessment Technical Report. See the ES (Volume 1): Chapter 2. See the ES (Volume 1): Chapter 19. See the ES (Volume 1): Chapter 7 and ES (Volume 2a): Landscape and Visual Impact Assessment Technical Report.</td>
</tr>
<tr>
<td>Organisation</td>
<td>Summary of Matters Raised</td>
<td>Location of response within the ES</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Natural England (Conti...)</td>
<td>with the creation of new footpaths and bridleways are to be encouraged. Links to other green networks and, where appropriate, urban fringe areas should also be explored to help promote the creation of wider green infrastructure. Relevant aspects of local authority green infrastructure strategies should be incorporated where appropriate.</td>
<td>Impact Assessment Technical Report.</td>
</tr>
<tr>
<td></td>
<td>The EIA should consider potential impacts on access land, public open land, rights of way and coastal access routes in the vicinity of the development. We also recommend reference to the relevant Right of Way Improvement Plans (ROWIP) to identify public rights of way within or adjacent to the proposed site that should be maintained or enhanced.</td>
<td>See the ES (Volume 1): Chapter 2, 7, 15 and 17.</td>
</tr>
<tr>
<td></td>
<td>The England Biodiversity Strategy published by Defra establishes principles for the consideration of biodiversity and the effects of climate change. The ES should reflect these principles and identify how the development’s effects on the natural environment will be influenced by climate change, and how ecological networks will be maintained.</td>
<td>See ES (Volume 1): Chapter 10 and ES (Volume 2b): Ecology and Nature Conservation Technical Report.</td>
</tr>
<tr>
<td></td>
<td>The ES should include an impact assessment to identify, describe and evaluate the effects that are likely to result from the project in combination with other projects and activities that are being, have been or will be carried out. The following types of projects should be included in such an assessment, (subject to available information):</td>
<td>See ES (Volume 1): Chapter 19.</td>
</tr>
<tr>
<td></td>
<td>a. existing completed projects;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. approved but uncompleted projects;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. ongoing activities;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d. plans or projects for which an application has been made and which are under consideration by the consenting authorities; and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e. plans and projects which are reasonably foreseeable, i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of the development and for which sufficient information is available to assess the likelihood of cumulative and in-combination effects.</td>
<td></td>
</tr>
<tr>
<td>Port of Boston</td>
<td>Relating to Project Objectives</td>
<td>See ES (Volume 1): Section 2.5.</td>
</tr>
<tr>
<td></td>
<td>We note that WLM has been separated out from the works associated with flood risk management, and the descriptions of the scheme ‘softened’ to imply that WLM may be dropped from the scheme e.g. the description of the project in 2.4.2, or alternatively delivered at a later date as noted in 3.1. However, the site selection for the barrier (and the associated Public and statutory consultation) was based on the delivery of a combined scheme serving both WLM and flood risk management. The Port of Boston’s views on site selection could change if the WLM aspect of the scheme were to be dropped.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If the operation of WLM were to be deferred, but all the infrastructure put in place, then the assessment is on the full scheme regardless of delivery timetable, however, if elements of the scheme might be dropped altogether, then it seems that the Environment Agency are seeking Scoping consultation on two schemes, not one. The Environmental Scoping for the EIA therefore needs to fully appraise the situation of the delivery of a structure that would be intended solely for flood risk management, including all the consequential impacts. The ‘segregation’ described needs to be more robust.</td>
<td></td>
</tr>
<tr>
<td>Organisation</td>
<td>Summary of Matters Raised</td>
<td>Location of response within the ES</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Scour protection is described in 3.1.1 - The Port of Boston believes that this might have the potential to impact on the safety of navigation and so the scope of the EIA should properly consider how this introduction of scour protection (and importantly how it might degrade over time) could impact on river users. We note that the justification for the introduction of scour protection should be made on the basis of robust and extensive analysis/modelling, since there is currently no other scour protection provide elsewhere in the Haven. We further note in support of this that commercial shipping arriving at the port are generally required to be NAABSA (Not Always Afloat But Safe Aground) rated, and consequently the placing of ‘hard’ infrastructure on the river bed might have the potential to jeopardise the safety of vessels.</td>
<td>See ES (Volume 1): Chapter 14 and the ES (Volume 2d): Navigational Risk Assessment Technical Report</td>
<td></td>
</tr>
<tr>
<td>Witham Forth IDB</td>
<td>The Board remains concerned that the project is limited to the barrier and short lengths of the Haven Banks downstream. On December 5th 2013 significant lengths of the banks on the west side of the Wash were subject to overtopping at the peak of the tide. Sections of these banks are at or around +6.00m ODN some 1.3m lower than the proposed barrier, leaving large areas of agricultural land, numerous villages (Fishtoft, Frieston, Butterwick, Benington, Leverton, Old Leake, Wrangle and Friskney) and parts of Boston at risk of tidal flooding if the banks are not brought up to the same standard as the proposed barrier. The Board wishes that these defences are raised in conjunction with the Barrier and Haven defence works.</td>
<td>The Project will not increase the potential for flooding downstream and further works to the Haven are part of the Boston Combined Strategy (2008).</td>
</tr>
</tbody>
</table>
This page has been left intentionally blank.
E. Stakeholder comments on the draft Environmental Statement (January 2016)
This page has been left intentionally blank.
### Table E.1: Comments of the draft Environmental Statement (2016)

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Comment:</th>
<th>Where has this been addressed?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anglian Water</strong></td>
<td>Heightened surface water levels impacting on surface water outfalls and sewer overflows.</td>
<td>See ES (Volume 2c): Flood Risk Assessment.</td>
</tr>
<tr>
<td><strong>Boston Borough Council</strong></td>
<td>The ES appears to cover all the issues well and within the technical documents I see no items in these documents that cause me concern.</td>
<td>-</td>
</tr>
<tr>
<td><strong>Canal and Rivers Trust</strong></td>
<td>A further concern is the barrier’s predicted width of 25 metres. Working on a figure of 60 metres of Haven width at that point, reducing the width of the flow of water to 25 metres will reduce the water flow to 40% of the original flow; less than half, not a desirable situation in times of fresh water run off! The addition of a lock of a suggested 10mts width would increase the width of flow to 60% of the original. However this still results in a much greater rate of current at that point as it is on the outer bend of the flow especially every fortnight when we experience the ‘spring tides’ some with tidal heights in the region of 8 metres. Twin screw motor boats with powerful engines may not be compromised but many yachts have far less power and only one engine coupled with far more windage aloft to contend with in a cross wind when under power. Other vessels that could be compromised are the long narrow boats. Competent boat owners who navigate tidal flows will know that control of their vessel is far easier when stemming the flow as opposed to going in the same direction as the flow. These flows will be at their worst when both the Witham and South Forty Foot are being run off together. That situation is made worse when you factor in the fact that the water can only flow out to sea for about 8 hours before the next tide stops that flow for a further 4 hours. Add the above restricted flow figures due to the presence of the barrier’s fixed wall across the river to the limited time when excess fresh water can flow and common sense would indicate a definite argument for the installation of the lock. Historically in my lifetime I recall 3 times when the Witham has nearly breached its bank further upstream and when the sluice gates were unable to cope and the lock had to also be opened. See ES (Volume 1): Chapter 14 and the ES (Volume 2d): Navigational Impact Assessment outline in greater detail the nature of the vessel safety measures employed to reduce the impact of the increased flow velocity through the barrier.</td>
<td></td>
</tr>
<tr>
<td><strong>The Crown Estate</strong></td>
<td>Raised no specific concerns .</td>
<td>-</td>
</tr>
<tr>
<td><strong>Eastern Inshore Fisheries and Conservation Authority</strong></td>
<td>The ES should provide further detail about the presence of estuarine fish spawning areas downstream of the project and potential for in-direct construction effects to all estuarine species that move within and outside the ZoI. We suggest that the ES highlights that mitigation measures like soft-start piling apply to all estuarine fish likely to occur in the project area and beyond the ZoI. It is recommended that the ES provides further information about the presence of estuarine fish spawning areas downstream of the project and potential for in-direct construction effects to all estuarine species. Also, the ES should emphasise that the mitigation measures proposed for fish receptors apply to all estuarine fish species (not just Sea Trout, Lamprey and Smelt). Specialist input has been acquired to assess the impact of the construction activities on fish. Please see ES (Volume 1): Chapter 10 and ES (Volume 2b): Ecology and Nature Conservation Technical Report.</td>
<td>Specialist input has been acquired to assess the impact of the construction activities on fish. Please see ES (Volume 1): Chapter 10 and ES (Volume 2b): Ecology and Nature Conservation Technical Report.</td>
</tr>
<tr>
<td><strong>Historic England</strong></td>
<td>We advise that the cap of the proposed wall and the cladding on the south side should be</td>
<td>This is the intention of the proposed works. Please see ES</td>
</tr>
</tbody>
</table>
designed to reduce the visual impact of the wall as much as possible.

We also advise that the proposed public benefits to the historic environment due to the reduced need for flood defences in the centre of Boston, and for individual buildings, should be more clearly defined in conjunction with Boston Borough Council.

Inland Waterways

Section 2.3.5 describes in outline systems for warning navigators of operation of the barrier, and to manage traffic through the barrier space. Without more detail it is not possible to ascertain whether this safety critical system is adequate for current navigators.

Section 2.4 discusses provision of Control building and WDL kiosk. It will be important that these units are both designed with very conservative levels of flood protection, given both the outcomes of some of the modelling downstream of the barrier, and other recent experiences where barriers have been lowered due to imminent risk of loss of control (e.g. the Foss in York).

Section 2.10.2 warns of scour protection work and its impact on navigation. Obviously all work of this nature will require early, clear and comprehensive warning of impact on navigation, both in the Port of Boston, upstream and in other coastal locations. Provision of local ‘safe harbour’ for vessels still arriving without awareness of any stoppage is necessary.

Section 7.4.6 notes visual impact for navigators as a significant impact. Given the height of the construction activities compared to the height of most leisure craft, this is rather underplaying the visual effect of a 7m high barrier across over half of the water space. More accurately it should note “… visual impact for navigators is a very high impact”.

Section 7.4.13 notes a continuing effect once the operational barrier is in place, again, given the height of the infrastructure in place on the Haven this will be equally as impactful as the construction activities, compared with the existing situation.

Section 10.5.4 discusses mitigation of dredging impacts creating algal blooms by moving the work into the cooler period October - March. This needs to also be balanced with the needs of navigation.

The main mitigation is given as a system of traffic management to ensure one-way traffic. This is not detailed, so it is difficult to understand how effective a system will be in allowing existing navigational patterns, and any likely to develop over the lifetime of the project. For navigation users, the essential requirement is to safely stop, carry on, manoeuvre, and get to the Haven and Grand Sluice above the barrier location, or lock onto the South Forty Foot Drain, or move down the Haven and get past the sand bar within the tide range necessary for all these actions. The EA has not provided any detail which gives any assurance that the traffic management system will be adequate to provide certainty that navigational objectives can be achieved, without running significant risk of collision, loss of control and grounding, or becoming isolated due to inability to complete the journey. The ES needs to include real practical examples which navigators can see and understand if this project is to
### Boston Barrier Tidal Project

#### Volume 1: Environmental Statement

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.8 knots results, giving total flows of 4.9-7.3 knots across the bypass. This will be a significant hazard to navigation, and well above the 3 knots suggested elsewhere.</td>
<td>The precise nature of the traffic management system is to be agreed between the Harbour Authority and PoB. The accurate assessment of the navigational risk and the development of a Traffic Management System (TMS) is crucial to ensure safe navigation through the barrier.</td>
</tr>
<tr>
<td>Collision mitigation measures in need to be firmed up in location and length, to ensure they can be confirmed by local experience as workable under all tides and other circumstances, and to indicate their length compared with likely need. As stated in these need to be in place before the traffic management system is needed, which also means before any work starts in the Haven which requires the safety system including one-way traffic. These moorings should be available for safe mooring at all times following construction of the barrier to ensure safe haven for vessels when there is significant traffic through the barrier.</td>
<td>As outlined in ES (Volume 1): Chapter 5 the Environment Agency held ongoing consultation events with local river users and has used their experience to shape the ES (Volume 2d): Navigational Impact Assessment Technical Report.</td>
</tr>
<tr>
<td>IWA is not questioning that a barrier should be built to protect Boston. However, the degree of safety preparation undertaken by the promoter is inadequate given the hazards involved for navigators. We want to see more and quicker preparation, modelling and effective mitigation to be worked on now, in preparation for submission of the TWAO.</td>
<td>Specialist input has been acquired to assess the impact of the construction activities on fish. Please see ES (Volume 1): Chapter 10 and ES (Volume 2b) Ecology and Nature Conservation Technical Report.</td>
</tr>
<tr>
<td>Section 6.4.26 described experiments to determine impact of increased velocities around the coffer dam and barrier on migrating fish. Sea trout, eels and smelt were considered. It is not clear whether the work was a desk study using SWIMIT or similar modelling data. The results showed increased lengths of time when fish would not be able to pass either the coffer dam or the barrier, due to increased velocities past the structures. Data shows eels have an endurance speed of around 0.5ms⁻¹ and trout around 1.3ms⁻¹ whereas smelt have a Critical Burst Swimming Speed (CBSS) of around 1.11ms⁻¹, and trout 1.6ms⁻¹. (Reference EA Swimming Speeds for fish Phase 1 W2-026/TR1, and EA Swimming Speeds for fish R&amp;D Technical Report W2-049/TR1). It would be useful to use the same data for water velocities to determine the effect of them on slow moving leisure craft.</td>
<td>Please see ES (Volume 2b): Estuarine Processes and Geomorphology Technical Report; Appendix B; Modelling Report – Non-Technical Summary for an outline of how the predicted channel flow velocities. Regarding safety, please see ES (Volume 2d): Navigational Impact Assessment Technical Report for an outline of how the effects of the modelling flow rates will be mitigated against.</td>
</tr>
<tr>
<td>Plate 6.3 shows the results of modelling a high 10 year fluvial flow, where an increase of 3.9-5.8 knots results, giving total flows of 4.9-7.3 knots across the bypass. This will be a significant hazard to navigation, and well above the 3 knots suggested elsewhere.</td>
<td>The overview mentions the contribution this report makes to the ES for the Boston Barrier. It makes no reference to the requirement for a Navigational Risk Assessment (NRA) to inform the TWAO Application, and the comments made in the MMO letter of May 2015 to Mott MacDonald. Does the EA regard this report as its NRA, or is it expecting to produce another report for that purpose? Section 3.1 later refers to MMO’s letter as guidance.</td>
</tr>
<tr>
<td>As outlined in ES (Volume 1): Chapter 5 the Environment Agency held ongoing consultation events with local river users and has used their experience to shape the ES (Volume 2d): Navigational Impact Assessment Technical Report.</td>
<td></td>
</tr>
<tr>
<td>Specialist input has been acquired to assess the impact of the construction activities on fish. Please see ES (Volume 1): Chapter 10 and ES (Volume 2b) Ecology and Nature Conservation Technical Report.</td>
<td></td>
</tr>
<tr>
<td>To ensure safe haven for vessels when there is significant traffic through the barrier.</td>
<td></td>
</tr>
</tbody>
</table>
### Association (Conti...)  

There is an overriding need to provide for the safety of navigators. This may be the responsibility of the Harbour Authority; however EA will need to provide a TWAO submission which addresses the safety of affected users, particularly navigators. This will presumably be tested through the TWAO hearings before the HA is required to take over responsibility.

Regrettably the claim that impacts could be reduced to non-significant by more modelling, simulation and provision of a one-way traffic control system look a long way from being proven. At the present time, even the limited and invalidated modelling appears to show it is likely that water velocities at the cofferdam and the barrier will exceed PIANC’s 3 knot ‘strong’ for longitudinal, and possibly 1.5 knots cross channel. These impacts will get worse over the life of the barrier, as climate change predictions are factored in and predictions get better with time and measurement.

### Lincolnshire County Council  

Another concern which should be addressed in the ES is regarding the permanent effect of reducing the channel from 55m to 25m as this will increase the risk of scouring and has the potential to impact on underlying remains in the future.

A strategy for recording early nineteenth and twentieth century Port buildings should be devised and approved prior to demolition. A strategy for recording any hulks that are to be removed should also be devised and approved prior to destruction.

While we recognise that the construction of the PoB will have destroyed any underlying archaeological remains they may still survive in the wet dock area. It is noted that during the construction of the wet dock that four mills were demolished and there may still be surviving post-medieval, medieval and Saxon material that could be disturbed during the widening of this lock.

We recognise that the design option chosen is the most effective to reduce impacts on historic assets; however it is evident that there will be some permanent disruption to settings of some historic assets. One of which is the visual nature of the barrier façade, we would recommend as at 5.2.5 in the non-technical summary, that the façade should be painted to blend in with the PoB however the paint scheme should be agreed with the Boston Borough Council Conservation Officer.

### Lincolnshire County Council: Department of Public Health  

The ES sets out how the site for the Barrier downstream of Black Sluice was arrived at in part due to the low negative impact on health and safety. However, it highlights that a site was preferred by the majority of local people downstream of Maud Foster Sluice due to it being further away from their homes. Could this siting decision be made clearer in Section 2.32.8 to alleviate the public’s concerns?

### Lincolnshire Wildlife Trust  

We are disappointed with the lack of enhancements proposed in the ES. It is acknowledged within the ES and supporting technical reports that the development will lead to a loss of habitats ranging from semi improved grassland, ruderal vegetation and scrub on the banks, to mudflat within The Haven. Whilst we appreciate that the loss of each habitat type is relatively small there will nevertheless be a loss of habitat and we would therefore expect enhancement measures to ensure that the development provides a net biodiversity improvement.

Remediation works will be carried out to ensure the environment is restored to a level no worse than that at present and ES (Volume 2a): Landscape and Visual Impact Assessment Technical Report outlines the actions that will be carried out. As part of the remediation, the introduction of Boston horsetail (a protected species of plant) is being
The need to enhance biodiversity is supported by the Environment Agency’s Flood and Coastal Risk Management Position Statement relating to conserving, enhancing and restoring biodiversity (July 2013) which states that ‘Our Flood and Coastal Risk Management (FCRM) work, whilst primarily undertaken to manage flood risk, must include measures to conserve, restore and enhance biodiversity where feasible.’

natural England

After reviewing the ES we consider that overall it provides a thorough assessment of the environmental impacts of the Project and addresses these impacts appropriately. We have set out the following comments on the individual chapters of the Environmental Statement (ES) which are particularly relevant to our interests on the natural environment as follows:

1) Townscape and Visual - We are satisfied that any changes to the townscape and visual amenity have been considered and agree with the findings that the barrier will be an additional industrial feature in a pre-existing industrial landscape. We welcome the proposed mitigation measures to reinstate and landscape the right bank and Macmillan Way which will offer opportunities to enhance biodiversity and recreational use.

2) Land Use - We note that whilst no significant effects were identified on land use by the EIA we note that these have been assessed in the technical accompanying technical report. We particularly note that the Macmillan Way has been considered as open space and an important community resource.

3) Ecology and Nature Conservation - Natural England advises that the potential impact of proposals upon features of nature conservation interest and opportunities for habitat creation/enhancement should be assessed in accordance with appropriate guidance. We are therefore pleased to note the following:

- that the Guidelines for Ecological Impact Assessment (the EcIA) have been followed within this ES.
- the ES correctly identifies Statutory and Non-Statutory nature conservation sites and has thoroughly assessed the potential for the Project to affect these sites.
- The ES includes evidence that assessment has been carried out of the impact of all phases of the Project on protected species (including great crested newts, reptiles, birds, water voles, badgers, bats and fish). It also assesses the impact of the proposals on habitats and/or species listed as ‘Habitats and Species of Principal Importance’ within the England Biodiversity List, published under the requirements of S41 of the Natural Environment and Rural Communities (NERC) Act 2006.
- We accept that the survey methods that have been employed have gathered an appropriate level of evidence. From the evidence provided both within chapter 10 and the accompanying technical reports Natural England concurs with the findings of the surveys.
- The ES has made recommendations for appropriate mitigation for water birds, breeding birds, hedgehog, reptiles and aquatic habitats and species during the construction phase of the Project. The mitigation measures proposed such as avoiding vegetation removal, rehoming of vulnerable species and hand searches of potentially vulnerable habitats are reasonable and should appear as conditions on any future planning permission.

We note that surveys carried out have identified that there will be significant adverse effects on fish species during operation and construction. However we acknowledge that with the recommended mitigation implemented the effects described would be reduced to a level added in to the Project strategy.

MMO believe any mitigation to ensure the impacts to the sensitive receptors are minimised, should be secured by conditioning the use of soft-start procedures. This will result in an incremental increase in pile power over a set time period until full operational power is achieved and allow mobile sensitive receptors to move away from the source of acoustic disturbance, in order to reduce the risk of injury.

During the summer months, and occasionally lasting towards the end of the year, there is an important cockle fishery within the Wash. Many Boston vessels participate and it is important that navigation is not hampered during this period. Possible impacts and necessary mitigation (if required) should be explored within the ES to ensure the document has fully considered the potential effects that these works could have on this fishery.

The mitigation explored within the ES that relates to navigational impacts is considered appropriate but the MMO suggests that additional mitigation is also incorporated in the DML such as, the need for a Notice to Mariners to be issued regularly during construction as well as Coastguard and UK Hydrographic Office notification.

The MMO considers that assurances should be included in the ES and method statements to ensure appropriate steps are taken to minimise damage to the shoreline and intertidal area resulting from the works in addition to navigational aids being returned to the original profile, or as close as reasonably practicable, following the completion of the works. Method statements are outlined within ES (Volume 1): Chapter 20.

The ES appropriately considers the potential cumulative effects from the projects listed within section 19. However, the MMO believe that the ES should also assess the possible cumulative impacts that may arise from the ongoing dredging activities carried out by the Port of Boston.


The sections 6.4.52 – 6.4.56 are vague and require clarification.

i). Section 6.4.52: it is not clear how the criteria have ‘been amended for impact driven piling’. The text refers to a non-auditory tissue damage cumulative criterion of 183 dB SEL to 213 dB, sliding scale corresponding to fish mass between 0.5 and 200g. This should
read 2g and not 200g.

ii). Secondly, it is not clear how this ‘sliding scale’ has been derived. For example, where has the value of 185 dB (accumulated SEL) for Temporary Threshold Shift (TTS) been derived from?

iii). Sections 6.4.54-55: similarly, it is not clear where the thresholds for vibratory pile driving (187 to 220 dB accumulated SEL) or behavioural thresholds (150 dB RMS) have come from. This should be clarified so that it is possible to see where these values have been obtained and whether they are appropriate.

iv). The physical unit for the behavioural threshold is root mean square (RMS). This is not appropriate in this instance since we are concerned primarily with the impact of pile driving, which is a pulsed sound. RMS is only appropriate for continuous sounds and pulsed sound should be characterised using peak-to-peak SPL or single-pulse SEL.

In terms of injury criteria, the more recent Popper et al. (2014) guidelines would have been more appropriate to use as this guidance is more up to date, and provides quantitative thresholds for recoverable injury, mortality and potential mortal injury in fish in response to pile driving (among other sources).


Section 6.4.56 states ‘the results of the noise assessment show that during construction typical sound levels within the channel of between 190 dB and 200 dB re 1 μPa’. Please provide details or cross referencing to this ‘noise assessment’ being referred to. Please include references to where these values have been derived from. Please clarify what is meant by ‘during construction’ (Is this specific to impact piling?) and what are the physical units of these sound levels? The units should be given (i.e. RMS, peak-to-peak, peak).


Section 6.4.57 concludes that by comparing these values with criteria in previous sections, injury to fish is unlikely (with the exception of the immediate vicinity) but behavioural effects would occur. In order to make this assumption, the physical units of the sound levels specified need to be stated, so that a comparison can be made with the necessary criteria. In order for a comparison to be made, the units need to be the same.


Table 5.6 states that sea trout (adults) migrate all year. Thus, as a worst case scenario, it would be more appropriate to assume that all of the adult migration would be affected and not just part of it.


The report highlights that there is smelt spawning habitat at the barrier footprint and section 6.4.60 identifies that there could be a potential impact on developing fish embryos, despite no in-depth studies on smelt egg sensitivity. As a mitigation measure, it is proposed that the avoidance of the smelt spawning period would help to avoid impacts on spawning beds. This appears to be suitable.


Table 5.6 states that sea trout (adults) migrate all year. Thus, as a worst case scenario, it would be more appropriate to assume that all of the adult migration would be affected and not just part of it.


MMO (Conti…) The MMO consider that mitigation measures to ensure the impacts to the sensitive receptors are minimised, should be secured by conditions within the DML including the use of soft-start procedures. This will result in an incremental increase in pile power over a set time period until full operational power is achieved and allow mobile sensitive receptors to

[Note: it is no longer proposed to seek a deemed marine licence through the TWAO application in light of correspondence received from Defra requesting that a separate marine licence application is made to the MMO]
move away from the source of acoustic disturbance, in order to reduce the risk of injury. and accordingly the MMO will require to make a regulatory decision."

The method that was used to gather information for the assessment of the proposed methodology appears to be thorough and informative. The methodology used to assess the significance of impacts for the geomorphological assessment follows an industry standard approach, described in Table 3.1 and Table 3.2 of Report 12, which follows Mott MacDonald practices (2015), although no detailed reference was provided in the reference list. Please refer to quality standards that were used in order to collect the data.

Vol. 2b presents impact assessment based on the ecological conditions. In section 6.2.1, it is states that “Potential effects on The Wash SPA, Ramsar site and the Wash and North Norfolk Coast SAC have been assessed by the Environment Agency in the Stage 2 Screening Assessment (Environment Agency, Form HR01 (2015))”. Details of this Assessment are not provided so no comments are made in consideration of whether impacts to these designations have been dealt with suitably.

Section 5.3.3, Vol. 2b indicates that the Preliminary Ecological Appraisal states that the mudflats present in the Zone of Influence (ZoI) are of national conservation value and are habitats of principle importance, while in Table 7.1 under the impact assessment, mudflats are indicated as county level conservation value. This affects the significance of impact and, therefore should be addressed and amended as appropriate.

It is difficult to provide an assessment regarding whether the assessment of potential impacts during either the construction or operation phases have been undertaken in an appropriate manner. This is primarily because there is no map of the spatial variability of the habitats or biotopes in the ZoI, together with limited information regarding exactly where certain activities or physical changes are expected. Without a better understanding of the location of the various ecological features are (together with a better understanding of how this information has been acquired, (see earlier comment), it is only possible to accept the assessment of impacts presented.

The impacts on fish from underwater noise have been considered on a general scale. It is noted that herring were caught at every site during the fisheries surveys, it is therefore likely that the Haven area is a herring nursery area. As herring are sensitive to the impacts of noise this should have been considered in the impact assessment. This was also recommended in MMO comments of November 2014.

The list of source material used is comprehensive. However, one omission is the Eel Management Plan for the river basin district within which the works are planned.

The list of source material is used for desk based studies is appropriate. The sub-tidal fisheries surveys were carried out using a 2m scientific beam trawl. This method may underestimate occurrence and abundance of larger demersal or pelagic marine and migratory fishes. This point was made in the MMO comments of November 2014 (also detailed below). This needs to be highlighted and other potential sources of information used to support the impact assessment.

MMO (Conti…) It appears that an appropriate evidence base has been used within the ES, however, it is
not possible to fully assess the suitability of the modelling without a more detailed description being provided and therefore confirm that this aspect of the application is sufficient.

Table 6.1 is difficult to interpret as no units are available for the data, and the title refers to ‘duration of velocities’ (i.e. unit time) whereas the column headings refer to speed (i.e. distance per unit time).

The migratory period of juvenile sea trout (Table 6) specified as Aug-Oct may not be appropriate if it refers to downstream migrating smolts, which we would expect to occur in the zone of influence in April and May.

There aren’t any mollusc fisheries within the immediate vicinity of the works but there are several substantial stocks in the western area of the Wash. Cockle and mussel beds are present on Roger Sand, Butterwick Low, Freiston Low and Gut Sand (the largest mussel bed in this area of the Wash being located here).

The MMO don’t expect any major impacts upon these beds, the most likely impact pathway would be the dredge works prior to construction and the subsequent silt dredge works which are indicated to be carried out on a routine basis to keep the channel clear. As per the advice on the scoping report, more detail of volumes; frequency and duration of these dredge events is required in the ES to enable further assessment.

Port of Boston

General Safety of Navigation – The Harbour Authority view is that overall statements carried through to the Non-Technical Summary are grossly simplistic, and appear to misunderstand the potential impact of this scheme to the safety of navigation, both in the temporary and permanent condition. There are issues associated with a potential increased risk to traffic from vessel collision, collision with structures, increased flow velocities (longitudinal and cross river), eddies and changes to siltation, that are not fully appreciated within the ES.

We do not expect all these issues to be fully resolved at this stage but we do expect them to be recognised.

Turning of Vessels at Port Entrance During Construction – The ES and the NIA do not adequately describe and identify the impact on turning and or the significance of the impact. During the closure of the wet dock all commercial shipping will turn in the tidal channel with the assistance of tugs. This increases this activity from perhaps up to 10 vessels annually, to perhaps 300 vessels in a nine month period. This impact is not mentioned in the summary, nor adequately described within the Navigational Impact Assessment.

Traffic manoeuvring through the barrier and the temporary by-pass channel – The ES has assumed the imposition of one-way traffic. We believe that one-way traffic may pose a greater hazard than two vessels passing in the constricted channel at the barrier (and through the temporary by-pass channel) since smaller craft will have difficulty holding their position in tidal or fresh water velocities. This issue is to be further discussed with the EA’s consultants, and so we would suggest that the ES describes the potential alternatives of two-way or one-way traffic, subject to approval by the Harbour Authority and other mitigation, if not resolved prior to submission of the TWAO.

Port of Boston

Navigation Authority - The PoB is the SHA and navigation authority in The Haven and...
Boston Barrier Tidal Project
Volume 1: Environmental Statement

(Conti…) these needs to be appropriately recognised within the ES. Further that since the SHA has the navigational jurisdiction in the area of the works and barrier, detailed design proposals to mitigate impact must be subject to the approval of the SHA. Given the foregoing, the Harbour Authority requires the EA to liaise further with them on the development of the ES, and the NIA in particular.

Navigational Impact Assessment Technical Report; Section 3.2

RSPB
In summary, we have no objections in principle to this proposal, but want to make sure that it does not result in any net loss of intertidal habitats, or refuge areas that may be used by birds as a tributary of the Wash estuary during periods of extreme weather.


Trinity House
Trinity House has no objections to the above project. Any requirements for aids to navigation to be agreed between Trinity House and the Port of Boston once specific details have been provided.


Witham Sailing Club
The modelling carried out by Mott Macdonald was not for a large spring tide. There are many days during the year when the high tide is more than 7.8m above the dock cill (4.1m AOD I think), and we often sail on these tides. Our experience suggests that flow velocities are much higher on these big tides and may well exceed 3 knots at the barrier position. It is essential that safe navigation is possible on these big tides. Once these tides have been correctly modelled we will need to have further discussions with you about the consequences of the revised flow rates.

The Witham Sailing Club is due to be relocated as part of the mitigation strategy to ensure safe navigation of the waterways. See ES (Volume 1): Chapter 14 and ES (Volume 2d): Navigational Impact Assessment Technical Report for further details.

We note that nowhere in the technical documents do we find a mention of our requirements for facilities at Hob hole to avoid the issues of taking dinghies and children through the barrier or bypass channel. We consider the risks of doing this to be unacceptable and that this is a major issue for us. During our discussions with you we indicated that we felt that provision of these facilities was a necessity which must be included as a mitigation feature in the environmental impact statement.

As outlined in the ES (Volume 2d): Navigational Impact Assessment Technical Report and ES (Volume 1): Chapter 14, the traffic management system will be designed to ensure constant contact is being maintained at all times with vessels. Additionally, notices to mariners and other pieces of information will be relayed to river users to ensure they are aware of the safety procedures involved.

It is essential that the pontoons for temporary mooring upstream and downstream of the barrier should be suitably dredged and that boats can be left on them safely over a full tidal cycle. They must be sufficiently large to allow several boats to moor in safety with enough room for yachts lowering masts which overhang the stern by several metres. As this is an essential feature for safety during both construction and operation we expect that since the SHA has contact is being maintained at all times with them before they are submitted for approval.

As outlined in the ES (Volume 2d): Navigational Impact Assessment Technical Report and ES (Volume 1): Chapter 2 and 14, safe mooring areas will be put in place for river users. To count as being safe, these areas will be deemed suitable for berthing multiple types of vessels.

We note that traffic management options are being considered. It should be noted that the use of radio (even marine VHF), mobile phone, internet etc. can be very difficult within the river channel at low and mid tides as these short wavelength signals require line of site between transmitter and receiver. This is made even more difficult since many boats (and especially sailing yachts) must lower radio antennas in the river to navigate through the town bridges.

Witham Sailing Club
We note that there may be a period of “several days or weeks” while the barrier is being installed. Can you assure us that the moorings downstream of the barrier will be safe and available for us to use during this period?

The Witham Sailing Club is due to be relocated as part of the mitigation strategy to ensure safe navigation of the waterways. See ES (Volume 1): Chapter 14 and ES (Volume 2d): Navigational Impact Assessment Technical Report for further details.
We also note from the construction schedule that the times of closure are during a part of the season when we (as a recognised RYA training centre) are very likely to be running coastal dinghy and powerboat courses which are important for our club both for generating revenue but also for maintaining a development process which started several years ago and has been supported by a number of grant awarding bodies. Running these courses involves towing dinghies and their crews, including children, downstream of the barrier to rig their boats before sailing on the tidal waters of the lower Haven and Wash and we believe that this will pose an unacceptable hazard. Provision of the facilities at Hobhole is therefore an essential mitigation measure for us.

The Witham Sailing Club is due to be relocated as part of the mitigation strategy to ensure safe navigation of the waterways. See ES (Volume 1): Chapter 14 and ES (Volume 2d): Navigational Impact Assessment Technical Report for further details.
This page has been left intentionally blank.
F. Updated Scoping Opinion Response
This page has been left intentionally blank.
Mr Paul Thompson
Bircham Dyson Bell LLP
50 Broadway
London
NW1H 0BL

Dear Mr Thompson

TRANSPORT AND WORKS ACT 1992 ("TWA")
TRANSPORT AND WORKS (APPLICATIONS AND OBJECTIONS PROCEDURE)
(ENGLAND AND WALES) RULES 2006 ("the Applications Rules")
PROPOSED BOSTON BARRIER ORDER – SCOPING OPINION FOR THE
ENVIRONMENTAL STATEMENT

1. I refer to your letter of 3 November 2014 requesting a scoping opinion under rule 8 of the Applications Rules.

2. You enclosed with your letter an Updated Scoping Report covering the Boston Barrier Order dated October 2014, produced by the Environment Agency which describes the scope of the information that your client intends to provide in the Environmental Statement ("ES") to accompany the application for the above Order.

3. We have considered your request for an opinion on the proposed content of the ES in accordance with rule 8 of the Applications Rules. In formulating this scoping opinion, the following organisations have been consulted:

- Lincolnshire County Council
- Boston Borough Council
- Natural England
- Environment Agency
- English Heritage
- Marine Management Organisation
- Black Sluice Internal Drainage Board
- Witham Fourth Internal Drainage Board
- Port of Boston
- Harbour Master
- Anglian Water
- Eastern Inshore Fisheries and Conservation Authority
- Canal and Rivers Trust, East Midlands
- Maritime and Coastguard Agency
- Trinity House
4. The Secretary of State considers that the environmental issues identified in the Scoping Report are properly ones that should be addressed in the ES to accompany the proposed application for the above proposed Order. In addition, it is considered that the matters raised by consultees and included in Annex A should also be addressed in the ES.

5. This scoping opinion is given without prejudice to our consideration of any such Order application which may be made. The giving of the opinion implies no view on the Department’s part about the merits or otherwise of the Boston Tidal Barrier scheme.

6. Please find attached the responses received to date from consultees (Annex A). Responses from Port of Boston / Harbour Master are outstanding. We advise the Environment Agency to address the issues raised in the responses in the ES and advise that the Environment Agency fully addresses MMO’s points if the Environment Agency intends to apply for a deemed Marine Licence supported by this ES.

7. Please find attached a high level, without prejudice, summary of the consultee responses (see Annex B). Whilst it is not a legal requirement under the TWA, we would encourage the Environment Agency to identify how it intends to address each of the issues raised.

Distribution

8. Copies of this letter are being distributed as set out below.

Yours sincerely,

Karl Hardy
Flood Investment & Assurance Team, Flood Management, Defra

Copies to –
- Lincolnshire County Council – Mr A Jee
- Boston Borough Council – Mr S Lumb
- Natural England – Mr R Hildred
- English Heritage – Mr T Allen
- Marine Management Organisation – M McGoldrick
- Black Sluice Internal Drainage Board – Mr I Warsap
- Witham Fourth Internal Drainage Board – Mr A Carrot
- Port of Boston – Mr N Harris
- Harbour Master – Captain R Walker via Mr N Harris
- Anglian Water – Ms S Bull
- Eastern Inshore Fisheries and Conservation Authority – Ms J Stoutt
- Environment Agency – Mr D Burton
- Canal and Rivers Trust, East and West Midlands – Mr I Dickinson
- Maritime and Coastguard Agency - N Salter
- Trinity House – M Thomas
Annex A – Responses to the Statutory Consultation

See separate document.

A1 Lincolnshire County Council  
A2 Boston Borough Council  
A3 Natural England  
A4 English Heritage  
A5 Marine Management Organisation  
A6 Black Sluice Internal Drainage Board  
A7 Witham Fourth Internal Drainage Board  
A8 Eastern Inshore Fisheries and Conservation Authority  
A9 Environment Agency  
A10 Canal and Rivers Trust, East and West Midlands  
A11 Maritime and Coastguard Agency  
A12 Port of Boston / Harbour Master

We have received 'no further comment responses' from Anglian Water and Trinity House. Harbour master feedback has been incorporated into the Port of Boston’s response.

Annex B – EIA Scoping Opinion Tracker

See separate spreadsheet.

The purpose of the tracker is for the Department and the Environment Agency to track/record actions to address the range of statutory consultee comments received, and show how these feed into the ES.
Annex A

A1 Lincolnshire County Council

From: Andrew Jee [mailto:Andrew.Jee@lincolnshire.gov.uk]
Sent: 04 December 2014 16:56
To: Hardy, Karl (Defra)
Cc: Beryl Lott; Louise Jennings; Kate Percival
Subject: Boston Barrier Project TWA Consultations

Karl,

This is the feedback from LCC:

This Authority would recommend that the work is updated by use of the County Historic Environment Record to reflect the state of current knowledge. This is the first occasion on which officers in our conservation and heritage teams have been consulted and given the unusually large amount of information to review officers felt that the time available was insufficient. Officers have noted numerous references to the County Archaeologist annotated "to be consulted" and anticipate a higher level of engagement going forward.

Thanks and regards,

Andy Jee.
08 December 2014

Karl Hardy
Defra Flood management
Area 3C, Nobel House
17 Smith Square
London SW1P 2AL

Dear Mr Hardy

Transport and Works Act 1992 (“TWA”)  
Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 (“the Application Rules”)  

Proposed Boston Barrier Order – Scope of Environmental Statement

Thank you for your letter of 12 November 2014. I apologise for responding after your 3 December deadline.

We are satisfied with the scope of the Environmental Statement.

I would like to add that we already have representation on the Project Board and continue to work closely with the EA on the development and implementation of the scheme.

Yours sincerely

Peter Udy
Forward Planning Officer
Planning and Strategy
Dear Karl

Please find attached Natural England’s response in relation to the EIA scoping for the Boston Barrier proposal.

If you require any further assistance, please do not hesitate to contact me.

Kind regards
Ryan

At Natural England we value our customers and seek to improve the quality of our services based on feedback and suggestions from you. If you would like to let us have your views, we would be grateful if you could take a few minutes to answer these questions and return it to us using the “Submit by Email” button.

Ryan Hildred
Lead Adviser
Sustainable Development
East Midlands Area Team
Natural England
Ceres House
2 Searby Road
Lincoln
LN2 4DT
Tel: 0300 060 2772 Mobile: 07785905291
Email: ryan.hildred@naturalengland.org.uk
Dear Mr Hardy

PROPOSED BOSTON BARRIER ORDER
LINCOLNSHIRE
Case Ref. PA00356696
Please find attached our consultation response on the ES Scoping - Boston Barrier.
Yours Sincerely

Tim Allen
Inspector of Ancient Monuments
E-mail: tim.allen@english-heritage.org.uk Direct Dial: 01604 735400

3 December 2014

Dear Mr Hardy

Request for Pre-application Advice

PROPOSED BOSTON BARRIER ORDER, LINCOLNSHIRE

Thank you for consulting English Heritage with regard to the scope of the Environmental Statement. As set out in previous English Heritage advice by letter dated 12th January 2012 we have specific concerns in respect of the scope of the ES and some of these issues still remain to be addressed. Current issues are set out below as matters wherein we not satisfied with the present report as a basis for an environmental impact assessment and an environmental statement. The following areas are therefore where further and / or different information will in our view need to be included.

The dating of the hulks and timber structures (as outlined in the scoping report) is not in our view conclusive given the absence of inspection and reporting by a suitably experienced and qualified specialist in the study of historic vessels.

The content of the submitted Foreshore Inspection Report (Nigel Nayling University of
Wales Lampeter) should be followed as a guide to future work, including the design and undertaking of a scientific dating programme on the river timbers.

The impact of the proposed barrier and associated structures including the proposed new moorings (and secondary effects such as wash) should be examined in detail in respect of sediments likely to contain archaeological and palaeo-environmental remains. Such remains are of importance in both the understanding of the port of Boston and the wider context of Coastal, North Sea and Baltic commerce. This matter should be treated through the detailed specification of an intrusive sampling and analysis strategy.

Also requiring detailed treatment (cf section 5.4.3 of the scoping report) are issues of the setting impacts of the proposed flood walls and gates upon the significance of the Grade II* listed Church of St Nicholas, the Conservation Area and the Grade II listed Maud Foster Sluice. English Heritage have published guidance on the analysis of heritage setting issues which should be referenced and used in this context https://www.english-heritage.org.uk/publications/setting-heritage-assets/. Work on setting impacts should inform options assessment for the design, detailing and finishing of the new structures.

With regard to all local historic environment matters the advice of the Heritage Trust for Lincolnshire should also be sought and attended to.

Yours sincerely

Tim Allen
Inspector of Ancient Monuments
E-mail: tim.allen@english-heritage.org.uk

cc Ms Jenny Young, Archaeological Advisor, Heritage Trust for Lincolnshire
Dear Karl,

Please find attached the MMO’s response to your consultation invitation on the scoping opinion request you have received from EA in relation to the proposed Boston Barrier.

Please feel free to give me a call should you need to clarify or query any aspect of our response.

Regards

Mike

Mike McGoldrick
Marine Licensing Case Officer
Her Majesty’s Government - Marine Management Organisation
Lancaster House, Hampshire Court, Newcastle upon Tyne, NE4 7YH

Tel: 0191 376 2708

Web: www.gov.uk/mmo
Twitter: @the_MMO
Facebook: https://www.facebook.com/MarineManagementOrganisation
Dear Karl,

Having reviewed the Updated Scoping Report and with reference to your letter dated 12 November 2014 I would like to make the following comments:-

- Page 21, 3.2.1 In Channel Works; there appears to be little information relating to the 'fine water-level bypass channel'.
- Page 52, 5.9.5 Opportunities; we would like to see the Lower Witham Water Body and the South Forty Foot Water Body included within these Opportunities.
- Page 61, 5.11.1 Work Undertaken To Date; the potential impact on the operation of the Black Sluice Pumping Station in it being able to continue to pump normal fluvial flows from the SFFD requires further reporting along with the effects and costs associated with additional pumping costs incurred by the BSIDB as the SFFD rises.
- Page 62, 5.11.6 Next Steps; we await further information following the test trials, detailed modelling, SFFCS options.
- Page 74, Conclusion; temporary navigation and flow channel information is required.
- Page 75, Surface Water; the potential changes in water quality and flood risk as a result of restricting flows, and also potential changes in water levels upstream of The Haven require evaluation.
- Witham Estuary Baseline Ecology Interim Report, page 4 of 28, first paragraph. Freshwater is also introduced by the BSIDB via its Wyberton Marsh Pumping Station on the southern bank of The Haven.
- Appendix 5: Detailed Issues Tables, page 11 of 50, Surface Water; the potential for reduced flushing during tidal exchange requires further investigation.

The points above are only minor, BSIDB are satisfied with the report as a basis for an environmental impact assessment and statement. Should you require any further information please do not hesitate to contact me. I would be grateful if you could confirm receipt.

Kind Regards,

Ian Warsap

Chief Executive,
Black Sluice Internal Drainage Board,
Station Road,
Swineshead,
Boston,
Lincs.
PE20 3PW

T: 01205 821440
M: 07854 141886
ian.warsap@blacksluiceidb.gov.uk
www.blacksluiceidb.gov.uk
Dear Sir,

Thank you for the opportunity to comment upon this project.

The Barrier should not adversely affect the fluvial flood risk presented by the River Witham during the construction phase and once operational. Similarly the project should not impact upon the fluvial flood risk presented by the Maud Foster Drain, in particular in respect to detrimental changes to the sedimentation regime that may restrict gravity discharge from the drain. The Board’s main pumped outfall, Hobhole Pumping Station (providing land drainage and flood defence to almost 40,000 Ha of south Lincolnshire, including parts of Boston and surrounding villages as well as agricultural land), should also not be affected by detrimental changes to the sedimentation regime.

It is understood from the Updated Scoping Report (Appendix 2 Scoping Consultation Letter comments) that these issues will be addressed by physical modelling but this is yet to be completed. It is essential that sufficient modelling and other work is carried out to ensure that the project does not increase flood risk elsewhere.

The Board remains concerned that the project is limited to the barrier and short lengths of the Haven Banks downstream. On December 5th 2013 significant lengths of the banks on the west side of the Wash were subject to overtopping at the peak of the tide. Sections of these banks are at or around +6.00m ODN some 1.3m lower than the proposed barrier, leaving large areas of agricultural land, numerous villages (Fishtoft, Frieston, Butterwick, Benington, Leverton, Old Leake, Wrangle and Friskney) and parts of Boston at risk of tidal flooding if the banks are not brought up to the same standard as the proposed barrier. The Board wishes that these defences are raised in conjunction with the Barrier and Haven defence works.

Regards,

Andy Carrott
Engineering Manager
Witham Fourth District Internal Drainage Board
47 Norfolk Street, Boston, Lincolnshire PE21 6PP
Tel. 01205 310099
Fax. 01205 311282
Hi Karl,

Will this response to you serve as our official single response or should we submit through the EA’s consultation portal as well?

Our comments are fairly limited, as we were involved from the initial stages and have had most of our concerns dealt with prior to this latest iteration of the scoping document. We would seek action on the following:

- The non-inclusion of any reference to the Boston Pirates Small Boat Angling Club in the scoping report and the extent to which their operations will be affected by the potential works. The Authority has previously provided the contact details of representative Gordon Jackson (mob: 07787541300) but the updated scoping document does not refer to any consultation with this group.

The following are not required actions but general comments:

- The Authority are satisfied with the conclusions of the scoping report and associated Habitats Regulation Screening Assessment that the Boston Barrier works will not have an adverse effect on the site integrity of the nearby Wash and North Norfolk Coast SAC/SPA.
- Though the Authority agrees that the aims and objectives of the Boston Barrier project are clear and that the scoping document indicates satisfactorily how they will be achieved, there remains an impression among our stakeholders in Boston that the project is a tourism initiative ‘disguised’ as a flood protection measure. There are concerns from the same stakeholders that maximum flood protection will not be achieved by the proposed position of the Barrier and that optimal positioning has been sacrificed in favour of satisfying two competing aims. Having consulted the scoping document, the Authority is satisfied that the optimal barrier placement for flood defence has been selected, but wishes to inform Defra/EA that these concerns persist and that promotion of the project may need to prioritise flood protection benefits over and above recreational access benefits in order to gain localised support.

Many thanks,

Daniel Steadman
Dear Karl,

The consultation response from the Environment Agency is attached. Please let me know if you need any further information.

Many thanks,

Dominic.

---

Hi Dominic,

The SR makes reference to further ground investigations (GI) currently underway (page 66, section 5.3.1, paragraph 4). This team would be interested in knowing what works this comprises.

It would be useful if the GI could be combined with a waste classification exercise if it has not been considered already as this would provide more cost certainty about potential waste types and pollutant linkages prior to groundworks and construction.

For example, numerous scheme components in Appendix 5 make reference to contamination being addressed by the contractors Environmental Management System at the time of construction. It would be a more sensible option to try and quantify the amount of land based contamination prior to construction to avoid financial surprises further down the line and come up with remedial solutions and waste disposal plans now, rather than deal with surprises during the construction phases.

If you need anything further do not hesitate to contact me.

Kind regards

Shaun Rowson  BA (Hons) MSc CIWEM CWEM
Team Leader - Groundwater & Contaminated Land
Lincolnshire and Northamptonshire

Environment Agency, Waterside House, Waterside North, Lincoln. LN2 5HA.

External - 01522 785996; Internal - 750 5996; Mobile - 07500 880 408
Email - shaun.rowson@environment-agency.gov.uk
Web: www.gov.uk/environment-agency
Hi Dominic

A statutory EIA should, according to the EIA Directive (and of course, the various EIA Regulations that have been transposed from it into UK law), only cover those topics that are considered to have a significant impact/effect on the environment. As explained in the body of the scoping report for the Boston Barrier, we do not consider that air quality effects, either on the structure and WLM, or resulting from the structure and WLM during both during construction and operation, to be significant. We are therefore of the opinion that this topic should not be considered further for this particular scheme.

Kind regards
Lesley

Lesley Clarke
Principal Environmental Project Manager
National Environmental Assessment Service
National Services, FCRM

Environment Agency
Kingfisher House, Goldhay Way, Orton Goldhay,
Peterborough, PE2 5ZR
Mobile: 07901715723
Tel. 01733464220 (Int 750-4220)
lesley.clarke@environment-agency.gov.uk
A10  Canal and Rivers Trust, East and West Midlands

From: Ian Dickinson [mailto:Ian.Dickinson@canalrivertrust.org.uk]
Sent: 03 December 2014 11:20
To: Hardy, Karl (Defra)
Subject: Proposed Boston Barrier Order- Scope of Environmental Statement

Dear Mr. Hardy,

Thank you for consulting the Canal & River Trust on the above matter.

Please find enclosed our formal comments on the EIA Scope and Methodology Report. I would be grateful if you could ensure that any future correspondence on this application is directed to me in the first instance, via either the email or postal address below.

Regards,

Ian Dickinson
Area Planner (East and West Midlands)

T: 01636 675790
M: 07825 608321
E-Mail: ian.dickinson@canalrivertrust.org.uk

Canal & River Trust, The Kiln, Mather Road, Newark, Notts NG24 1FB

Please visit our website www.canalrivertrust.org.uk to find out more and download our ‘Shaping our Future document’ on the About Us page.

03 December 2014

Mr. K. Hardy
Defra Flood Management
Area 3C
Nobel House
17 Smith Square
London
SW1 2AL

Dear Mr. Hardy

Consultation under Transport and Works Act 1992
Thank you for your consultation dated 12 November 2014 in respect of the above.

The Canal & River Trust is a company limited by guarantee and registered as a charity. It is separate from government but still the recipient of a significant amount of government funding. The Trust is a statutory consultee for the purposes of Section 42 of the Planning Act 2008.

The Trust has a range of charitable objects including:

- To hold in trust or own and to operate and manage inland waterways for public benefit, use and enjoyment;
- To protect and conserve objects and buildings of heritage interest;
- To further the conservation, protection and improvement of the natural environment of inland waterways; and
- To promote sustainable development in the vicinity of any inland waterways for the benefit of the public.

After due consideration of the details provided in the EIA Scope and Methodology Report, the Canal & River Trust has the following comments to make:

The Canal & River Trust is owner and operator of the River Witham north of the Grand Sluice. It does not appear likely that the proposed works to deliver the barrier will have any direct impact on our assets. We would however comment that it will be important to ensure that the scheme does not prevent the continued navigation of boats at the Grand Sluice in either direction, and would ask that this is taken into account when considering any changes in water levels which may occur as a result of the proposed works.

The Trust would be happy to enter into further discussion at any stage during the application process should you require. Please direct all correspondence to me, preferably via the email details below, in the first instance.

Should you have any queries please contact me at this office.

Yours sincerely

Ian Dickinson
Area Planner (East and West Midlands)
Telephone: 01636 675790
E-Mail: ian.dickinson@canalrivertrust.org.uk

Canal & River Trust Peel's Wharf Lichfield Street Fazeley Tamworth Staffordshire B78 3QZ
T 0303 040 4040 E customer.services@canalrivertrust.org.uk www.canalrivertrust.org.uk

Patron: H.R.H. The Prince of Wales. Canal & River Trust is a company limited by guarantee registered in England & Wales under number 7807276; and a charity registered with the Charity Commission under number 1146792.
Dear Karl,

Thank you for your letter dated 18 November 2014 requesting our views on the above proposal.

A navigation risk assessment should be undertaken to supply detail on possible impacts to commercial and recreational craft, namely collision risk, risk management, emergency response, lighting and marking of the site and information to mariners. It may also have affect the Class V passenger vessels that work out of the Port of Boston and leave the port by the river for maintenance and out of water surveys at Fosdyke. The EA should therefore consult, and liaise with, with the Port of Boston harbourmaster, Capt Richard Walker (harbourmaster@portofboston.co.uk). He may be able to provide contact details for fishermen using the river who should also be consulted for their collective views.

I hope the above information is useful.

Best regards

Nick

Nick Salter
Navigation Safety Branch
Maritime and Coastguard Agency
Tel: 023 8032 9448
Mob: 07879 000658
Email: nick.salter@mcga.gov.uk
Hello Karl,

Environment Agency Proposed Scheme for Boston Barrier

Environmental Scoping Consultation - Response from Port of Boston

Further to the issue of the Updated Scoping Report IMAN001472-BBOSR-ES-101 E, I set out the Port of Boston response to the changes in the update as follows:

Corrections to Summary

1. Summary Page i, 4th para - the Environment Agency proposals are for a new combined flood defence gate and wet dock gate at the port entrance; there is no proposal to provide 'new lock gates'. Indeed the actual description should note that it is proposed to remove the lock.

2. Summary Page i, 7th para - the fishing fleet are to be relocated to the Port's riverside quays immediately downstream of the barrier, not to the Wet Dock

3. We note that WLM has been separated out from the works associated with flood risk management, and the descriptions of the scheme 'softened' to imply that WLM may be dropped from the scheme e.g. the description of the project in 2.4.2, or alternatively delivered at a later date as noted in 3.1. However, the site selection for the barrier (and the associated Public and statutory consultation) was based on the delivery of a combined scheme serving both WLM and flood risk management. The Port of Boston's views on site selection could change if the WLM aspect of the scheme were to be dropped.

If the operation of WLM were to be deferred, but all the infrastructure put in place, then the assessment is on the full scheme regardless of delivery timetable, however, if elements of the scheme might be dropped altogether, then it seems that the Environment Agency are seeking Scoping consultation on two schemes, not one. The Environmental Scoping for the EIA therefore needs to fully appraise the situation of the delivery of a structure that would be intended solely for flood risk management, including all the consequential impacts. The 'segregation' described needs to be more robust.

4. Scour protection is described in 3.1.1 - The Port of Boston believes that this might have the potential to impact on the safety of navigation and so the scope of the EIA should properly consider how this introduction of scour protection (and importantly how it might degrade over time) could impact on river users. We note that the justification for the introduction of scour protection should be made on the basis of robust and extensive analysis/modelling, since there is currently no other
scour protection provide elsewhere in the Haven. We further note in support of this that commercial shipping arriving at the port are generally required to be NAABSA (Not Always Afloat But Safe Aground) rated, and consequently the placing of 'hard' infrastructure on the river bed might have the potential to jeopardise the safety of vessels.

5. Table 2, page 24 - the wet dock flood gate is described as being an element enabling WLM, however, the scheme described (location of barrier and route of defences) for flood risk management requires the crossing of the wet dock entrance and the introduction of a flood risk management flood gate. This should be corrected.

6. Section 5.4.4, page 40 - 'Port of Boston was once one of the largest and most important in the county', this should read 'country'

7. Section 5.14.1 - There is an implied presumption towards disposal to sea of the capital dredging although much of this might be in material that would be appropriate for beneficial re-use, and we note that the scheme will involve extensive bulk filling operations. Notwithstanding that the MMO would normally require this to be considered within any marine licensing application, we believe that the EIA should carefully consider the merits of re-use within the scheme so as to mitigate the impact on disposal to sea, and noting further that the current disposal site used by the Port of Boston could become exhausted.

8. Section 6.2, Key IssuesScoped in to EIA - we believe that Commercial Navigation should be scoped in for 'Scour Protection'.

Kind regards,

Neil
for and on behalf of the Port of Boston

Neil Harris BSc CEng MIStructE
Chartered Structural and Maritime Engineer

Neil Harris Consulting
t: 01752 872806
m: 07786 981423
e: nah.consult@icloud.com
Annex B
### Annex B

**Scoping Opinion Tracker by Issues/Risk**

<table>
<thead>
<tr>
<th>Source of comment</th>
<th>Issue raised</th>
<th>Detail of issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMO</td>
<td>Dealing with the Marine Licence as part of this scoping opinion</td>
<td>The applicant is seeking a deemed marine licence through the TWAO for those applicable activities in the marine environment. Therefore, the MMO is not making a regulatory decision that will require a consent under the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended).</td>
</tr>
<tr>
<td>MMO</td>
<td>Dealing with the Marine Licence as part of this scoping opinion</td>
<td>Should EA subsequently seek a marine licence under the 2009 Act out with the TWAO, they will need to submit an EIA screening request to the MMO. The MMO has the power (under Regulation 10(b) of the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) to defer its EIA decision where we are satisfied that an assessment of all effects on the environment of the project is already being carried out by another consenting authority.</td>
</tr>
<tr>
<td>MMO</td>
<td>Land Use / Marine planning</td>
<td>The MMO advise that due to the location of the proposed works, the ES will need to have regard to the Eastern Inshore Marine Plan Area. There is no reference in the Report to these plans and, therefore, it is not clear to what extent, if any, these have been considered. This will need to be made explicit in the proposed ES. The Eastern Inshore Marine Plan was originally published in April 2014 and is available on the MMO website at <a href="https://www.gov.uk/government/publications/east-inshore-and-east-offshore-marine-plans">https://www.gov.uk/government/publications/east-inshore-and-east-offshore-marine-plans</a>.</td>
</tr>
<tr>
<td>MMO</td>
<td>Local community</td>
<td>The report highlights that the Boston Barrier scheme also has the potential to increase tourism opportunities (for example, linked to boating and the town’s maritime history). However, the report makes no mention of any intention to assess or quantify the effects that the Project could potentially have.</td>
</tr>
<tr>
<td>MMO</td>
<td>Local community</td>
<td>MMO recommend that the ES includes a detailed assessment of the potential tourism-related socio-economic impacts of the development both for the town of Boston and the immediate surrounding area.</td>
</tr>
<tr>
<td>MMO</td>
<td>Commercial Navigation</td>
<td>Recommendation that, in addition to the local harbour authority, EA consult both the Maritime and Coastguard Agency and the Corporation of Trinity House regarding the preparation and content of the proposed Navigational Risk Assessment. This assessment should inform and be included within ES.</td>
</tr>
<tr>
<td>MCGA</td>
<td>Commercial Navigation</td>
<td>A navigation risk assessment should be undertaken to supply detail on possible impacts to commercial and recreational craft, namely collision risk, risk management, emergency response, lighting and marking of the site and information to mariners. It may also have affect the Class V passenger vessels that work out of the Port of Boston and leave the port by the river for maintenance and out of water surveys at Fosdyke.</td>
</tr>
<tr>
<td>MCGA</td>
<td>Commercial Navigation</td>
<td>The EA should therefore consult, and liaise with, with the Port of Boston harbormaster, Capt Richard Walker (<a href="mailto:harbormaster@portofboston.co.uk">harbormaster@portofboston.co.uk</a>). He may be able to provide contact details for fishermen using the river who should also be consulted for their collective views.</td>
</tr>
<tr>
<td>CRT</td>
<td>Commercial Navigation</td>
<td>The Canal &amp; River Trust is owner and operator of the River Witham north of the Grand Sluice. It does not appear likely that the proposed works to deliver the barrier will have any direct impact on our assets. However, it will be important to ensure that the scheme does not prevent the continued navigation of boats at the Grand Sluice in either direction, and would ask that this is taken into account when considering any changes in water levels which may occur as a result of the proposed works.</td>
</tr>
<tr>
<td>Black Sluice IDB</td>
<td>Commercial Navigation</td>
<td>Page 74, Conclusion; temporary navigation and flow channel information is required.</td>
</tr>
<tr>
<td>EH</td>
<td>Cultural Heritage and Archaeology</td>
<td>The dating of the hulks and timber structures (as outlined in the scoping report) is not in our view conclusive given the absence of inspection and reporting by a suitably experienced and qualified specialist in the study of historic vessels.</td>
</tr>
<tr>
<td>EH</td>
<td>Cultural Heritage and Archaeology</td>
<td>The impact of the proposed barrier and associated structures including the proposed new moorings (and secondary effects such as wash) should be examined in detail in respect of sediments likely to contain archaeological and palaeo-environmental remains. Such remains are of importance in both the understanding of the port of Boston and the wider context of Coastal, North Sea and Baltic commerce. This matter should be treated through the detailed specification of an intrusive sampling and analysis strategy.</td>
</tr>
<tr>
<td>Source</td>
<td>Section</td>
<td>Text</td>
</tr>
<tr>
<td>--------</td>
<td>---------</td>
<td>------</td>
</tr>
<tr>
<td>EH</td>
<td>Cultural Heritage and Archaeology</td>
<td>Also requiring detailed treatment (cf section 5.4.3 of the scoping report) are issues of the setting impacts of the proposed flood walls and gates upon the significance of the Grade II* listed Church of St Nicholas, the Conservation Area and the Grade II listed Maud Foster Sluice. English Heritage have published guidance on the analysis of heritage setting issues which should be referenced and used in this context. <a href="https://www.english-heritage.org.uk/publications/setting-heritage-assets/">https://www.english-heritage.org.uk/publications/setting-heritage-assets/</a></td>
</tr>
<tr>
<td>EH</td>
<td>Cultural Heritage and Archaeology</td>
<td>Work on setting impacts should inform options assessment for the design, detailing and finishing of the new structures.</td>
</tr>
<tr>
<td>Lincs CC</td>
<td>Cultural Heritage and Archaeology</td>
<td>This Authority would recommend that the work is updated by use of the County Historic Environment Record to reflect the state of current knowledge. This is the first occasion on which officers in our conservation and heritage teams have been consulted and given the unusually large amount of information to review officers felt that the time available was insufficient. Officers have noted numerous references to the County Archaeologist annotated &quot;to be consulted&quot; and anticipate a higher level of engagement going forward. Recommends that the work is updated by use of the County Historic Environment Record to reflect the state of current knowledge.</td>
</tr>
<tr>
<td>Port of Boston</td>
<td>Cultural Heritage and Archaeology</td>
<td>Section 5.4.4, page 40 - ‘Port of Boston was once one of the largest and most important in the county’, this should read ‘country’</td>
</tr>
</tbody>
</table>
| MMO | Material Assets | MMO has identified the following activities which we consider would require inclusion in a deemed marine licence and are in line with the activities set out in the 2009 Act:  
- Construction and installation of the tidal barrier plus fish and eel passes; installation of scour protection; dredging and disposal of dredge material to sea; piling works; installation of a new gate at the Wet Dock lock; temporary and permanent moorings; construction of a new quay facilities; and cofferdam and temporary bypass channel construction.  
- It is possible that other aspects of the land-based works will require a marine licence. For example, it is not clear from the scoping report whether any of the new or upgraded flood defence structures will require access through or works below MHWS.  

The MMO should be notified at the earliest opportunity of any such requirements - or any additional works or activities in the marine environment – and the impacts of these will need to fully considered and assessed within the Environmental Statement (ES). Further information on licensable activities can be found on the MMO’s website. |
| Black Sluice IDB | Material Assets | • Page 21, 3.2.1 In Channel Works; there appears to be little information relating to the ‘fine water-level bypass channel’.  
• Witham Estuary Baseline Ecology Interim Report, page 4 of 28, first paragraph. Freshwater is also introduced by the BSIDB via its Wyberton Marsh Pumping Station on the southern bank of The Haven. |
| EA | Material Assets | The SR makes reference to further ground investigations (GI) currently underway (page 66, section 5.3.1, paragraph 4). This team would be interested in knowing what works this comprises. |
| Port of Boston | Material Assets related | 1. Summary Page i, 4th para - the Environment Agency proposals are for a new combined flood defence gate and wet dock gate at the port entrance; there is no proposal to provide ‘new lock gates’. Indeed the actual description should note that it is proposed to remove the lock.  
2. Summary Page i, 7th para - the fishing fleet are to be relocated to the Port’s riverside quays immediately downstream of the barrier, not to the Wet Dock. |
Port of Boston  Material Assets related  Relating to Project Objectives

We note that WLM has been separated out from the works associated with flood risk management, and the descriptions of the scheme 'softened' to imply that WLM may be dropped from the scheme e.g. the description of the project in 2.4.2, or alternatively delivered at a later date as noted in 3.1. However, the site selection for the barrier (and the associated Public and statutory consultation) was based on the delivery of a combined scheme serving both WLM and flood risk management. The Port of Boston's views on site selection could change if the WLM aspect of the scheme were to be dropped.

If the operation of WLM were to be deferred, but all the infrastructure put in place, then the assessment is on the full scheme regardless of delivery timetable, however, if elements of the scheme might be dropped altogether, then it seems that the Environment Agency are seeking Scoping consultation on two schemes, not one. The Environmental Scoping for the EIA therefore needs to fully appraise the situation of the delivery of a structure that would be intended solely for flood risk management, including all the consequential impacts. The 'segregation' described needs to be more robust.

Port of Boston  Material Assets  Scour protection is described in 3.1.1 - The Port of Boston believes that this might have the potential to impact on the safety of navigation and so the scope of the EIA should properly consider how this introduction of scour protection (and importantly how it might degrade over time) could impact on river users. We note that the justification for the introduction of scour protection should be made on the basis of robust and extensive analysis/modelling, since there is currently no other scour protection provide elsewhere in the Haven. We further note in support of this that commercial shipping arriving at the port are generally required to be NAABSA (Not Always Afloat But Safe Aground) rated, and consequently the placing of 'hard' infrastructure on the river bed might have the potential to jeopardise the safety of vessels.

Environment Agency  Air Quality  A statutory EIA should, according to the EIA Directive (and of course, the various EIA Regulations that have been transposed from it into UK law), only cover those topics that are considered to have a significant impact/effect on the environment. As explained in the body of the scoping report for the Boston Barrier, we do not consider that air quality effects, either on the structure and WLM, or resulting from the structure and WLM during both during construction and operation, to be significant. We are therefore of the opinion that this topic should not be considered further for this particular scheme.

MO  Traffic, Transport and Recreational Navigation  The MMO notes EA’s intention to transport materials and machinery for the Project primarily by barge and to liaise closely with interested parties (such as Boston Sailing Club) in relation to any potential effects and possible mitigation measures arising from the Barrier scheme.

MO  Traffic, Transport and Recreational Navigation  The commercial navigational impacts are included separately under the Commercial Navigation section of the report and we welcome EA’s intention to prepare a detailed Navigational Risk Assessment for inclusion with the ES. The Assessment should include any prospective implications for recreational navigation.

MO  Traffic, Transport and Recreational Navigation  The MMO would also recommend that EA consult the RYA, as the national body for all forms of recreational boating, on that aspect.

MO  Noise and vibration  MMO welcome EA’s plans to further assess the noise and vibration impacts of the proposed scheme within the EIA – including the impacts on sensitive marine receptors from the construction activities. The ES will need to include details of proposed pile diameters, pile depths and piling methodology. We also recommend that the ES includes an assessment of ongoing impacts on sensitive marine

MO  Estuarine Processes and Geomorphology  The MMO notes that EA has undertaken previous hydrodynamic sediment modelling in relation to the Project and their intention to undertake further flow and sediment modelling as part of the EIA. The ES will need to include all relevant technical reports to enable the MMO to determine their appropriateness and to review the validation and calibration techniques.

MO  Estuarine Processes and Geomorphology  If the design of the project has changed since the 2011 modelling was undertaken, a new modelling exercise should be performed to inform of potential changes to the hydrodynamics and sediment dynamics. Modelling should be undertaken for all aspects of the construction and possible stages of the Barrier throughout its operation to provide a realistic scenario of the potential impacts which may occur. Where the design and construction methodology is still to be determined, the modelling will need to be based on a worst case scenario.
| MMO | Estuarine Processes and Geomorphology | Section 5.9.1 of the report indicates that some accretion may occur in small, localised areas (such as the river quay wall opposite Black Sluice) as a result of the Project. However, the Project may also have implications for erosion (which is not mentioned in the report). The ES will need to include full details of any potential accretion and erosion impacts - including both anticipated rates and locations. |
| MMO | Estuarine Processes and Geomorphology | The MMO notes and agrees with the potential impacts identified. The ES should include an assessment of the potential impacts on physical processes from dredging the channel as well as any impacts from dredge material disposal to a designated disposal site and the potential increase in maintenance dredging from the presence of the barrier. |
| MMO | Estuarine Processes and Geomorphology | The ES should also detail the amount, type and location of the scour protection and include an assessment of how the Project will impact channel width and the potential impacts on the physical processes of the area. |
| Black Sluice IDB | Estuarine Processes and Geomorphology | Page 52, 5.9.5 Opportunities; we would like to see the Lower Witham Water Body and the South Forty Foot Water Body included within these Opportunities. |
| Port of Boston | Estuarine Processes and Geomorphology | Also note Port of Boston’s points about scour protection under Section 3.1.1, above. |
| NE | Flora, Fauna and Biodiversity - Ecological aspects | Natural England advises that the potential impact of the proposal upon features of nature conservation interest and opportunities for habitat creation/enhancement should be included within this assessment in accordance with appropriate guidance on such matters. Guidelines for Ecological Impact Assessment (EcIA) have been developed by the Chartered Institute of Ecology and Environmental Management (CIEEM) and are available on their website. |
| NE | Flora, Fauna and Biodiversity - Ecological aspects | EcIA is the process of identifying, quantifying and evaluating the potential impacts of defined actions on ecosystems or their components. EcIA may be carried out as part of the EIA process or to support other forms of environmental assessment or appraisal. The National Planning Policy Framework sets out guidance in S.118 on how to take account of biodiversity interests in planning decisions and the framework that local authorities should provide to assist developers. |
| NE | Flora, Fauna and Biodiversity - Ecological aspects - Internationally and Nationally Designated Sites | The ES should thoroughly assess the potential for the proposal to affect designated sites. European sites (e.g. designated Special Areas of Conservation and Special Protection Areas) fall within the scope of the Conservation of Habitats and Species Regulations 2010. In addition paragraph 118 of the National Planning Policy Framework requires that potential Special Protection Areas, possible Special Areas of Conservation, listed or proposed Ramsar sites, and any site identified as being necessary to compensate for adverse impacts on classified, potential or possible SPAs, SACs and Ramsar sites be treated in the same way as classified sites. |
| NE | Flora, Fauna and Biodiversity - Ecological aspects - Internationally and Nationally Designated Sites | Under Regulation 61 of the Conservation of Habitats and Species Regulations 2010 an appropriate assessment needs to be undertaken in respect of any plan or project which is (a) likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and (b) not directly connected with or necessary to the management of the site. |
| NE | Flora, Fauna and Biodiversity - Ecological aspects - Internationally and Nationally Designated Sites | Should a Likely Significant Effect on a European/Internationally designated site be identified or be uncertain, the competent authority (in this case DEFRA and the Marine Management Organisation) may need to prepare an Appropriate Assessment, in addition to consideration of impacts through the EIA process. |
| NE | Flora, Fauna and Biodiversity - SSSIs, SPAs, and Ramsar Sites | The development site is approximately 4 kilometres upstream from the following designated nature conservation sites: - The Wash and North Norfolk Coast Special Area of Conservation (SAC) - The Wash Special Protection Area (SPA) - The Wash Ramsar - The Wash Site of Special Scientific Interest (SSSI) Further information on The Wash SSSI and its special interest features can be found at www.magic.gov. The Environmental Statement should include a full assessment of the direct and indirect effects of the development on the features of special interest within this site and should identify such mitigation measures as may be required in order to avoid, minimise or reduce any adverse significant effects. Natura 2000 network site conservation objectives are available on our internet site http://publications.naturalengland.org.uk/category/6490068894089216 |
| NE | Flora, Fauna and Biodiversity - SSSIs, SPAs, and Ramsar Sites | Natural England has already provided advice on Habitats Regulations Assessment (HRA) to the Environment Agency which has resulted in the identification of no likely significant effect on The Wash and North Norfolk Coast SAC, The Wash SPA and The Wash Ramsar. This is on the basis of the information currently available to Natural England and this assessment is documented within Appendix 7 of the scoping report consultation document. |
| NE | Flora, Fauna and Biodiversity - SSSIs, SPAs, and Ramsar Sites | In order to assist DEFRA and the Marine Management Organisation with Habitats Regulations Assessments, we provide the following advice. The proposal is not directly connected with, or necessary to, the management of a European site. In our view there is potential for the proposal to have a significant effect on internationally designated sites and therefore will require assessment under the Conservation of Habitats and Species Regulations 2010. We recommend that there should be a separate section of the Environmental Statement to address impacts upon European and Ramsar sites entitled ‘Information for Habitats Regulations Assessment’. This will allow a Habitats Regulations Assessment to be undertaken easily by both competent authorities. |
| NE | Flora, Fauna and Biodiversity - Regionally and Locally Important Sites | The EIAs will need to consider any impacts upon local wildlife and geological sites. Local Sites are identified by the local wildlife trust, geoconservation group or a local forum established for the purposes of identifying and selecting local sites. They are of county importance for wildlife or geodiversity. The Environmental Statement should therefore include an assessment of the likely impacts on the wildlife and geodiversity interests of such sites. The assessment should include proposals for mitigation of any impacts and if appropriate, compensation measures. The Lincolnshire Wildlife Trust and Greater Lincolnshire Nature Partnership can be contacted for further information. |
| NE | Flora, Fauna and Biodiversity - Species protected by the Wildlife and Countryside Act 1981 (as amended) and by the Conservation of Habitats and Species Regulations 2010 | The ES should assess the impact of all phases of the proposal on protected species (including, for example, great crested newts, reptiles, birds, water voles, badgers and bats). Natural England does not hold comprehensive information regarding the locations of species protected by law, but advises on the procedures and legislation relevant to such species. Records of protected species should be sought from appropriate local biological record centres, nature conservation organisations, groups and individuals; and consideration should be given to the wider context of the site for example in terms of habitat linkages and protected species populations in the wider area, to assist in the impact assessment. |
| NE | Flora, Fauna and Biodiversity - Species protected by the Wildlife and Countryside Act 1981 (as amended) and by the Conservation of Habitats and Species Regulations 2010 | The conservation of species protected by law is explained in Part IV and Annex A of Government Circular 06/2005 Biodiversity and Geological Conservation: Statutory Obligations and their Impact within the Planning System. The area likely to be affected by the proposal should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included as part of the ES. |
| NE | Flora, Fauna and Biodiversity - Species protected by the Wildlife and Countryside Act 1981 (as amended) and by the Conservation of Habitats and Species Regulations 2010 | In order to provide this information there may be a requirement for a survey at a particular time of year. Surveys should always be carried out in optimal survey time periods and to current guidance by suitably qualified and where necessary, licensed, consultants. Natural England has adopted https://www.gov.uk/protected-species-and-sites-how-to-review-planning-proposals#standing-advice-for-protected-species for protected species which includes links to guidance on survey and mitigation. |
| NE | Flora, Fauna and Biodiversity - Habitats and Species of Principal Importance | The ES should thoroughly assess the impact of the proposals on habitats and/or species listed as ‘Habitats and Species of Principal Importance’ within the England Biodiversity List, published under the requirements of S41 of the Natural Environment and Rural Communities (NERC) Act 2006. Section 40 of the NERC Act 2006 places a general duty on all public authorities, including local planning authorities, to conserve and enhance biodiversity. Further information on this duty is available in the Defra publication ‘Guidance for Local Authorities on Implementing the Biodiversity Duty’. |
| NE | Flora, Fauna and Biodiversity - Habitats and Species of Principal Importance | Government Circular 06/2005 states that Biodiversity Action Plan (BAP) species and habitats, ‘are capable of being a material consideration…in the making of planning decisions’. Natural England therefore advises that survey, impact assessment and mitigation proposals for Habitats and Species of Principal Importance should be included in the ES. Consideration should also be given to those species and habitats included in the relevant Local BAP. |
Natural England advises that a habitat survey (equivalent to Phase 2) is carried out on the site, in order to identify any important habitats present. In addition, ornithological, botanical and invertebrate surveys should be carried out at appropriate times in the year, to establish whether any scarce or priority species are present. The Environmental Statement should include details of:
- The habitats and species present;
- The status of these habitats and species (e.g. whether priority species or habitat);
- The direct and indirect effects of the development upon those habitats and species;
- Full details of any mitigation or compensation that might be required.

The development should seek if possible to avoid adverse impact on sensitive areas for wildlife within the site, and if possible provide opportunities for overall wildlife gain. The record centre for the relevant Local Authorities should be able to provide the relevant information on the location and type of priority habitat for the area under consideration.

Natural England does not hold local information on local sites, local landscape character and local or national biodiversity priority habitats and species. We recommend that you seek further information from the appropriate bodies (which may include the Lincolnshire Wildlife Trust and Greater Lincolnshire Nature Partnership).

The Authority are satisfied with the conclusions of the scoping report and associated Habitats Regulation Screening Assessment that the Boston Barrier works will not have an adverse effect on the site integrity of the nearby Wash and North Norfolk Coast SAC/SPA.

The report refers to the findings of a previously-conducted ‘Boston Barrier and Haven Works Marine Benthic Invertebrate summary report (October 2010)’ wherein it is stated that "the benthic communities were typical of estuarine muddy habitats although some species found to be present may be impacted by changes in emergence regime”. No species of conservation importance were found.

We are not able to comment as to the appropriateness of this survey, the processing of samples, nor the data analyses, but the report states that “given the small footprint of the works within the channel and the associated likely impacts, it is considered that the development is compliant with the specifications of the Water Framework Directive (WFD) for benthic invertebrates” – and, thus, no further monitoring of benthic invertebrate for WFD compliance purposes is proposed. The MMO advises the Planning Inspector to consult the relevant competent authority on matters relating to WFD.

The impacts of the project on the functional value of these invertebrates acting as a food source for fish will, nevertheless, need to be considered in more detail within the ES. In this respect, we note EA’s intention (in Section 5.10.6) that the ES will include the potential environmental impacts of the direct loss of habitat and species and effects of smothering associated with the dredging and disposal of dredged material, and the potential changes in areas of intertidal mudflats due to sediment distribution shifts and sediment flows.

The report acknowledges the limitations of the fisheries surveys that have been carried out between 2011 and 2014 in that they can only provide a snapshot of habitat and species in the study area. We recommend that EA use other potential sources of information to supplement the survey data to support any impact assessment in the ES.
<p>| MMO | Flora, Fauna and Biodiversity - Fisheries | The MMO supports the mitigation measures that EA have proposed to incorporate a fish pass into the barrier and the building of fishing quay facilities downstream of the barrier. Further mitigation measures may need to be considered which would be dependent upon identification of any species of issue and following completion of assessment of impacts within the ES. The ES should also include an assessment of the environmental effects of those species and habitats on the OSPAR List of Threatened and Declining Species and Habitat (for example, cod). |
| MMO | Flora, Fauna and Biodiversity - Fisheries | We note that smelt are present in all the surveys carried out and these are a UK BAP priority species. There are other UK BAP priority species that also need to be highlighted for their conservation status (specifically, eels) within the ES along with an appropriate impact assessment. |
| MMO | Flora, Fauna and Biodiversity - Fisheries | We note also that Flora and Fauna Biodiversity is scoped out of the temporary piled cell for alterations within the Wet dock to create additional berth and navigation and flow channel. However, it is not clear why the effect of noise produced from these activities is thought to have no effect on aquatic animal communities in surrounding areas. This location is likely to be a herring nursery area and herring are sensitive to the impacts of noise. This will need to be assessed and considered as part of the impact assessment. |
| MMO | Flora, Fauna and Biodiversity - Shellfisheries | Although there are no mollusc fisheries within the immediate vicinity of the Project, there are several substantial stocks in the western area of the Wash. The impacts from the scheme on these beds should be assessed. There is scope for potential impacts from the initial capital and ongoing maintenance dredging that will be required to maintain the channel. These will need to be fully assessed within the ES once the volumes, frequency and duration of such dredging are known. |
| MMO | Flora, Fauna and Biodiversity - Regulatory advice | The MMO acknowledges the conclusions reached jointly with Natural England regarding there being no Likely Significant Effect on The Wash SPA and Ramsar site or The Wash and North Norfolk Coast SAC, and their interest features, as a result of the Boston Barrier and Haven Works (as detailed in the Habitats Regulations Screening Assessment at Appendix 7 of the report). |
| MMO | Flora, Fauna and Biodiversity - Regulatory advice | As the MMO is a competent authority under the Habitats Regulations when making a marine licence determination under the 2009 Act. It is the MMO’s understanding that the applicant is seeking a deemed marine licence through the TWAO for those applicable activities in the marine environment. As the MMO is not making a regulatory decision under the 2009 Act, the MMO is not a competent authority for this decision. |
| MMO | Flora, Fauna and Biodiversity - Regulatory advice | However we recommend that the ES includes a separate Habitats Regulations Assessment chapter detailing and/or signposting to the supporting evidence and information (including any plans/projects that could have an in-combination effect on the designated sites) that will enable the MMO to undertake that assessment. |
| MMO | Flora, Fauna and Biodiversity - Regulatory advice | Should the applicant subsequently seek a marine licence under the 2009 Act out with the TWAO, the MMO will be a competent authority for that decision and will undertake a Habitats Regulation Assessment and also act in line with Defra’s “Guidance on competent authority coordination under the Habitats Regulations”, dated July 2012. |
| Black Sluice IDB | Flora, Fauna and Biodiversity - Ecology | Witham Estuary Baseline Ecology Interim Report, page 4 of 28, first paragraph. Freshwater is also introduced by the BSIDB via its Wyberton Marsh Pumping Station on the southern bank of The Haven. |
| MMO | Surface Water | The MMO notes that some of the information with regards to the potential impacts from the construction and operational works are included within the Water Framework Directive (WFD) appraisal and this is referenced throughout the report. We would recommend that the ES includes a WFD appraisal as a separate chapter along with details of all potential impacts. |
| MMO | Surface Water | The MMO also recommends that the ES identifies the likely level of sediment accumulation that may occur on the barrier and suspended sediment concentration levels from the regular disturbance and redistribution of sediment arising from its operation. These should be assessed, in particular, against those fish species highlighted above as well as any wider impacts. |
| Black Sluice IDB | Surface Water | Page 61, 5.11.1 Work Undertaken To Date; the potential impact on the operation of the Black Sluice Pumping Station in it being able to continue to pump normal fluvial flows from the SFFD requires further reporting along with the effects and costs associated with additional pumping costs incurred by the BSIDB as the SFFD rises. |
| Black Sluice IDB | Surface Water | Page 62, 5.11.6 Next Steps; we await further information following the test trials, detailed modelling, SFFCS options. |
| NE | Landscape / Townscape and Visual Amenity | Need to see details of local landscape character areas mapped at a scale appropriate to the development site as well as any relevant management plans or strategies pertaining to the area. |
| NE | Landscape / Townscape and Visual Amenity | EIA should include assessments of visual effects on the surrounding area and landscape together with any physical effects of the development, such as changes in topography. [The European Landscape Convention places a duty on Local Planning Authorities to consider the impacts of landscape when exercising their functions] |
| NE | Landscape / Townscape and Visual Amenity | The EIA should include a full assessment of the potential impacts of the development on local landscape character using landscape assessment methodologies. [We encourage the use of Landscape Character Assessment (LCA), based on the good practice guidelines produced jointly by the Landscape Institute and Institute of Environmental Assessment in 2013. LCA provides a sound basis for guiding, informing and understanding the ability of any location to accommodate change and to make positive proposals for conserving, enhancing or regenerating character, as detailed proposals are developed.] |
| NE | Landscape / Townscape and Visual Amenity | Advice to draw upon the publication Guidelines for Landscape and Visual Impact Assessment, produced by the Landscape Institute and the Institute of Environmental Assessment and Management in 2013 (3rd edition) to prepare landscape and visual impact assessments. |
| NE | Landscape / Townscape and Visual Amenity | All new development to consider the character and distinctiveness of the area, with the siting and design of the proposed development reflecting local design characteristics and, wherever possible, using local materials. In order to foster high quality development that respects, maintains, or enhances, local landscape character and distinctiveness, |
| NE | Landscape / Townscape and Visual Amenity | EIA to detail the measures to ensure building design will be of a high standard, as well as detail of layout alternatives together with justification of the selected option in terms of landscape impact and benefit. |
| NE | Landscape / Townscape and Visual Amenity | Cumulative effect of the development with other relevant existing or proposed developments in the area. This should include other proposals currently at Scoping stage. Due to the overlapping timescale of their progress through the planning system, cumulative impact of the proposed development with those proposals currently at Scoping stage would be likely to be a material consideration at the time of determination of the planning application. |
| NE | Landscape / Townscape and Visual Amenity | Relevant National Character Areas can be found on the NE website. Links for Landscape Character Assessment at a local level are also available on the same page. |
| MMO | Ground Conditions, Contamination and Waste | A number of the proposed in-channel works (such as the new Wet Dock lock, construction of the temporary cofferdam and dredging of parts of The Haven river channel) will entail the excavation and removal of material from below MHWS. The report acknowledges that the removal of sediment material needs to be treated as waste and, as such, needs to be handled, transported, treated and/or disposed of in line with the Environmental Permitting Regulations 2010 and the Environmental Protection (Duty of Care) Regulations 1991 (as amended). The removal of dredged sediment material is also classified as waste under the Waste Framework Directive (Directive 2008/98/EC) (WaFD) and its disposal within the marine environment is also governed by the London and OSPAR conventions, both of which are concerned with protecting the marine environment from human activities, notably the pollution arising from those activities. |
| MMO | Ground Conditions, Contamination and Waste | The MMO has recently agreed an appropriate sample plan with EA (Reference: MLP/2014/00275) for the additional analysis that will be needed to properly inform any marine licence considerations but this has not been referenced in the report. |
| MMO | Ground Conditions, Contamination and Waste | Samples have been taken and are currently being analysed for trace metals, organotins, polycyclic aromatic hydrocarbons, polycyclic biphenyls and particle size – with the results due shortly. |
| MMO | Ground Conditions, Contamination and Waste | The results of the analysis need to be fully incorporated within the ES to determine both the suitability of the material for disposal to sea (as well as a full assessment of alternatives to sea disposal) and any possible impacts on receptors through contaminant release into the water column. |
| MMO | Ground Conditions, Contamination and Waste | The report acknowledges that the removal of sediment material needs to be treated as waste and, as such, needs to be handled, transported, treated and/or disposed of in line with the Environmental Permitting Regulations 2010 and the Environmental Protection (Duty of Care) Regulations 1991 (as amended). The removal of dredged sediment material is also classified as waste under the Waste Framework Directive (Directive 2008/98/EC) (WaFD) and its disposal within the marine environment is also governed by the London and OSPAR conventions, both of which are concerned with protecting the marine environment from human activities, notably the pollution arising from those activities. |
| MMO | Ground Conditions, Contamination and Waste | The WaFD provides a general duty to ensure that waste is dealt with in an environmentally friendly way. The waste hierarchy emphasises prevention, reuse and recovery of waste rather than disposal to manage waste. |
| MMO | Ground Conditions, Contamination and Waste | The main objective of the waste hierarchy is the prevention of waste. Where waste cannot be avoided, the hierarchy aims for the re-use, recycling or recovery of waste. Disposal to landfill or at sea is the least favourable option. |</p>
<table>
<thead>
<tr>
<th>Organisation</th>
<th>Category</th>
<th>Section</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMO</td>
<td>Ground Conditions, Contamination and Waste</td>
<td>5.14</td>
<td>There is a presumption in the report that dredged material will be disposed of either to sea or landfill. However, no consideration has been given to the alternatives to disposal. Whilst such consideration will be dependent on the results of any sample analysis, EA will need to fully consider and assess within the ES the full range of waste hierarchy options that may be available for dealing with this material.</td>
</tr>
<tr>
<td>MMO</td>
<td>Ground Conditions, Contamination and Waste</td>
<td>5.14</td>
<td>Section 5.14 of the report suggests that a separate marine licence will be sought for the disposal of dredged material. The MMO recommends that any such disposal should form part of the deemed marine licence for the scheme as a whole rather than being considered separately.</td>
</tr>
<tr>
<td>EA</td>
<td>Ground Conditions, Contamination and Waste</td>
<td>Waste</td>
<td>The Scoping Report makes reference to further ground investigations (GI) currently underway (page 66, section 5.3.1, paragraph 4). This team would be interested in knowing what works this comprises.</td>
</tr>
<tr>
<td>EA</td>
<td>Ground Conditions, Contamination and Waste</td>
<td>Waste</td>
<td>It would be useful if the GI could be combined with a waste classification exercise if it has not been considered already as this would provide more cost certainty about potential waste types and pollutant linkages prior to groundworks and construction.</td>
</tr>
<tr>
<td>EA</td>
<td>Ground Conditions, Contamination and Waste</td>
<td>Waste</td>
<td>For example, numerous scheme components in Appendix 5 make reference to contamination being addressed by the contractors Environmental Management System at the time of construction. It would be a more sensible option to try and quantify the amount of land based contamination prior to construction to avoid financial surprises further down the line and come up with remedial solutions and waste disposal plans now, rather than deal with surprises during the construction phases.</td>
</tr>
<tr>
<td>Port of Boston</td>
<td>Ground Conditions, Contamination and Waste</td>
<td>Waste</td>
<td>Section 5.14.1 - There is an implied presumption towards disposal to sea of the capital dredging although much of this might be in material that would be appropriate for beneficial re-use, and we note that the scheme will involve extensive bulk filling operations. Notwithstanding that the MMO would normally require this to be considered within any marine licensing application, we believe that the EIA should carefully consider the merits of re-use within the scheme so as to mitigate the impact on disposal to sea, and noting further that the current disposal site used by the Port of Boston could become exhausted.</td>
</tr>
<tr>
<td>NE</td>
<td>Access and Recreation</td>
<td>Waste</td>
<td>Natural England encourages any proposal to incorporate measures to help encourage people to access the countryside for quiet enjoyment. Measures such as reinstating existing footpaths together with the creation of new footpaths and bridleways are to be encouraged. Links to other green networks and, where appropriate, urban fringe areas should also be explored to help promote the creation of wider green infrastructure. Relevant aspects of local authority green infrastructure strategies should be incorporated where appropriate.</td>
</tr>
<tr>
<td>Eastern Inshore Fisheries and Conservation Authority</td>
<td>Access and Recreation</td>
<td>Waste</td>
<td>The non-inclusion of any reference to the Boston Pirates Small Boat Angling Club in the scoping report and the extent to which their operations will be affected by the potential works. The Authority has previously provided the contact details of representative Gordon Jackson (mob: 07787541300) but the updated scoping document does not refer to any consultation with this group.</td>
</tr>
<tr>
<td>Eastern Inshore Fisheries and Conservation Authority</td>
<td>Access and Recreation</td>
<td>Waste</td>
<td>Though the Authority agrees that the aims and objectives of the Boston Barrier project are clear and that the scoping document indicates satisfactorily how they will be achieved, there remains an impression among our stakeholders in Boston that the project is a tourism initiative ‘disguised’ as a flood protection measure. There are concerns from the same stakeholders that maximum flood protection will not be achieved by the proposed position of the Barrier and that optimal positioning has been sacrificed in favour of satisfying two competing aims. Having consulted the scoping document, the Authority is satisfied that the optimal barrier placement for flood defence has been selected, but wishes to inform Defra/EA that these concerns persist and that promotion of the project may need to prioritise flood protection benefits over and above recreational access benefits in order to gain localised support.</td>
</tr>
<tr>
<td>NE</td>
<td>Rights of Way, Access land and Coastal access</td>
<td>Waste</td>
<td>The EIA should consider potential impacts on access land, public open land, rights of way and coastal access routes in the vicinity of the development. We also recommend reference to the relevant Right of Way Improvement Plans (ROWIP) to identify public rights of way within or adjacent to the proposed site that should be maintained or enhanced.</td>
</tr>
</tbody>
</table>
Climate Change Adaptation

The England Biodiversity Strategy published by Defra establishes principles for the consideration of biodiversity and the effects of climate change. The ES should reflect these principles and identify how the development’s effects on the natural environment will be influenced by climate change, and how ecological networks will be maintained. The NPPF requires that the planning system should contribute to the enhancement of the natural environment ‘by establishing coherent ecological networks that are more resilient to current and future pressures’ (NPPF Para 109), which should be demonstrated through the ES.

Cumulative and in-combination effects

A full consideration of the implications of the whole scheme should be included in the ES. All supporting infrastructure should be included within the assessment.

Cumulative and in-combination effects

The ES should include an impact assessment to identify, describe and evaluate the effects that are likely to result from the project in combination with other projects and activities that are being, have been or will be carried out. The following types of projects should be included in such an assessment, (subject to available information):

- existing completed projects;
- approved but uncompleted projects;
- ongoing activities;
- plans or projects for which an application has been made and which are under consideration by the consenting authorities; and
- plans and projects which are reasonably foreseeable, i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of the development and for which sufficient information is available to assess the likelihood of cumulative and in-combination effects.

Cumulative and in-combination effects

The MMO recommends that, in addition to considering the impacts of the Project in combination with the impacts of other projects that have been granted planning consent by Boston Borough Council, EA also investigate the potential cumulative and in-combination effects of other marine schemes within the vicinity. In particular, for example, the ES should take account of the Port of Boston’s regular maintenance dredging campaigns.

Cumulative and in-combination effects

We would also recommend that EA regularly review the MMO’s Public Register (https://marinelicensing.marinemanagement.org.uk/mmo/fox/live/MMO_PUBLIC_REGISTER/) for any other developments/licence applications within the vicinity of the Barrier scheme whose impact may additionally need to be considered. The cumulative and in-combination assessment should be undertaken in accordance with the European Commission (1999) and IEMA (2004) guidance for the Cumulative Impacts Assessment.

Flood risk

The Barrier should not adversely affect the fluvial flood risk presented by the River Witham during the construction phase and once operational. Similarly the project should not impact upon the fluvial flood risk presented by the Maud Foster Drain, in particular in respect to detrimental changes to the sedimentation regime that may restrict gravity discharge from the drain. The Board’s main pumped outfall, Hobhole Pumping Station (providing land drainage and flood defence to almost 40,000 Ha of south Lincolnshire, including parts of Boston and surrounding villages as well as agricultural land), should also not be affected by detrimental changes to the sedimentation regime.

Flood risk

It is understood from the Updated Scoping Report (Appendix 2 Scoping Consultation Letter comments) that these issues will be addressed by physical modelling but this is yet to be completed. It is essential that sufficient modelling and other work is carried out to ensure that the project does not increase flood risk elsewhere.

Flood risk

The Board remains concerned that the project is limited to the barrier and short lengths of the Haven Banks downstream. On December 5th 2013 significant lengths of the banks on the west side of the Wash were subject to overtopping at the peak of the tide. Sections of these banks are at or around +6.00m ODN some 1.3m lower than the proposed barrier, leaving large areas of agricultural land, numerous villages (Fishtoft, Frieston, Butterwick, Benington, Leverton, Old Leake, Wrangle and Friskney) and parts of Boston at risk of tidal flooding if the banks are not brought up to the same standard as the proposed barrier. The Board wishes that these defences are raised in conjunction with the Barrier and Haven defence works.

Flood risk

Page 75, Surface Water; the potential changes in water quality and flood risk as a result of restricting flows, and also potential changes in water levels upstream of The Haven require evaluation.

Flood risk

Appendix 5: Detailed Issues Tables, page 11 of 50, Surface Water; the potential for reduced flushing during tidal exchange requires further investigation.

IDB
| MMO | Marine environment | The MMO advise that due to the location of the proposed works, the ES will need to have regard to the Eastern Inshore Marine Plan Area. There is no reference in the Report to these plans and, therefore, it is not clear to what extent, if any, these have been considered. This will need to be made explicit in the proposed ES. The Eastern Inshore Marine Plan was originally published in April 2014 and is available on the MMO website at https://www.gov.uk/government/publications/east-inshore-and-east-offshore-marine-plans. |
| MMO | Conclusions | We are pleased to see that the comments we provided to EA on earlier versions of the report have been adequately incorporated and addressed in this version. The topics we have highlighted in this consultation response should be assessed by EA during the EIA process and the outcome of those assessments fully documented in an ES in support of the TWAO and deemed marine licence application. |
| MMO | Conclusions | This response should not, however, be seen as a definitive list of all potential EIA requirements. Given the scale and programme of these planned works (and as further information about the project becomes available), other work may prove necessary. |
| Port of Boston | Key issues | Section 6.2, Key Issues Scoped in to EIA - we believe that Commercial Navigation should be scoped in for ‘Scour Protection’. |
This page has been left intentionally blank.
G. Identification of potential in-combination cumulative effects
This page has been left intentionally blank.
Environmental aspect key
NRE = No residual effect  \(\rightarrow\) = minor, moderate, major adverse effect  \(+/-/+\) = minor, moderate, major beneficial impact
Blank = Not Applicable  N = No cumulative effect

Y = Potential for cumulative effect

Table G.1: Cumulative in-combination Project effects during Project construction

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Cultural heritage</th>
<th>Landscape and visual amenity</th>
<th>Land use</th>
<th>Noise and vibration</th>
<th>Ecology and nature conservation</th>
<th>Surface water and flood plain</th>
<th>Erosion processes</th>
<th>Contaminate ground</th>
<th>Traffic and transport</th>
<th>Navigation</th>
<th>Community</th>
<th>Potential for Combined effect</th>
<th>Project duration (Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultural Heritage</td>
<td>MM01</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM02</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM05</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM07</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM08</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM09</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Landscape and Visual</td>
<td>MM01</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM02</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM05</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM07</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM08</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM09</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>MM18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
</tbody>
</table>

Residents in properties on Wyberton Low Road between London Road and Marsh Lane
Recreational users of the Boston Public footpath No.14 (Macmillan Way) along the right bank of the Haven on flood embankment
<table>
<thead>
<tr>
<th>Receptor</th>
<th>Cultural heritage</th>
<th>Land use</th>
<th>Noise and vibration</th>
<th>Ecology and nature conservation</th>
<th>Surface water and flood risk</th>
<th>Erosion processes</th>
<th>Contaminated land</th>
<th>Traffic and transport</th>
<th>Navigation</th>
<th>Community</th>
<th>Potential for Combined effects (Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers at the Riverside Industrial Estate</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Residents in properties in River Way, Fishtoft Road and Maple Road</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Users of green area within the churchyard of St Nicholas Church, residents and recreational users of the Boston Public footpath No.13, on the left bank of the Haven</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Residents in properties within The Featherworks and Rectory Road Windsor Bank and Alfred Street</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Workers and visitors of PoB</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Residents of properties on London Road</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Users of the moorings and hard to the north of Black Sluice (right bank)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Users of commercial units on London Road</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cycle and vehicle users of London Road (Sustrans route 1)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>River users of the Haven</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LLCA 1 Estuary Corridor</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LLCA 2 Wharves and Moorings</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LLCA 3 Industrial – Docks</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LLCA 4 Historic Urban Core and Riverside</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LLCA 5 Skirbeck Quarter (east)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LLCA 6 Industrial (large-scale)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LLCA 7 Industrial and Commercial (small-scale)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LLCA 8 Skirbeck – Maud Foster Drain</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
</tr>
<tr>
<td>LLCA 9 Skirbeck Hall and Church</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
</tr>
<tr>
<td>LCA 10 Skirbeck - Fishtoft Road</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
</tr>
<tr>
<td>LLCA 11 Agricultural Fenland</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
</tr>
<tr>
<td><strong>Land use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial or commercial land (PoB and their commercial operators)</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
<td>NRE</td>
</tr>
<tr>
<td>Housing or residential land</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Open space land</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Other Land uses (Fields on right bank adjacent to Wester power Distribution site)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Noise and vibration</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wyberton Low Road</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wyberton Low Road and Marsh Lane</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Marsh Lane and Marsh Avenue</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Victoria House / Lealand Way Industrial Estate</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>The Featherworks</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Receptor</td>
<td>Cultural heritage</td>
<td>Landscape and visual amenity</td>
<td>Land use</td>
<td>Noise and vibration</td>
<td>Ecology and nature conservation</td>
<td>Surface water and flood risk</td>
<td>Estuarine processes</td>
<td>Contaminated land</td>
<td>Traffic and transport</td>
<td>Navigation</td>
<td>Community</td>
</tr>
<tr>
<td>------------------------------</td>
<td>------------------</td>
<td>------------------------------</td>
<td>----------</td>
<td>---------------------</td>
<td>-------------------------------</td>
<td>-------------------------------</td>
<td>---------------------</td>
<td>-------------------</td>
<td>---------------------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Windsor Bank</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Alfred Street</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Skirbeck Road</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bath Gardens</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>London Road</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Ecology and nature conservation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Havenside LNR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mudflats and saltmarsh</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saline lagoons</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waterbirds (non-breeding populations)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquatic invertebrate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terrestrial habitats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hedgehog</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birds</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reptiles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Surface water and flood risk</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Witham Transitional, downstream of Grand Sluice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Estuarine process and geomorphology</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Haven</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Contaminated land</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction workers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjacent site users</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Haven</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site end users</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Navigation impact assessment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port of Boston</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fishing Fleet/ Other commercial incl. MLC/ Recreational boat – incl. non powered</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Traffic and Transport (done)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Businesses on A1138</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The local open space and businesses on St John’s Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Businesses on Marsh Lane (Boston Industrial Estate)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Properties on South Terrace (Bath Gardens)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Properties on Wyberton Low Rd and Marsh Lane</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to businesses along St. Johns Rd and A1138</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to Boston College</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to Boston River Industrial Estate via Marsh Lane</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receptor</td>
<td>Cultural heritage</td>
<td>Landscape and visual amenity</td>
<td>Land use</td>
<td>Noise and vibration</td>
<td>Ecology and nature conservation</td>
<td>Surface water and flood risk</td>
<td>Surface processes</td>
<td>Contaminated land</td>
<td>Traffic and transport</td>
<td>Navigation</td>
<td>Community</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>------------------</td>
<td>-----------------------------</td>
<td>---------</td>
<td>----------------------</td>
<td>---------------------------------</td>
<td>----------------------------</td>
<td>------------------</td>
<td>----------------</td>
<td>---------------------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Access to PoB</td>
<td>NRE</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Access to residential properties along Wyberton Low Road</td>
<td>NRE</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Access to open space recreation</td>
<td>NRE</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Public footpath along the Haven banks - Boston Public Footpath No.14 (Macmillan Way)</td>
<td>NRE</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>National Cycle Route Number 1</td>
<td>NRE</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Bus routes along Skirbeck Road and London Road</td>
<td>NRE</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Bus stops on Skirbeck Road and London Road</td>
<td>NRE</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>PRoWs</td>
<td>NRE</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td><strong>Air Quality</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>St John’s Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1138 South End</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1138 South End, near junction with A16 John Adams Way</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North of A16 John Adams Way</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A16 John Adams Way, east of junction with High Street</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A16 John Adams Way, west of junction with High Street</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A16 John Adams Way and A52 roundabout</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A52 Liquorpond Street</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A16, south of roundabout</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A16 Spalding Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A16 Spalding Road, south of junction with B1397</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marsh Lane, west</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marsh Lane, east</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A16 Spalding Road, south of junction with Marsh Lane</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Community**

- Community receptors --
  - Boston residents - Y

- Community receptors --
  - Local residents/users of the Boston Public Footpath No.14 (Macmillan Way) - Y
### Environmental aspect key

| NRE | Blank | +/++/++++ | |---|---|---|
| No residual effect | Not Applicable | minor, moderate, major adverse effect | minor, moderate, major beneficial impact |
| Y | N | N | = No cumulative effect |

Y = Potential for cumulative effect

Table G.2: Cumulative in-combination Project effects during Project operation

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cultural Heritage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM01</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hussey Tower</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM02</td>
<td>++</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parish Church of St Botolph</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM03</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>St Nicholas Church</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM04</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skirbeck Conservation Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM05</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skirbeck Hall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM06</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maud Foster Sluice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM07</td>
<td>++</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swingbridge, gatehouse and signals cabin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM08</td>
<td>++</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston Conservation Area; Character Areas 12a and 12b and associated listed buildings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM09</td>
<td>++</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston Conservation Area Character Areas 1 – 11 and associated listed buildings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM10</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prehistoric fenland deposits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM11</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tidal mud banks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM12</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remains of abandoned hulks, wooden structures and posts within the tidal mud banks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM13</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port of Boston and associated structures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM14</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Black Sluice and pump house</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM18</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old Fen Bank or Roman Bank</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Landscape and Visual</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residents in properties on Wyberton Low Road between London Road and Marsh Lane</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational users of the Boston Public footpath No.14 (Macmillan Way) along the</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receptor</td>
<td>Cultural heritage</td>
<td>Landscape and visual amenity</td>
<td>Land use</td>
<td>Noise and vibration</td>
<td>Ecology and nature conservation</td>
<td>Surface water and flood risk</td>
<td>Estuarine processes</td>
<td>Contaminated land</td>
<td>Traffic and transport</td>
<td>Navigation</td>
<td>Community</td>
<td>Combined effects</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-------------------</td>
<td>-----------------------------</td>
<td>----------</td>
<td>---------------------</td>
<td>---------------------------------</td>
<td>-----------------------------</td>
<td>---------------------</td>
<td>------------------</td>
<td>----------------------</td>
<td>------------</td>
<td>-----------</td>
<td>-------------------</td>
</tr>
<tr>
<td>right bank of the Haven on flood embankment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workers at the Riverside Industrial Estate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>++ Y</td>
</tr>
<tr>
<td>Residents in properties in River Way, Fishtoft Road and Maple Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>++ Y</td>
</tr>
<tr>
<td>Users of green area within the churchyard of St Nicholas Church, residents and recreational users of the Boston Public footpath No.13, on the left bank of the Haven</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>++ Y</td>
</tr>
<tr>
<td>Residents in properties within The Featherworks and Rectory Road Windsor Bank and Alfred Street</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>++ Y</td>
</tr>
<tr>
<td>Workers and visitors of PoB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Residents of properties on London Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>++ Y</td>
</tr>
<tr>
<td>Users of the moorings and hard to the north of Black Sluice (right bank)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Users of commercial units on London Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>++ Y</td>
</tr>
<tr>
<td>Cycle and vehicle users of London Road (Sustrans route 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>River users of the Haven</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>LLCA 1 Estuary Corridor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>LLCA 2 Wharves and Moorings</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>LLCA 3 Industrial – Docks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>LLCA 4 Historic Urban Core and Riverside</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>LLCA 5 Skirbeck Quarter (east)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>LLCA 6 Industrial (large-scale)</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>LLCA 7 Industrial and Commercial (small-scale)</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>LLCA 8 Skirbeck – Maud Foster Drain</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>LLCA 9 Skirbeck Hall and Church</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>LCA 10 Skirbeck - Fishtoft Road</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>LLCA 11 Agricultural Fenland</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td><strong>Land use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial or commercial land (PoB and their commercial operators)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Housing or residential land</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>++ N</td>
</tr>
<tr>
<td>Open space land</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>++ N</td>
</tr>
<tr>
<td>Other Land uses (Fields on right bank adjacent to Wester power Distribution site)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>++ N</td>
</tr>
<tr>
<td><strong>Ecology and nature conservation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Havenside LNR</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Mudflats and saltmarsh</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Saline lagoons</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Fish</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Waterbirds (non-breeding populations)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Receptor</td>
<td>Cultural heritage</td>
<td>Landscape and visual amenity</td>
<td>Land use</td>
<td>Noise and vibration</td>
<td>Ecology and natural connection</td>
<td>Surface water and flood risk</td>
<td>Estuarine processes</td>
<td>Contaminated land</td>
<td>Traffic and transport</td>
<td>Navigation</td>
<td>Community</td>
<td>Combined effects</td>
</tr>
<tr>
<td>----------</td>
<td>-------------------</td>
<td>-----------------------------</td>
<td>---------</td>
<td>---------------------</td>
<td>------------------------------</td>
<td>-----------------------------</td>
<td>-------------------------</td>
<td>----------------</td>
<td>----------------------</td>
<td>-----------</td>
<td>-----------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Aquatic invertebrate</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terrestrial habitats</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hedgehog</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bats</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birds</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reptiles</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Surface water and flood risk</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Witham Transitional, downstream of Grand Sluice (other)</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Witham Transitional, downstream of Grand Sluice (flood risk)</td>
<td>++</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Estuarine process and geomorphology</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Haven</td>
<td>++</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Contaminated land</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjacent site users</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>++</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Haven</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site end users</td>
<td>NRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>++</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Navigation impact assessment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port of Boston</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>+</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fishing Fleet/ Other commercial incl. MLCD/ Recreational boat incl. non powered</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>++</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Community</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community receptors --</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>++</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston residents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community receptors --</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>++</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local residents/users of the Boston Public Footpath No.14 (Macmillan Way)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Would you like to find out more about us or about your environment?

Then call us on
03708 506 506 (Monday to Friday, 8am to 6pm)

email
enquiries@environment-agency.gov.uk

or visit our website
www.gov.uk/environment-agency

incident hotline 0800 807060 (24 hours)
floodline 0345 988 1188 (24 hours)

Find out about call charges (www.gov.uk/call-charges)

Environment first: Are you viewing this on screen? Please consider the environment and only print if absolutely necessary. If you are reading a paper copy, please don’t forget to reuse and recycle if possible.