



# A17/2a - Volume 2a: Technical Report: Landscape and Visual Impact Assessment

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*Quality Assurance*

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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.

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# 1 Introduction

## 1.1 Overview

1.1.1 This report forms part of the Technical Reports (Volume 2a – 2d) that support the Boston Barrier Project Environmental Statement (ES) (Volume 1). Volume 2 reports the EIA for the Project, identifying all the predicted effects, irrespective of their significance. Whereas Volume 1 discusses only those effects, both temporary and permanent, deemed significant under the EIA regulations.

## 1.2 The Project

1.2.1 The purpose of the Project is to improve the standard of protection from tidal flooding. The proposals would not affect the existing standards of fluvial flood protection provided upstream within the River Witham and South Forty Foot Drain (SFFD). In January 2015 water level management (WLM) was removed from the scope of this current Project. In making the decision, the Environment Agency, Lincolnshire County Council (LCC) and Boston Borough Council (BBC) confirmed that it remains the vision to provide WLM at a later date through a standalone project and consenting process.

1.2.2 The Project would connect to the existing defences downstream of the town of Boston. The Project would consist of water-based works (the barrier structure) and land-based work (along the Haven).

1.2.3 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.

1.2.4 The Project would be constructed south of the town of Boston across the area of the River Witham known as 'the Haven' (see ES (Volume 1): Appendix A; Figure 1.1). It would be approximately 100m downstream of Black Sluice, adjacent to the Starch Berth (on the Port of Boston (PoB) estate - left bank) and existing residential properties (along Wyberton Low Road - right bank).

1.2.5 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.

1.2.6 A detailed description of the project is included in the ES (Volume 1): Chapter 2.

### 1.3 Purpose of the assessment

- 1.3.1 The purpose of the landscape and visual impact assessment (LVIA) is to identify, understand and interpret the character and value of the landscape setting of the Project and to assess the potentially significant issues scoped in to the Project's Updated Scoping Report (Environment Agency, 2014) (outlined in Chapter 2). The assessment identifies the predicted impacts and proposes management and mitigation to minimise predicted significant effects. This includes consideration of the receptors associated with landscape and visual impact that could be affected during both construction and operation, as well as environmental receptors associated with the proposed construction and operation of the Project.

### 1.4 Report structure

- 1.4.1 This Technical Report comprises the following key sections:
- Methodology: Outlines the methodology employed to carry out the assessment;
  - Legislation and planning policy: Outlines the key legislation and policies relevant to the area and to the Project;
  - Baseline conditions: Outlines the baseline scenario and current local conditions in the surrounding area;
  - Works affecting baseline conditions: Provides a high level description of key construction and operational activities which have implications on surrounding environmental elements;
  - Impact Assessment: Sets out the likely effects on the local and wider landscape and visual amenity assets during construction and operation following the implementation of appropriate mitigation measures;
  - Summary: Describes the predicted significant residual effects following the implementation of mitigation measures and the extent to which the Project complies with planning and relevant policy; and
  - References: Contains the references and source materials relating to the landscape and visual assessment.

## 2 Assessment methodology

### 2.1 Sources of Information

#### Desk Study

- 2.1.1 Desk study information on landscape and visual amenity resources within the study area has been obtained from the following sources:
- Ordnance Survey (OS) mapping;
  - Aerial photography;
  - Local authority plans and studies (identified in Chapter 3);
  - International, national and local landscape and heritage designations; and
  - Existing character assessments.
- 2.1.2 The identification of character areas was informed by the following published character assessments:
- National Character Area Profiles (Natural England, 2014) - provided the wider landscape context of the area; and
  - Boston Barrier Landscape Character Assessment (July 2009) - provided a more detailed description.

#### Surveys and site visits

- 2.1.3 The findings of the desk study were reviewed in conjunction with site surveys to identify local landscape character areas - broadly homogeneous units of distinct features and elements.
- 2.1.4 Two site visits were carried out in September 2014 and March 2015 with trees in full leaf and without leaves, respectively.
- 2.1.5 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. The outcome of the discussions has been taken into account in carrying out the assessment and identifying the mitigation measures now proposed. The issues included:
- Mitigation proposals regarding the softening and greening of the right bank (saline tolerant grass planting along the proposed sheet piling, with timber fendering (subject further consultation with BBC and LCC) along the length of the proposed sheet piling);
  - Views to and from St Nicholas Church (the retention of tidal mud banks within Project area downstream of the barrier structure);
  - Treatment of the path on the right bank;
  - Appearance and finishing of sheet piling; and
  - Incorporation of public art/interpretation boards.

### 2.2 Study Area

- 2.2.1 The site application boundary ES (Volume 1): Appendix A: Maps and Figures: Figure 1.1 defines the Project area. However, for the purpose of this LVIA, the extent of a manually produced zone of theoretical visibility (ZTV) was used to establish the spatial scope for the study area. The ZTV is defined as the area of land within which a development is theoretically visible ('Guidelines for Landscape and Visual Impact Assessment', Third Edition (Landscape Institute with the Institute of Environmental Management and Assessment, 2013) (GLVIA 3). This assumes an observer eye level of 1.5m above ground level. This was defined from desk based study and verified during the site survey and is mapped in Figure 2.1.
- 2.2.2 The study area for this topic covers the landscape and townscape environment surrounding the Haven defined by the spatial scope of the ZTV and includes areas and views that could be affected by the construction and/or operation of the Project.

### 2.3 Scoping assessment

- 2.3.1 The scoping process for this Project has been carried out using information from Original (2011) and Updated Scoping Reports (Environmental Agency, 2014) and professional judgement, based on our understanding of the baseline conditions and how the Project would be constructed and operated. Issues considered as being likely to result in a significant effect were identified in the Updated Scoping Report (Environment Agency, 2014) and have been taken forward for further consideration within this ES and are discussed below.
- 2.3.2 The issues identified in the Updated Scoping Report that would have had an acceptable level of certainty and unlikely to result in a significant environmental effects have been scoped out. Justification for this is provided in the Updated Scoping Report (Environment Agency, 2014). These issues are not considered further.
- 2.3.3 The Updated Scoping Report identified the following potential environmental issues as requiring further consideration as part of the LVIA:
- Land based elements:
    - Potential temporary impact on the visual amenity of the Haven close to the PoB as a result of the presence of construction works and machinery;
    - Potential impact on the landscape and visual amenity of the Haven close to Wyberton Low Road; and
    - Potential for greater impacts on the visual amenity of the Haven close to the PoB during the construction works, involving alterations to the wet dock entrance and installation of a slip-in facility to facilitate the movement of the Boston and District Fishermen's Association (BDFA).
  - In-channel elements:

- Potential change in visual amenity of the area due to the presence of dredging machinery, particularly due to the close proximity to residential properties on Wyberton Low Road; and
- Potential for permanent improvement to visual amenity and enhancement of the surrounding landscape as a result of improved finishing and landscaping associated with the new flood defences.

### **2.4 Assessment methodology**

2.4.1 The LVIA 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).

2.4.2 The assessment used structured, informed and reasoned professional judgement, taking into account a combination of quantitative and qualitative data, derived from desk study and fieldwork. This provided the basis of information against which to predict levels of potential effects and impacts and to assess the significance of such impacts.

### **2.5 Assessment of baseline conditions**

#### **Landscape resource**

2.5.1 The baseline study, together with the Updated Scoping Report (Environment Agency, 2014), identified the existing character of the landscape, its constituent elements, 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 could accommodate the Project without significant change to its landscape character.

2.5.2 The assessment considered:

- Physical influences on the landscape resource; geology, soils, landform, drainage and water bodies;
- Influence of human activity; land use, land management, the character of settlement and buildings, the pattern and type of enclosure; and
- Aesthetic and perceptual aspects of the landscape; scale, complexity, openness, tranquillity and wildness.

2.5.3 Local landscape character areas (LLCA) have been defined as unique geographical areas of a particular landscape type. The landscape types define areas of relatively homogenous in character sharing similar characteristics relating to topography, vegetation, land use and settlement pattern and aesthetic attributes. LLCA are areas with broadly homogenous characteristics. The baseline descriptions of the LLCA were based on published character assessments and site survey.

- 2.5.4 The condition of each LLCA was evaluated with reference to the following criteria:
- Good - components are regularly maintained to a high standard and in a good state of repair, typical characteristics strongly represented, largely intact;
  - Fair - components are relatively well maintained with variable state of repair, typical characteristics represented demonstrating change, with some unspoilt characteristics; and
  - Poor - components are poorly maintained or damaged, poor state of repair, few typical characteristics and demonstrates a high degree of change, with many detracting elements.
- 2.5.5 The tranquillity of each character area was evaluated with reference to the following criteria based on the recognition that the Project is located partly within the urban context of Boston:
- Land use;
  - Level of seclusion or isolation, including perception of nature;
  - Extent and type of enclosure by surrounding land uses;
  - Level of screening afforded by vegetation, ground level change or boundary treatments;
  - Levels and types of vehicular traffic within, or close to the character area;
  - Levels of pedestrian traffic within, or close to the character area;
  - Level of light pollution; and
  - The absence or presence of major infrastructure routes within or in the vicinity of the character area.
- 2.5.6 Tranquillity was defined as high, medium or low.
- 2.5.7 The overall sensitivity for landscape character areas was determined following the GLVIA 3 methodology to define the susceptibility to change and value. GLVIA 3 defines susceptibility to change as the ability of the landscape receptor to accommodate the proposed development without undue consequences for the maintenance of the baseline situation. Value is the relative value that is attached to different landscape by society.
- 2.5.8 The landscape sensitivity was determined based on the attributes set out in Table 2.1. The presence of any combination of attributes may be considered when assessing the sensitivity of a character area which allows professional judgement to be used when determining the relative importance of different attributes.

Table 2.1: Landscape sensitivity

Landscape value	Susceptibility to change	Sensitivity
<p>Landscape of high scenic quality with a distinctive combination of features, elements and characteristics, outstanding views and a distinctive sense of place. May be protected by designation at an international, national or regional level</p> <p>A scarce or fragile landscape with historic or ecological elements which make major contribution to landscape character.</p>	<p>Attributes that make up the character of the landscape offer limited opportunities for the accommodation of the type of change proposed. Attributes may include: Rare/ vulnerable landscape or component; notable aesthetic/ perceptual qualities or cultural associations that could be adversely affected</p>	<p>High</p>

Landscape value	Susceptibility to change	Sensitivity
A tranquil landscape in good condition, largely intact, with an unspoilt character.		
<p>Landscape of some scenic quality with a combination of features, elements and characteristics and a moderate sense of place. Landscape valued at a regional or local level. May be protected by designations or in an undesignated area, but is of significance through literary or cultural associations or through demonstrable use.</p> <p>Some high use areas, but overall medium tranquillity.</p> <p>A landscape in moderate condition, demonstrating change, with some unspoilt characteristics. Some detracting elements.</p>	Attributes that make up the character of the landscape offer some opportunities for the accommodation of the type of change proposed without key characteristics being fundamentally altered.	Medium
<p>Landscape which might be valued by the local community for its scenic quality, containing a disparate combination of features, elements and characteristics and a weak sense of place.</p> <p>Few cultural associations and mainly common features. Elements or features that might benefit from restoration or enhancement. Low tranquillity.</p> <p>A landscape in poor condition, demonstrating a high degree of change, with many detracting elements.</p>	Attributes that make up the character of the landscape are resilient to being changed by the type of development proposed.	Low

Source: Based on GLVIA: IEMA and LI, 2013

**Visual amenity**

2.5.9 The baseline study together with the Updated Scoping Report identified the people (visual receptors) in the area and the designated or protected views potentially affected by the Project. *The assessment of visual effects deals with the effects of change and development on the views available to people and their visual amenity.*<sup>1</sup>

2.5.10 Visual effects in relation to are discussed on a number of levels:

- Specific viewpoints that are protected views defined in:
  - Conservation area appraisals; and
  - Local plans
- Views to and from heritage assets (reported in the ES (Volume 2a): Cultural Heritage Technical Report); and
- Views from representative viewpoints.

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<sup>1</sup> GLVIA 2013

2.5.11 Representative viewpoints were ‘selected to represent the experience of different types of visual receptor, where larger numbers of viewpoints cannot all be included individually and where the significant effects are unlikely to differ.’<sup>2</sup>

2.5.12 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 Updated Scoping Report; and
- Discussions with the local planning authority and key stakeholders.

2.5.13 The sensitivity of different visual receptors varies according to their interest in their visual environment, distance from the site, viewing opportunity and duration. As set out in GLVIA 3, sensitivity is defined as the combination of susceptibility to change in views and visual amenity (in relation to the Project) and the value attached to a particular view. Susceptibility to change of visual receptors depends on the occupation or activity of people and the extent to which their attention is focused on views and visual amenity. The presence of any combination of attributes may be considered when assessing the sensitivity of a visual receptor which allows professional judgement to be used when determining the relative importance of different attributes. Visual receptors were categorised into the groups reflecting proximity to the site and viewers’ expectations, as set out in the Table 2.2.

Table 2.2: Visual receptor sensitivity

Value	Susceptibility to change	Sensitivity
Protected or designated view at national, regional or local level. Scene with considerable scenic or amenity value	Occupiers of residential properties. Communities where views contribute to the landscape setting enjoyed by the community. Residents or visitors, engaged in outdoor recreation (including users of public rights of way) and whose attention is focused on the landscape and on particular views. Visitors to heritage assets or other attractions where the surroundings make an important contribution to the experience.	High
Protected or designated view at local level. Views valued at a local level for scenic and amenity value	People travelling through a scenic landscape by car, bus, train and bicycle. People staying in hotels. Users of restaurants and bars and recreational users of rivers where the views contribute to the landscape setting.	Medium
Views valued at a community level; views with limited scenic/amenity value	People at their place of work or at educational institutions. People taking part in active sports. Road users, passengers on public transport and pedestrians (including commuters) with fleeting views and/or passing through everyday landscapes.	Low

Source: Based on GLVIA: IEMA and LI, 2013

<sup>2</sup> GLVIA 2013

**2.6 Identification of potential impacts**

2.6.1 Impacts on the landscape resource may arise from changes to overall landscape character or to individual elements or features. As shown in Table 2.3 factors that may affect the magnitude of change to the landscape resource include:

- Extent of the loss of existing landscape elements;
- 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;
- Scale of the geographical area affected by the development; and
- Duration and reversibility of the effect.

Table 2.3: Magnitude of change to landscape

Magnitude	Criteria
<b>High</b>	Total loss or fundamental alteration to key landscape elements and/or addition of new features that substantially alter the character of the landscape.
<b>Medium</b>	Partial loss or alteration to key landscape elements and/or addition of new features that form prominent new elements that are largely characteristic of their setting, but alter the character of the landscape.
<b>Low</b>	Minor loss or alteration to landscape elements and/or addition of new features that form largely inconspicuous elements in the landscape, resulting in a detectable change in the character of the landscape.
<b>Negligible</b>	No change to, or very minor loss of landscape elements and/or additions of new features that do not alter the character of the landscape.

Source: Based on GLVIA: IEMA and LI, 2013

2.6.2 As shown in Table 2.4, factors that may affect the magnitude of impacts on visual amenity include the following:

- Context of the existing view (e.g. whether it is across a natural landscape or an industrial site);
- Extent to which the view has been altered due to the loss/addition of features and the proportion of the view the Project would occupy;
- Scale and appearance of the Project and the degree of contrast/integration with the existing view; and
- Distance of the visual receptor from the Project and the angle/position of the view; and
- Duration and reversibility of the effect.

Table 2.4: Magnitude of change to visual amenity

Magnitude	Criteria
<b>High</b>	The development would be the dominant feature of the view in which other elements become subordinate.
<b>Medium</b>	The development would be a noticeable feature of the view which is immediately apparent to the receptor.
<b>Low</b>	The development would be perceptible, but would not alter the overall balance of features and elements that comprise the view.
<b>Negligible</b>	The development would result in an almost imperceptible change to the view.

Source: Based on GLVIA: IEMA and LI, 2013

## 2.7 Assessment of significance

2.7.1 Effects have been evaluated by combining the assessment of both magnitude and sensitivity to predict the significance of effect, as described in Table 2.5 for landscape and Table 2.6 for visual effects. These effects can be beneficial or adverse and temporary or permanent, depending on the nature of the Project, the mitigation and any enhancement measures proposed.

Table 2.5: Significance of landscape effects

Effect	Description
<b>Major beneficial – significant</b>	Would considerably and distinctly improve and enhance the existing character. Would restore or enhance valued characteristic features substantially or entirely lost through other land uses.
<b>Moderate beneficial - significant</b>	Would markedly improve and enhance the existing character. Would restore or enhance valued characteristics substantially lost through other land uses.
<b>Minor beneficial</b>	Would slightly enhance the existing character. Would restore valued characteristic features partially lost through other land uses
<b>Negligible</b>	Would be compatible with the existing character
<b>Minor adverse</b>	Would be slightly at variance with the existing character. Would damage or partially remove some valued characteristic features
<b>Moderate adverse - significant</b>	Would be at variance with the existing character. Would degrade, diminish or destroy valued characteristic features, elements and/or their setting. Would not be wholly compatible with local environmental policies for the protection and enhancement of the landscape.
<b>Major adverse - significant</b>	Would be at considerable variance with the existing character, degrading its integrity. Would permanently degrade, diminish or destroy the integrity of valued characteristic features, elements and/or their setting Would comprehensively conflict with national, regional or local environmental policies for the protection and enhancement of the landscape.

Source: Mott MacDonald 2016

Table 2.6: Significance of visual effects

Effect	Description
<b>Major beneficial – significant</b>	A marked improvement in the existing view
<b>Moderate beneficial - significant</b>	A noticeable improvement in the existing view
<b>Minor beneficial</b>	A discernible improvement in the existing view
<b>Negligible</b>	No perceptible deterioration or improvement in the existing view
<b>Minor adverse</b>	A discernible deterioration in the existing view
<b>Moderate adverse - significant</b>	A noticeable deterioration in the existing view
<b>Major adverse - significant</b>	A marked deterioration in the existing view

Source: Based on GLVIA: IEMA and LI, 2013

2.7.2 A significant effect in EIA terms is identified as those that are major and moderate effects. Where adverse effects are considered to be either ‘major’ or ‘moderate’ opportunities to mitigate these through design were considered. Effects have been assessed during the construction and operational phases of the Project. A worst case scenario (i.e. winter landscape condition) has been considered for the assessment of impacts during the construction phase, and during the first year of operation.

## 2.8 Mitigation of landscape and visual amenity effects

2.8.1 The identification of potential landscape and visual effects helps designers avoid or minimise the potential adverse effects of the Project and, where appropriate, can help to identify opportunities for mitigation measures. Mitigation measures can be:

- Primary measures developed through the iterative design process and embedded into the Project design;
- Standard construction and operational management practices for avoiding or reducing environmental effects; and/or
- Secondary measures to address any residual effects remaining after the primary measures and standard construction/operational practices have been incorporated into the Project.

## 2.9 Cumulative effects of landscape and visual amenity

2.9.1 Cumulative effects result from the additional changes to landscape or visual amenity caused by the Project, in conjunction with other developments in the local vicinity which exist or are likely to take place in the future. These may include:

- Other examples of the same type of development; and
- Different types of development within or proposed within the study area.

2.9.2 For the purpose of this assessment, only schemes with planning consent have been taken into account in carrying out the cumulative assessment.

### **2.10 Visualisations**

2.10.1 Visualisations are illustrations that aim to represent an observer's view of a proposed development. The photographs have been taken based on the approach in the Landscape Institute Advice Note 01/11 "Photography and photomontage in landscape and visual impact assessment"; it should be stressed that visualisations provide a tool for assessment, i.e. an image that can be compared with an actual view in the field. They should not be considered as a substitute to visiting a viewpoint in the field. Additionally, the Project would be carried through to the detailed design stage and the visualisations generated are illustrative of the current outline design of the Project.

2.10.2 The visualisations combine a photograph of an existing view with a computer-generated image. They provide photo-realistic, rendered representations of how the proposed development may look in the context of the existing landscape, as would be seen in a photograph, but not as would appear to the human eye in the field.

2.10.3 Images have been taken at 300ppi on a Nikon D3200 with a Nikon AF-S DX NIKKOR 18-55 mm f/3.5-5.6G VR II Lens. The Nikon D3200 is a cropped-frame DSLR and images have been taken at a focal length of 35mm, which is equivalent to a focal length of 50mm on a full-framed DSLR.

2.10.4 The camera was mounted on a tripod at eye level (approximately 1.5m above ground level).

2.10.5 A 3-dimensional model of the above-ground building elements was supplied by the engineering team in AutoCAD. Virtual viewpoints were created in AutoCAD and exported to Adobe Photoshop for rendering of final images.

2.10.6 The visualisations are reproduced in Appendix B and should be viewed at a distance of 300mm when printed at A3 size.

### **2.11 Assumptions concerning the baseline environment**

2.11.1 Where appropriate, visual receptors were grouped rather than identified individually for the purposes of the assessment.

2.11.2 The assessment focussed on the public domain and photographs illustrating typical views were taken from publically accessible locations.

2.11.3 To capture and illustrate the Project extent, photographs used in the baseline photography are stitched panoramas.

**2.12 Assumptions concerning prediction of impacts**

- 2.12.1 The descriptions of the significance of the visual effects relate to groups, rather than individual properties. In quantifying effects, the assessment process aims to be as objective as possible. However, the evaluation of landscape character and visual effect frequently requires qualitative judgements to be made. The conclusions of this assessment therefore combine objective measurement with informed professional judgement as set out in GLVIA 3.

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## 3 Legislation and planning policy

### 3.1 National Planning policy

#### National Planning Policy Framework (NPPF)

3.1.1 The NPPF attaches importance to the character of the built environment, emphasising that developments should add to the overall quality of the area, respond to local character, history and reflect the identity of local surroundings and materials. The provisions relevant to the LVIA of the Project are included in the following sections of the NPPF:

- Section 7: Requiring good design;
- Section 10: Meeting the challenge of climate change, flooding and coastal change;
- Section 11: Conserving and enhancing the natural environment; and
- Section 12: Conserving and enhancing the historic environment.

### 3.2 Local Planning Policy

#### South East Lincolnshire (SEL) Local Plan

3.2.1 It has been noted that the South East Lincolnshire Local Plan 2011-2036 was submitted as a draft for Public Consultation between January and April 2016. As this Plan is still a draft, it currently carries a limited material weight, but reference the policies relevant to this report are outlined below:

- Policy 3: Development Management
- Policy 25: The Natural Environment
- Policy 26: The Historic Environment
- Policy 29: Design of New development

3.2.2 The 'Landscape Character Assessment of Boston Borough 2009' is referenced in the SEL and notes the 'Framed views of St Botolph's church in Boston, otherwise known as 'the Boston Stump' as being 'Highly appreciated'. There is no direct reference to where these 'framed' views are located.

#### Boston Borough Local Plan

3.2.3 The Boston Borough Local Plan was adopted in April 1999. In accordance with the provisions of the Planning & Compulsory Purchase Act 2004, the Secretary of State agreed that some of the policies in the adopted local plan should be saved. All other policies in the adopted Local Plan 1999 were not saved and therefore no longer have any consideration in planning policy terms.

3.2.4 The following saved policies are relevant to the Project:

- Policy G1: Amenity – Planning permission would only be granted for Development which would not substantially harm the amenities of other nearby land users or residents, or the

general character of the area because of its nature, scale, density, layout, appearance or level of traffic generation;

- Policy G2: Wildlife & Landscape Resources – Planning permission would not be granted for proposals which would have a significant adverse impact upon existing landscape, wildlife and vegetation resources;
- Policy ED2: Development of Ports – In areas of port related development shown on the proposals map planning permission would be granted for development which is associated with the port's activities, provided that the proposals would not:
  - Generate levels of traffic, dust, noise, smell or other pollution which would significantly harm the amenities or interests of other nearby land users or residents;
  - Cause unacceptable harm to the character of the locality due to its 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 R6: Public Rights of Way – Planning permission would not be granted for development which results in the loss of a public right of way;
- Policy C7: Development of sites adjacent to River Witham – Planning permission would 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; or
- Policy C8: Stump Views – Planning permission would not be granted for any development which would obstruct a public view of St. Botolph's Church, Boston, or which would challenge the visual dominance of the church.

### **3.3 Boston Borough Interim Plan (non-statutory development control policy)**

3.3.1 The Interim Plan was adopted in February 2006. 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.

3.3.2 The following policies are considered to be relevant to the Project:

- Policy E1: Design in Conservation Areas – On sites within conservation areas, and on sites affecting the setting of conservation areas a high quality of architectural design would be of particular importance as a material consideration in the determination of planning applications;
- Policy E7: Public Art – Where a proposal for a large new development is submitted, the borough council would seek to negotiate with the developer for the provision of a new work or new works of public art;

- Policy E9: Development of Sites adjacent to River Witham – Planning permission would be granted for the development of land adjacent to the river Witham, or the Haven (the tidal stretch of the river) provided the submitted proposals enhance the character of the area and are visually well related to the river scene. Where appropriate proposals should provide for public access to the waterfront and promote any recreational potential of the site concerned;
- Policy E10: Boston Stump (The Tower of St Botolph's Church) Views – Planning permission would be granted for development provided it would not obstruct a public view of St. Botolph's church, Boston or challenge the visual dominance of the church; and
- Policy E16: Tree Preservation – Planning permission would be granted for development provided it would not cause harm to, or the loss of, a tree or trees of significant amenity value, especially where protected by a tree preservation order.

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## 4 Baseline conditions

### 4.1 Current conditions

- 4.1.1 The Project area is located south of Boston town centre and the PoB. It comprises the area on both sides of the Haven including the flood defence walls on the south bank and the area within the PoB adjacent to The Haven, including the quay and the land around the knuckle – the entrance to the wet dock.
- 4.1.2 The River Witham runs through the centre of the study area. The tidal mudflats within the Haven channel area are a constantly changing element in the landscape: at low tide they are exposed and at high tide they are covered by the incoming water.
- 4.1.3 The study area is predominantly flat, with raised flood embankments on the right bank of The Haven, above the adjoining Wyberton Low Road, and along the left bank adjacent to Skirbeck Hall and St. Nicholas' Church which are at a lower level.
- 4.1.4 There is limited vegetation on the left bank within the PoB estate due to the industrial land use; that is 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. Downstream of the sluice the open grass area associated with St Nicholas church, the pond and open space facing onto Fishtoft Road support more trees. This area links to the Havenside Country Park downstream but partially separated by the presence of an industrial unit. 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 electricity substation, the river corridor takes on an increasingly rural character.
- 4.1.5 The town of Boston is of significant historic interest due to its long history as a port. There are a number of buildings of historic and architectural significance which relate to the River Witham and The Haven, reflecting the designated conservation areas for Boston and Skirbeck. These are discussed in more detail in the ES (Volume 2a): Cultural Heritage Technical Report.
- 4.1.6 Land use comprises a mixture of urban and suburban development, with residential areas to the south. Properties on Wyberton Low Road are characterised by Victorian terraced houses with small gardens backing onto the flood embankment and to the north-east. Houses on Rectory Road, Alfred Street and Fishtoft Road; largely modern housing estates with central green open spaces located on lower ground, below the existing flood embankments. 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.

4.1.7 There is vegetation within the gardens of properties on Wyberton Low Road; however, the street itself has no planting. The new residential development at the Featherworks and Rectory Road has landscaped front gardens and a small open space in the centre.

4.1.8 The banks of the river are sparsely vegetated, with amenity grassland on the flood embankments and scattered shrubs and isolated semi-mature trees. The ES (Volume 1) Chapter 10: Ecology and Nature Conservation has further detail on the species present and distribution.

## 4.2 Landscape related designations within study area

4.2.1 Landscape and heritage related designations that apply to the study area or features within it as illustrated in Figure 4.1 and include:

- Conservation Areas:
  - Boston Conservation Area; and
  - Skirbeck Conservation Area.
- Scheduled Monuments:
  - Hussey Tower.
- Listed Buildings:
  - Swing Bridge (Grade II);
  - London Road Gatehouse and Signals Cabin, (Grade II);
  - Maud Foster Sluice, (Grade II);
  - Parish Church of St Nicolas; and
  - St Botolph's Church (Grade I) – known as the Boston Stump.
- Havenside Country Park; and
- Public rights of way (PRoW) including Boston Public footpath No.14 (Macmillan Way) along the right bank of the Haven, Boston Public footpath No.13 along Windsor Bank and left bank downstream to the Havenside Country Park, Boston Public footpath No.12 on the left bank upstream of the swing bridge and Boston Public footpath No.17 along the South Forty Foot Drain (SFFD) to the west.

4.2.2 Boston Cemetery Registered Park and Garden is to the north of the study area and not affected by the Development.

## 4.3 Landscape character

### National landscape character

4.3.1 The study area lies in National Character Area (NCA) 46: The Fens. The key characteristics of this NCA are based on the description in The Fens: NCA 46 profile published by Natural England in March 2013 are:

- Expansive, flat, open, low-lying wetland landscape influenced by The Wash estuary, and offering extensive vistas to level horizons and huge skies throughout, provides a sense of rural remoteness and tranquillity;
- The Wash is the largest estuarine system in Britain, supporting internationally important intertidal and coastal habitats, forming salt marsh and mudflats and providing habitats for wildfowl, wading birds and other wildlife;
- Overall, woodland cover is sparse, notably a few small woodland blocks, occasional avenues alongside roads, isolated field trees and occasionally hedges around farmsteads.
- The predominant land use is arable;
- Open fields, bounded by a network of drains and the distinctive hierarchy of rivers, have a strong influence on the geometric landscape pattern;
- Large, built structures exhibit a strong vertical visual influence, such as the tower of St Botolph's Church, wind farms and other modern large-scale industrial and agricultural buildings; and
- Settlements and isolated farmsteads are mostly located on the modestly elevated 'geological islands'. Elsewhere, villages tend to be dispersed ribbon settlements along the main arterial routes through the settled fens, and scattered farms remain as relics of earlier agricultural settlements. Domestic architecture mostly dates from after 1750 and comprises a mix of late Georgian-style brick houses and twentieth century bungalows.

#### 4.4 Regional landscape character

- 4.4.1 The Landscape Character Assessment of Boston Borough was published by BBC in July 2009, as part of the evidence base for the emerging Local Development Framework. The published assessment took into account only the areas outside Boston town and therefore sets out the wider landscape context for the development but does not cover the study area.

#### 4.5 Local landscape character areas

- 4.5.1 The Environmental Statement for Boston Waterways Link undertaken by the Environment Agency<sup>3</sup> and the Boston Barrier Landscape, Townscape and Visual Assessment, October 2011<sup>4</sup> discusses a wider area that includes the study area defined for this Project. The landscape character areas defined in these documents and relevant to the study area have been used as a basis for this assessment. Minor refinements have been included informed by desk top study and field surveys for this Project. Local landscape character areas (LLCA) have been defined as unique geographical areas of a particular landscape type. The landscape types define areas of relatively homogenous in character sharing similar characteristics relating to topography, vegetation, land use and settlement pattern and aesthetic attributes. The LLCA are illustrated on Figure 4.1 (see Appendix A of this report).

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3 Boston Waterways Link: River Witham to South Forty Foot Link Environmental Statement Volume 1 – Main Statement, Environment Agency, December 2004

4 IMAN001472 Boston Barrier: Landscape, Townscape and Visual Assessment, Environment Agency 2011

### **LLCA 1 Estuary Corridor**

- 4.5.2 The LLCA is in the centre of the study area and part of the Project would be located here. This LLCA comprises the area of the river within the study area, downstream of Black Sluice and beyond. The character area contains salt marsh and rough grazing adjacent to the river channel and the Havenside Country Park on the outskirts of Boston. Closer to the Project, the LLCA is characterised by the wharves along the river, sheet piling in places and the large scale industrial estate and the PoB on either side of the Haven. Pylons and overhead lines cross the river and give the area an industrial feel. The tidal mud banks exposed at low tide are another characteristic feature, together with the navigation activity at high tides. The flood embankment, on the right bank is covered with amenity grassland, sparse shrubs and single trees with good public access via embankment footpaths and open spaces. This forms a transitional element linking the semi-rural character downstream with the industrial area and beyond. There is a visual connection with landmarks, including the Stump and St Nicholas' Church but this is interrupted by the large scale presence of the PoB. The area has experienced a high degree of change through the development along the river frontage. The Project is located within this LLCA.
- 4.5.3 The tranquillity of this LLCA is low, close to the PoB, becoming more tranquil downstream of Boston as the influence of the large scale infrastructure and hard riverside flood defences diminishes. The LLCA has some scenic quality downstream with its tidal nature and features such as mud banks, old jetty structures, rough grazing and salt marsh. Together they create a relatively unique character, although the surrounding areas of industrial developments and the pylons closer to Boston are detracting elements. Landscape condition is fair. The susceptibility to change is influenced by the existing presence of similar structures to the Project in this LLCA and offers some opportunities for the accommodation of the type of change proposed. Overall the sensitivity of the LLCA 1 Estuary Corridor is considered to be medium.

### **LLCA 2 Wharves and Moorings**

- 4.5.4 This LLCA covers the northern reach of the Haven within the study area, stretching upstream from the Black Sluice to Haven Bridge. This part of the River Witham is more urban than LLCA 1 and is characterised by the smaller-scale moorings and riverside quays and fishing boats within the narrow tidal channel. The mud banks are exposed in this stretch at low tides, uncovering the old and disused timber jetties. The area has strong visual connections with surrounding landmarks, including the railway swing bridge and control house, Black Sluice and associated facilities, the riverside properties and the Stump. This LLCA has good public links along the SFFD to the Boston Public footpath No.14 (Macmillan Way) running along the right bank of the Haven. London Road connects the Sustrans Route 1 and the Macmillan way into the centre of Boston. The LLCA falls partly within the Boston CA.
- 4.5.5 The tranquillity of the LLCA is low due to the busy London Road. The LLCA has some scenic quality due to the exposed mud banks at low tide and features connected with fishing such as

boats and jetties. Landscape condition is fair. The character of the LLCA offers limited opportunities for the accommodation of the type of change proposed, particularly closer to the town centre. Overall the sensitivity of the LLCA 2 Wharves and Moorings is considered to be high.

### **LLCA 3 Industrial – Docks**

4.5.6 The LLCA is in the centre of the study area and part of the Project would be located here. The LLCA has connections with the river which encompasses the LLCA from the west and south. Parts of the docks are in a semi-derelict condition, while a significant area is still commercially active. The LLCA is a flat landscape accommodating large-scale industrial buildings and associated elements including cranes, silos and conveyors, as well as high level flood lighting. There are large areas of hard standing within the docks, together with the railway tracks and a number of derelict buildings. There is no public access and vegetation is limited to the row of trees and shrubs on the western edges of the PoB along Riverside Quay.

4.5.7 This area is characterised by industrial land use and large-scale urban pattern. The semi-derelict buildings and hard standing are detracting features in the LLCA and the condition of the LLCA is poor. The tranquillity of the LLCA is low due to the PoB activities. The LLCA has a low susceptibility to change as the existing characteristics of the landscape contain similar features to those of the type of development proposed. Overall, the sensitivity of the LLCA 3 Industrial – Docks is considered to be low.

### **LLCA 4 Historic Urban Core and Riverside**

4.5.8 This character area is located to the north of the study area and comprises the older historic streets and buildings of Boston. It is characterised by the dense grid of streets with mainly terraced houses and areas of mixed use including residential, commercial, small-scale industrial uses and areas of re-development. The historic buildings, including the Stump and Guildhall, constitute important landmarks within this LLCA.

4.5.9 This area is largely within the Boston Conservation Area that extends to the north of the study area and includes many historically important buildings that relate to the riverside setting. Within the study area, the turn of the century terraces are interspersed by larger scale developments and modern housing areas. Although there are detracting elements, the LLCA is in relatively good condition, tranquillity is medium away from the A1138 and London Road.

4.5.10 The character of the LLCA offers limited opportunities for the accommodation of the type of change proposed. Overall, the sensitivity of the LLCA 4 Historic Urban Core and Riverside is considered to be high.

### **LLCA 5 Skirbeck Quarter (east)**

4.5.11 The LLCA is in the south-western part of the study area and is characterised by the residential areas of the Skirbeck Quarter, south of the SFFD and the Haven. The residential areas consist mostly of nineteenth century terraced properties and mid-twentieth century residential

estates with no outstanding architectural style or quality. The mixed commercial land use associated with Marsh Lane is large scale with expansive areas of car parking. The Skirbeck Quarter is influenced by the Riverside Industrial Estate, traffic on Wyberton Low Road, Marsh Lane and A16 and, in the vicinity of the river, flood defence structures.

- 4.5.12 The residential and mixed commercial land use of this area is common place but the overall condition is good. The tranquillity within the LLCA is medium for the residential areas but reduces closer to the main roads. The character of the LLCA offers some opportunities for the accommodation of the type of change proposed. Overall the sensitivity of the LLCA 5 Skirbeck Quarter is considered to be medium.

### **LLCA 6 Industrial (large-scale)**

- 4.5.13 This LLCA is in the south-eastern part of the study area and includes the Riverside Industrial Estate, contained to the north by The Haven and the raised flood embankment. The area consists of large-scale buildings, sheds and related structures including tanks, hard standing, storage areas and car parks. Overhead electricity cables cross the LLCA.
- 4.5.14 The large-scale sheds and similar industrial structures and service roads are detracting elements. The tranquillity of the LLCA is low and the landscape is in poor condition. The LLCA has low susceptibility to change as the attributes that make up the character of the landscape are resilient to being changed by the type of development proposed. Overall, the sensitivity of the LLCA 6 Industrial (large-scale) is considered to be low.

### **LLCA 7 Industrial and Commercial (small-scale)**

- 4.5.15 This LLCA is located to the north of the SFFD and to the east of Spalding Road (A16). It consists of medium and small-sized commercial and retail units. The residential properties facing the London Road mark the edge of the Boston Conservation area and LLCA 4.
- 4.5.16 The area is relatively unattractive, dominated by buildings with large footprints, large areas of parking at the supermarket and medium-scale sheds and service roads on the industrial estate. The tranquillity of the LLCA is low and the landscape is in poor condition. The LLCA has low susceptibility to change as the attributes that make up the character of the landscape contain similar features to those of the type of development proposed. Overall, the sensitivity of the LLCA 7 Industrial and Commercial (small-scale) is considered to be low.

### **LLCA 8 Skirbeck – Maud Foster Drain**

- 4.5.17 This LLCA is located in the eastern part of the study area and comprises small-scale nineteenth century terraced housing around Maud Foster Drain and Skirbeck Road. There are small-scale industrial and commercial units within this LLCA, of a similar age to the residential properties. The Skirbeck Conservation Area is located partly within this LLCA.
- 4.5.18 This urban area of residential and small-scale mixed land use is of ordinary quality, with some locally detracting features such as pylons and the busy Skirbeck Road. There are some

attractive areas of older housing. Some of the properties along Windsor Bank, the route of Boston Public footpath No.13, face directly onto the open Maud Foster Drain which creates a green river corridor with some tree and shrub areas. The tranquillity of the LLCA is medium and the landscape condition is fair. The character of the LLCA offers some opportunities for the accommodation of the type of change proposed. Overall, the sensitivity of the LLCA 8 Skirbeck – Maud Foster Drain is considered to be medium.

### **LLCA 9 Skirbeck Hall and Church**

4.5.19 The smallest LLCA is within the eastern part of the study area. It comprises a few historic stone and brick-built houses and the listed St. Nicholas' Church, surrounded by mature trees, gardens and the cemetery. A small block of wooded landscape extends around an area of green open space, with a model boating lake and the northern grass-covered flood embankment of the Haven. The Boston Public footpath No.13 crosses the LLCA. Modern residential properties are also present.

4.5.20 Although small, this area contains a number of elements that positively contribute to landscape character such as the older houses, the church and extensive mature tree cover. The Skirbeck Conservation Area is located partly within this LLCA. There is good public access and it is well-used for recreational purposes with good views of the river. The tranquillity of the LLCA is high, although views of the overhead lines and pylons are intrusive elements. Overall condition is good. The character of the LLCA offers limited opportunities for the accommodation of the type of change proposed and the LLCA has high susceptibility to change. Overall, the sensitivity of the LLCA 9 Skirbeck Hall and Church is considered to be high.

### **LCA 10 Skirbeck - Fishtoft Road**

4.5.21 This is a residential area of medium density post-war development of one and two storey properties and established gardens. The topography is flat, consequently the riverside embankment and intervening trees limit visibility of the river. Pylons cross this LLCA. The Skirbeck Conservation Area is adjacent.

4.5.22 This urban area of residential development comprises common place features with some locally detracting features such as pylons. There are areas of green open spaces and well established gardens. The tranquillity of the LLCA is medium and the landscape condition is fair. The character of the LLCA offers some opportunities for the accommodation of the type of change proposed. Overall, the sensitivity of the LLCA 10 Skirbeck - Fishtoft Road is considered to be medium.

### **LLCA 11 Agricultural Fenland**

4.5.23 This LLCA is to the south-east of the study area. It represents the agricultural hinterland of drained marshes extending northwards towards Boston and bounded by the riverside embankment. The area is very gently undulating and the embankment is prominent and

supports some scrub on the landwards face. Current land use includes arable, rough grazing and areas of hardstanding. Pylons and overhead lines are visible.

- 4.5.24 The tranquillity of the LLCA is high and landscape condition is fair in places although there are some detracting elements. The character of the LLCA offers some opportunities for the accommodation of the type of change proposed. Overall, the sensitivity of the LLCA 11 Agricultural Fenland is considered to be medium.

### 4.6 Visual amenity

- 4.6.1 The proposed site lies within the urban area of Boston with mostly industrial and commercial buildings surrounding it. The visual envelope is limited to the south by the residential properties of Wyberton Low Road and sheds of 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.
- 4.6.2 There are no identified protected views in the Skirbeck Conservation Area (a Conservation Area Appraisal is currently not available). The noted protected views in the Boston Conservation Area are concentrated on the channel and approach to Boston and are not directly affected by the Scheme. However, views to and from the Boston Stump are highlighted both in the conservation appraisal and in the Boston Borough Interim Plan. The Stump is visible from the western end of the Boston public footpath No.14 (Macmillan Way), by the Black Sluice. Travelling eastwards along the footpath, the PoB facilities and the presence of pylons screen and compromise clear views of the Stump. From the left bank, the Church of St Nicholas and the Stump can be seen in the same view, but this view would not be directly affected by the proposed works. The views to and from these heritage assets are discussed further in the ES (Volume 2a): Cultural Heritage Technical Report.
- 4.6.3 Boston Borough Local Plan saved policy C8, also notes the importance of the Stump Views (St. Botolph's Church) where *planning permission would not be granted for any development which would obstruct a public view of, Boston, or which would challenge the visual dominance of the church*. There are no specific viewpoints locations noted.
- 4.6.4 A summary of the key visual receptors and views (shown on Figure 5.2 in Appendix A) is set out in the following Table 4.1. Approximate distances shown in the table are classified as follows:
- Close – up to 100m from the Project;
  - Mid-distance – between 100m and 250m from the Project; and
  - Distant – more than 250m from the Project.

Table 4.1: Key visual receptors

No	Visual Receptor	Description	Sensitivity
1	Residents in properties on Wyberton Low Road between London Road and Marsh Lane	Current view has the PoB facilities in the background and facilities associated with Black Sluice and flood embankment in the fore ground beyond rear gardens. Clear views of the site, mostly from the upper windows at the rear of the properties. Ground floor views may be partially obscured by back garden vegetation and existing flood embankment. Viewpoint approximately 50m; close. Value - medium reflecting the views to the Stump from selected properties.	High
2	Residents in properties between Wyberton Low Road and Marsh Lane	Views of the site possible from this location, from the bungalows on the corner of Wyberton Low Road and Marsh Lane and from Marsh Lane facing north. Current view of light industrial facilities with PoB in the background.  Viewpoint approximately 50m; close. Value – low, valued at a community level	High
3	Recreational users of the Boston Public footpath No.14 (Macmillan Way) along the right bank of the Haven on flood embankment	Clear views of the site from Boston Public footpath No.14 (Macmillan Way) along the flood embankment. Current view is from the elevated flood bank over the river towards the industrial estate and the PoB.  Viewpoint adjacent to Mid-distance. Value – medium, valued for amenity value and susceptibility to change high	High
4	Workers at the Riverside Industrial Estate	Views of the site possible from the industrial estate, mostly from the north-west edges towards the existing flood embankment with the PoB in the background.  Viewpoint adjacent to distant. Value and susceptibility to change – low	Low
5	Residents in properties in River Way, Fishtoft Road and Maple Road	Distant views of the site possible from this location, partly screened by the existing vegetation in front of the houses and flood embankments. The properties are set on lower ground due to the presence of the embanked river landform. Pylons and the PoB facilities set the context of the view  Viewpoint distance: 700m to distant. Views valued at a local level for scenic and amenity value and susceptibility to change high.	High
6	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	Views west towards the site are partly screened by the existing vegetation within the green space and around St Nicholas church and by the raised flood embankments. Views of the PoB facilities and pylons are prominent on the skyline of the view. The Riverside Industrial estate is visible in the background of the view. The view south along the flood embankment has fewer detractors in the view although pylons and small scale buildings are visible.  Viewpoint distance: 300m to distant. Views valued at a local level for scenic and amenity value susceptibility to change high;	High
7	Residents in	Views of the site are mostly obscured by the existing	High

	properties within The Featherworks and Rectory Road Windsor Bank and Alfred Street	intervening vegetation along the drain, the flood embankment, garden walls and vegetation from the two and three storey properties. Existing PoB buildings are apparent and pylons prominent. Viewpoint distance: 215m to Mid-distance. Views valued at a local level for amenity value; susceptibility to change high	
8	Workers and visitors of PoB	Clear views of the site from the areas of the port adjacent to the site boundary. Large-scale shed and ancillary structures obscure some views from more distant parts of the PoB. Viewpoint distance: Adjacent. Views with limited scenic value; susceptibility to change low	Low
9	Residents of properties on London Road	The site is obscured by the intervening sheds, buildings and existing vegetation within the PoB. Viewpoint distance: 380m to Distant. Views valued at a local level for amenity value; susceptibility to change high	High
10	Users of the moorings and hard to the north of Black Sluice (right bank)	Oblique views of the site possible upstream of the Black Sluice seen in the context of existing houses and PoB as well as the Black Sluice facilities. Further north, views are obscured by the intervening sheds, buildings and existing vegetation within the PoB. Viewpoint distance: Adjacent to Mid-distance. Views valued at a local level for amenity value; susceptibility to change medium	Medium
11	Users of commercial units on London Road	Oblique views of the site possible in the location of the Black Sluice. Further north, views are obscured by the intervening sheds, buildings and existing riverside vegetation. Viewpoint distance: 230m to Mid-distance. Views valued at a local level for amenity value; susceptibility to change low	Low
12	Cycle and vehicle users of London Road (Sustrans route 1)	Oblique and glimpsed views of the site possible from vehicles and cyclists passing the site. Views slightly obscured by the barriers and infrastructure of the Black Sluice. Viewpoint distance: Adjacent to Distant. Views valued at a local level for scenic and amenity value; susceptibility to change medium	Medium
13	River users of the Haven	Clear views of both banks of the site for river users set in the context of the PoB facilities to the north and the flood embankment and electricity substation to the south. Viewpoint distance: Adjacent to Distant. Views valued at a local level for scenic and amenity value; susceptibility to change medium	Medium

Source: Mott MacDonald 2016

4.6.5 Representative existing views for each of the above key visual receptors are illustrated below; locations are shown on Figure 4.2 in Appendix A of this report.

## Boston Barrier Tidal Project

A17/2a – Volume 2a: Landscape and Visual Impact Assessment Technical Report

Viewpoint 1A: Typical view for Visual Receptor 1. Residents in properties on Wyberton Low Road between London Road and Marsh Lane. View looking north-east from the flood embankment, the residential properties are to the south of the embankment



Source: Mott MacDonald 2016

## Boston Barrier Tidal Project

A17/2a – Volume 2a: Landscape and Visual Impact Assessment Technical Report

Viewpoint 1B: Typical view for Visual Receptor 1. Residents in properties on Wyberton Low Road between London Road and Marsh Lane. View looking east along the flood embankment, the residential properties is to the south of the embankment



Source: Mott MacDonald 2015

## Boston Barrier Tidal Project

A17/2a – Volume 2a: Landscape and Visual Impact Assessment Technical Report

Viewpoint 2: Typical view for Visual Receptor 2. Residents in properties on Wyberton Low Road, Marsh Avenue and Marsh Lane. View looking north from Marsh Lane towards the proposed compound area.



Source: Mott MacDonald 2015

## Boston Barrier Tidal Project

A17/2a – Volume 2a: Landscape and Visual Impact Assessment Technical Report

Viewpoint 3: Typical view for Visual Receptor 3. Recreational users of the Boston Public footpath No.14 (Macmillan Way) along the right bank of the Haven on flood embankment (looking west)



Source: Mott MacDonald 2015

## Boston Barrier Tidal Project

A17/2a – Volume 2a: Landscape and Visual Impact Assessment Technical Report

Viewpoint 4: Setting for Visual Receptor 4. Workers at the Riverside Industrial Estate, illustrating the view from the flood embankment looking north west, note the industrial estate is set below the flood embankment to the south of the embankment to the left of the image.



Source: Mott MacDonald 2015

## Boston Barrier Tidal Project

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Viewpoint 5: Typical view for Visual Receptor 5. Residents in properties in River Way, Fishtoft Road and Maple Road. View looking north west towards the flood embankment, the PoB is central to the photograph.



Source: Mott MacDonald, 2015

## Boston Barrier Tidal Project

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Viewpoint 6A: Typical view for Visual Receptor 6. Users of the green area within the Skirbeck and the churchyard of St Nicholas, residents and recreational users of the PRoW on left bank of the Haven. View looking north west towards the PoB.



Source: Mott MacDonald, 2015

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Viewpoint 6B: Typical view for Visual Receptor 6. Users of the green area within the Skirbeck and the churchyard of St Nicholas, residents and recreational users of the PRoW on left bank of the Haven. View looking south from the flood embankment.



Source: Mott MacDonald, 2015

## Boston Barrier Tidal Project

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Viewpoint 7 Typical view for Visual Receptor 7. Residents in properties within The Featherworks Rectory Road Windsor Bank and Alfred Street. View looking west, the flood embankment and Maud foster Sluice are in the centre of the photograph)



Source: Mott MacDonald, 2015

## Boston Barrier Tidal Project

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Viewpoint 8: Typical view for Visual Receptor 8. Workers and visitors of PoB – View of the PoB entrance looking south west.



Source: Mott MacDonald, 2015

## Boston Barrier Tidal Project

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Viewpoint 9: Typical view for Visual Receptor 8 Workers and visitors of PoB – View of the PoB quay looking east.



Source: Mott MacDonald 2015

## Boston Barrier Tidal Project

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Viewpoint 10: Typical view for Visual Receptor 10. Users of the moorings to the north of Black Sluice (right bank). View looking south from the flood embankment towards Black Sluice, PoB is to the left of the photograph.



Source: Mott MacDonald 2015

## Boston Barrier Tidal Project

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Viewpoint 11: Typical view for Visual Receptor 11. Users of commercial units on London Road, view looking south



Source: Mott MacDonald 2015

## Boston Barrier Tidal Project

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Viewpoint 12: Typical view for Visual Receptor 9. Residents of properties on London Road. View looking south from the hard standing, the residential properties are on the western side of London Road



Source: Mott MacDonald 2015

## Boston Barrier Tidal Project

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Viewpoint 13: Typical view for Visual Receptor 12. Cycle and vehicle users of London Road (Sustrans route 1), view from the Black Sluice looking east



Source: Mott MacDonald 2015

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## 5 Impact assessment

### 5.1 Assessment

5.1.1 This section considers the impacts and effects during both the construction and operation of the Project on the landscape character resource and visual amenity following implementation of incorporated mitigation.

### 5.2 Construction

#### Assessment assumptions and limitations

5.2.1 This Landscape and Visual Amenity assessment has been carried out using the Project description and construction methods described in the ES (Volume 1): Chapter 2 and as shown on ES (Volume 1) Appendix A: Maps and Figures; Figures 2.1 to 2.5. Specifically, the site boundary, site compounds are shown in Figure 1.1 and haul routes in ES (Volume 2d): Traffic and transport Technical Report; Appendix A, Figure 4.1. Dredging and lighting are discussed in the Project Description in the ES (Volume 1); Chapter 2 and the Lighting Statement in Appendix C of this Technical Report.

5.2.2 The following assumptions have been made:

- Construction would be carried out in line with best practice and under an Environmental Action Plan (EAP) or a Construction Environmental Management Plan (CEMP);
- Construction would be limited to between Monday and Friday other than works to the wet dock where construction would be on 24 hours/7 days working week basis;
- Construction noise would be carefully monitored during construction to minimise impacts on the local area;
- During construction works along the channel the PoB would continue operating, with no reduction in the associated activity, traffic and noise. During construction activity at the wet dock, the PoB would relocate from the wet dock to the berths available at the left hand bank. For further details, see ES (Volume 2d): Navigational Impact Assessment Technical Report;
- Construction works to the wet dock would be carried out over 24 hours a day, seven days of the week (24/7) to expedite the completion of the Project;
- Normal tidal activity (that is, tidal activity as it is now) would continue in the Haven during the construction period;
- Sheet piling would weather over time following its installation, the surface becoming duller, due to the effects of tidal activity;
- The existing grass embankment would be retained down to the water side of the new flood wall on the right bank;
- Sheet piling would be driven into the existing flood embankment along the right bank (working from the land), the tidal mudflats would be allowed to reform and recolonise along the right bank post-construction;
- In consultation with BBC, appropriate grasses (saline tolerant) would be introduced below the new sheet piling 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 further consultation with BBC and LCC); and

- The right bank would be re-instated with grassland and wildflowers with an improved route for pedestrians and light vehicles (for barrier maintenance) running along the crest in the post-construction period.

### 5.3 Construction impact assessment

5.3.1 Potential construction impacts would be temporary and localised in nature. The construction of the Project is anticipated to commence in October 2017 and be completed by December 2019.

5.3.2 Activities during the construction phase of the Project which might give rise to potential impacts on landscape character and visual amenity include:

- Presence of construction traffic along haul routes, construction plant, equipment and workers;
- Construction activities associated with the erection of the barrier structure, piling and works at the knuckle and along the PoB quay and right bank;
- Elevated noise affecting enjoyment of public open spaces;
- Diversion of Boston public footpath No.14 (Macmillan Way) along Marsh Lane for the duration of the construction activity;
- Introduction/removal of built structures;
- Movement of excavated earth and dredgings, as well as changes in the landform on site;
- Presence of construction compounds and temporary security fencing;
- Servicing the 24/7 working programme, requiring floodlighting for the installation of the wet dock gates in PoB (7 months duration); and
- Presence and views of dredging activities which would take place at low tide and directional task floodlighting (if required).

### 5.4 Landscape effects

5.4.1 Construction activity would take place within a small proportion of the study area and impacts would be contained by the densely developed urban environment. The summary of landscape effects during construction is shown in Appendix A: Figure 5.1 of this report.

5.4.2 The construction activity would take place in LLCA 1: Estuary corridor, LLCA 3 Industrial – Docks, LLCA6 Industrial (large-scale) or immediately adjacent to: LLCA 2 Wharves and Moorings; LLCA5 Skirbeck Quarter; LLCA 8 Skirbeck – Maud Foster Drain and LLCA 9 Skirbeck Hall and Church (high sensitivity).

5.4.3 Haul routes and the movement of dewatered dredged material would use main arterial roads including the A16, A52 and A1138. More local routes passing close to residential properties and areas of open public spaces include the sections of the A1138, Marsh Lane and Skirbeck

Road. None of these roads are considered minor roads and currently accommodate large HGV vehicles. The ES (Volume 2a) Noise and Vibration Technical Report has not identified any significant effects on changes in the noise environment during construction in relation to traffic. Due to the presence of intervening residential, commercial and industrial buildings, together with the current land uses and activities at PoB, the key characteristics of the following LLCAs would not be affected by construction activity: LLCA 4 Historic Urban Core and Riverside (high sensitivity), LLCA 7 Industrial and Commercial (small-scale) (low sensitivity), LLCA 9 Skirbeck Hall and Church (high sensitivity), LLLA 10 – Skirbeck-Fishtoft Road (medium sensitivity) and LLCA 11 – Agricultural Fenland (medium sensitivity).

- 5.4.4 Indirect effects on the setting of the Boston Conservation Area in LLCA 4 Historic Urban Core and Riverside and on the Skirbeck Conservation Area in LLCA 9 Skirbeck Hall and Church are discussed in the Cultural Heritage Assessment (see ES (Volume 2a): Cultural Heritage Technical Report).

### **LLCA1 Estuary Corridor**

- 5.4.5 Construction activities would take place in the LLCA1 Estuary Corridor and would affect its setting through the presence of the construction works and associated plant and machinery. The Boston Public Footpath No.14 (Macmillan Way) would be temporarily diverted away from the flood embankment during the construction period with links east and west of the Project. Tranquillity in the LLCA is currently low close to the PoB and it would be further reduced during construction. During the construction period, 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. Dredging and works to the left bank are typical of current activities associated with the PoB. The temporary relocated Witham Sailing Club (WSC) would be present on the left bank downstream of Maud Foster Sluice adjacent to an existing building. The facilities would include a small temporary boat club building and the existing hardstanding area would be used for car parking. 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.

### **LLCA 2 Wharves and Moorings**

- 5.4.6 Construction activities would take place in the adjacent LLCA1 Estuary Corridor and would indirectly affect setting of LLCA 2 through the presence of the construction works and associated plant and machinery. During the construction period, piling activity and the presence of plant on the right bank downstream of Black Sluice and works within the channel associated with the barrier would introduce new prominent elements into the adjacent LLCA. Dredging works would be typical of current activities associated with the PoB. The magnitude of change to the LLCA would be low reflecting the minor alteration to key landscape elements.

The magnitude of impact on the LLCA would therefore be low. The sensitivity of the LLCA is high and therefore overall, the effect would be minor adverse.

### **LLCA3 Industrial – Docks**

- 5.4.7 Construction works would take place in the LLCA3 Industrial – Docks, mainly along the quay and across the PoB frontage to the wet dock entrance. Site compound 1, servicing the barrier construction activities would be located adjacent to the Haven. This would not be a 24/7 site. The satellite compound for the wet dock works would be located just to the north of the wet dock gates. This would be operational 24/7 for nine months of the total construction period. Both compound sites are compatible in scale and land use to the existing PoB. Similarly the piling activity and construction of floodwall would introduce activity that is largely characteristic of the setting. Whilst some areas are in semi-derelict condition, other parts are commercially active with large-scale industrial buildings and associated elements, including cranes, silos and conveyors. The 24/7 construction works taking place within the wet dock would be floodlit. The PoB currently has tall floodlighting masts through the site and the additional floodlighting would not alter the existing background lighting. Therefore, the setting and character of this LLCA would not be affected to a great extent. Tranquillity in the LLCA is already low and would be further reduced during construction. The magnitude of change to the LLCA would be low due to the minor alteration to landscape elements resulting in a detectable change in the character of the landscape. The sensitivity of the LLCA is low and therefore overall, the effect during construction would be minor adverse and temporary in nature.

### **LLCA5 Skirbeck Quarter**

- 5.4.8 Site compound 2, off Marsh Lane would be adjacent to LLCA5 Skirbeck Quarter. The compound would not operate 24/7 and would be compatible in scale and character with the existing and adjacent land uses. The diversion of the Boston Public footpath No.14 (Macmillan Way) would be routed along Wyberton Low Road through the LLCA. The works on the right bank including piling and construction activities associated with the barrier would be outside of, but adjacent to, this LLCA. Construction traffic would access the main roads though this LLCA but since these roads are already well used, the additional traffic is unlikely to affect tranquillity discernibly. The addition of new features would result in a detectable change in the character of the landscape and the magnitude of impact on the LLCA would be low. The sensitivity of the LLCA is medium and therefore overall, the effect during construction would be minor adverse and temporary in nature.

### **LLCA6 Industrial (large-scale)**

- 5.4.9 Site compound 2, off Marsh Lane, would be located within this LLCA. The compound would not operate 24/7 and would be compatible in scale and character to the existing and adjacent land uses. The diversion of the Boston Public footpath No.14 (Macmillan Way) would be routed along Wyberton Low Road/Marsh Lane through the LLCA. The works on the right bank including piling and construction activities associated with the barrier would be outside of but

adjacent to this LLCA. Construction traffic would access the main roads through this LLCA but since these roads are already well used, the additional traffic is unlikely to affect tranquillity discernibly. The temporary construction works would not affect the setting or character of the LLCA as the works would take place in an area with an existing strong industrial character including large scale industrial and commercial buildings, storage areas and extensive car parks. The minor addition of new features would form largely inconspicuous elements in the landscape, resulting in a low magnitude of change. The sensitivity of the LLCA is low and therefore overall, the effect during construction would be minor adverse and temporary in nature.

### **LLCA 8 – Skirbeck – Maud Foster Drain**

- 5.4.10 The satellite compound servicing the works associated with the wet dock in the PoB would be located close to the LLCA but separated by existing large-scale industrial buildings. The compound would operate 24/7 for a period of 9 months. The PoB currently has tall floodlighting masts through the site and the additional floodlighting would not alter the existing background lighting. The proposed floodwall would tie into the Maud Foster Sluice. The scale of construction plant and activity would be compatible with the existing land use of the PoB and the key landscape characteristics of the LLCA would be unaffected.

### **LLCA 9 Skirbeck Hall and Church**

- 5.4.11 The Witham Sailing Club facility would be temporarily moved adjacent to the existing commercial building and hard standing/car parking area on the left bank. The facility is expected to be small scale including a temporary small jetty and club house. No additional areas of hardstanding would be required and access would be off Fishtoft Road. The scale of sailing club facility would be compatible with the existing land use and key landscape characteristics of the LLCA would be unaffected.

### **Summary of landscape effects during construction**

- 5.4.12 Overall, temporary moderate adverse, and therefore significant, effects during construction are predicted on the LLCA1 Estuary Corridor due to the works affecting the key characteristics of the Haven.

## **5.5 Visual effects**

- 5.5.1 Construction activity would be visible from a number of close locations surrounding the site. There would be open views from upper back windows of properties on Wyberton Low Road between London Road and Marsh Lane and from footpaths and Boston public Footpath No.14 (Macmillan Way) along the right bank of the Haven. There would be views of the works from the residential properties on London Road. Views of construction activities from more distant receptors would be mostly screened by the intervening residential, commercial and industrial

buildings and existing vegetation. Effects on visual receptors are summarised in Table 5.1. The location of receptors is shown on Figure 4.2 in Appendix A of this report.

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Table 5.1: Visual effects during construction

No	Visual Receptor	Description	Sensitivity	Magnitude	Significance
1	Residents in properties on Wyberton Low Road between London Road and Marsh Lane	Clear views of the temporary construction activities associated with the barrier structure and piling activity from the upper rear windows of the two storey residential properties over rear gardens. Views from ground floor windows would be partially obscured by back garden vegetation and the existing flood embankment for in channel works. However, the embankment would be used for construction access therefore plant would be elevated in the view. Dredging would take place at low tide, therefore, if night time works are required, the floodlighting would be visible from this location. The barrier construction is scheduled for a 7 month period and the piling work would move sequentially down the right bank therefore tall plant and equipment would be prominent for only part of the construction period. The current view includes the PoB facilities in the background and facilities associated with Black Sluice and works on the left bank would be seen in the context of the PoB. Views of the Stump are largely screened by the PoB buildings, except for the properties looking along the line of the river. Views of the Stump may be obscured by construction plant for a short period. The development would be a noticeable feature of the view but viewed in the context of the PoB in the background.	High	Medium	Moderate adverse
2	Residents in properties between Wyberton Low Road and Marsh Lane	Views of the temporary construction activities, the compound and traffic associated with the works would be visible mostly from the houses on the corner of Wyberton Low Road and Marsh Lane and from Marsh Lane facing north. Views would be partially obscured by the intervening houses and industrial buildings and the compound would be perceptible, but would not alter the overall balance of features and elements that comprise the view.	High	Low	Minor adverse
3	Recreational users of the Boston public footpath No.14 (Macmillan Way) along the right bank of the Haven on flood embankment	The Boston Public footpath No.14 (Macmillan Way) would be temporarily diverted away from the flood embankment during the construction period along Wyberton Low Road and Marsh Lane before re-joining the river side alignment. The quality of the views and experience of the users walking through the Riverside Industrial Estate would be reduced compared with the current views experienced by walkers on the path by the Haven, but the construction works would be largely screened from by industrial buildings. The magnitude of change is considered to be medium.	High	Medium	Moderate adverse
4	Workers at the Riverside Industrial Estate	Views of the temporary construction activities, compound and associated traffic would be possible from the north and western edges of the industrial estate. From locations further afield, views would be obscured by the intervening industrial sheds and the large-scale buildings. Views from	Low	Medium	Minor adverse

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No	Visual Receptor	Description	Sensitivity	Magnitude	Significance
		ground level would be partially obscured by the existing flood embankment for in-channel works. However, the embankment would be used for construction access; therefore plant would be elevated in the view. Piling work would move sequentially down the right bank. Works on the left bank would be seen in the context of PoB. The development would be a noticeable feature of the view which is immediately apparent to the receptor.			
5	Residents in properties in River Way, Fishtoft Road and Maple Road	Views of tall machinery associated with the construction works would be possible from this location but in the background of the view, seen in the context of existing pylons and the PoB facilities, Works associated with the knuckle would be partly screened by the existing vegetation and flood embankments. The temporary relocated Witham Sailing Club (WSC) facility would be visible, possibly on the skyline from some upper floors of the residential properties. However, the buildings are expected to be single storey and small scale and would be viewed in the context of existing hardstanding and an adjacent building. The development would be perceptible, but would not alter the overall balance of features and elements that comprise the view.	High	Low	Minor adverse
6	Users of green area within the churchyard of St Nicholas Church and residents and recreational users of the footpath on the left bank of the Haven	Distant views of the construction activities and plant associated with the works at the barrier structure in the background of the view. Views of the floodwall construction activities for the left bank and wet dock would be possible in the middle ground of the view and works associated with the knuckle in the foreground, although partly screened by the existing vegetation within the green space and around St Nicholas Church and by flood embankments. From the crest of the flood embankment, the construction activity associated with the flood wall and the tie into Maud Foster Sluice would be visible, but seen in the context of the existing PoB facilities. Looking downstream, the temporary relocated Witham Sailing Club (WSC) facility would be visible, viewed in the context of existing hardstanding and adjacent building. The development would be perceptible, but would not alter the overall balance of features and elements that comprise the view.	High	Low	Minor
7	Residents in properties within The Featherworks, Rectory Road, Windsor Bank and Alfred Street	Oblique views of the construction works associated with the works at the knuckle would be possible from the upper windows of the properties. There would be no ground level views due to the intervening vegetation and wall/fences. Views of the construction works associated with the barrier structure would be partially obscured by the existing intervening vegetation along the drain and industrial buildings and seen in the context of the PoB facilities and pylons located to the west of the Maud Foster drain. The floodlighting associated with the 24/7 works at the wet dock would be seen	High	Low	Minor adverse

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No	Visual Receptor	Description	Sensitivity	Magnitude	Significance
		in the context of the existing floodlights in the PoB facility. The development would be perceptible, but would not alter the overall balance of features and elements that comprise the view.			
8	Workers and visitors of PoB	Clear views of the construction works and associated plant from the areas of the PoB adjacent to the site boundary along the Haven and site entrance. Large-scale shed and ancillary structures would obscure views from within the PoB site. The development would be a noticeable feature of the view which is immediately apparent to the receptor.	Low	Medium	Minor adverse
9	Residents of properties on London Road	Views of tall machinery associated with the construction works at the barrier structure and piling would be possible from this location, however, there would be no views of the works associated with the barrier structure taking place at the ground level. No views of works associated with the knuckle would be possible from this location due to the intervening sheds, buildings and existing vegetation within the PoB. The development would be perceptible, but would not alter the overall balance of features and elements that comprise the view.	High	Low	Minor adverse
10	Users of the moorings and hard to the north of Black Sluice (right bank)	Views of the construction activities and plant associated with the barrier structure and the piling would be possible from this location, limited to the section tying into the Black Sluice infrastructure and seen in the context of the existing houses and infrastructure. The construction compound on the left bank would be visible but seen in the context of the existing PoB buildings, cranes and gantries. Further north, views of the construction works would be obscured by the intervening sheds, buildings and existing vegetation within the PoB. Dredging activities would be typical of the current activities already undertaken by PoB. The development would be a perceptible, but would be viewed in the context of existing PoB and the Black Sluice infrastructure.	Medium	Low	Minor adverse
11	Users of commercial units on London Road	Views of the construction activities, compound and plant associated with the barrier structure and piling would be possible from the supermarket location close to the Black Sluice. Further north, views of the construction works would be obscured by the intervening sheds, buildings and existing riverside vegetation. The development would be perceptible, but would not alter the overall balance of features and elements that comprise the view.	Low	Low	Minor adverse
12	Cycle and vehicle users of London Road (Sustrans route 1)	Glimpsed views travelling along the road the works associated with the barrier structure would be possible from the road, mostly near the Black Sluice section and seen in the context of the PoB and sluice infrastructure. No views of works associated with the knuckle would be possible from this location due to the intervening sheds, buildings and existing vegetation	Low	Low	Minor adverse

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No	Visual Receptor	Description	Sensitivity	Magnitude	Significance
13	River users of the Haven	<p>within the PoB. The development would be perceptible, but would not alter the overall balance of features and elements that comprise the view.</p> <p>Dredging – harbour master would issue a notice for dredging works, therefore river users would be excluded from the Haven during these activities and would not be directly affected during the dredging works.</p> <p>WSC would be located temporarily downstream of the Project for the duration of construction and it is assumed that they would not be affected by the Project as they would sail downstream towards the Wash and construction activity, where visible, would be seen in the context of the PoB facilities in the background of the views. BDFA during construction of the barrier would be temporarily relocated to the PoB estate downstream of the barrier/coffer dam location. It is assumed that they access the Haven downstream of the barrier to access the Wash. Therefore the users would see the construction activity associated with the in the vicinity of the site boundary. There would be clear views of the temporary construction activities at the barrier structure, the knuckle and the floodwalls from the river within the section between the Black Sluice and Lealand Way seen in the context of the PoB and the Riverside Industrial Estate. 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 to the Wash.</p> <p>PoB users are discussed under viewpoint 8.</p>	Medium	Medium	Moderate adverse

Source: Mott MacDonald 2016

### Summary of visual effects during construction

- 5.5.2 Overall, there are significant adverse effects during construction predicted on:
- Residents in properties on Wyberton Low Road between London Road and Marsh Lane (major adverse);
  - Recreational users of the Boston Public footpath No.14 (Macmillan Way) along the right bank of the Haven on flood embankment (moderate adverse); and
  - River users of the Haven (moderate adverse).

## 5.6 Operation

### Assessment assumptions and limitations

- 5.6.1 The following assumptions have been made for the operation of the Project:
- The operational level of the Barrier would be 5.3m AOD, which would result in the Barrier being raised and lowered more frequently, than if a higher level been selected. Other than during these times, normal tidal activity would continue in the Haven; and
  - There would be no impacts on traffic movements, noise or air quality during the operation of the barrier.
- 5.6.2 The main activities during the operation of the barrier that would cause the predicted impacts are:
- The closing of the barrier during a flood event; and
  - The closing of the barrier for maintenance.

## 5.7 Operational impact assessment

- 5.7.1 Operational impacts may be short-term, long term, temporary or permanent in nature. Potential impacts on landscape character and visual amenity during operation would result from:
- The presence of the new tidal barrier structure and a new control building;
  - Presence of the new flood walls and retaining walls on both banks;
  - Presence of new partly-surfaced light vehicular access (for access to the barrier) and footpath on the right bank over a distance of approximately 900m;
  - Presence of new wet dock gate;
  - Additional navigational lighting and racons to aid mariners through the barrier;
  - Introduction of wildflower meadow on the southern side on the existing flood embankment, along the flood wall and the new surfaced footpath;
  - Introduction of planting below the new sheet piling along the right bank, downstream of the barrier structure, to soften views from St Nicholas Church, with proposed timber fendering (subject to further consultation with BBC and LCC) along the length of the proposed sheet piling; and

- Introduction of the proposed artwork along the right bank in the vicinity of the barrier (subject to consultation with BBC).

### 5.8 Landscape effects

- 5.8.1 During its operational phase, the Project would occupy a small proportion of the study area. Impacts would be contained by the existing built environment surrounding the site. The new barrier structure would be located to the east of Black Sluice between the flood embankment and the PoB. The new sheet piling on the right bank would extend approximately 900m to the east. A new concrete wall would be introduced on the PoB quay. The illustrative summary of landscape effects during operation is shown in Appendix A, Figure 6.2.
- 5.8.2 The operational elements of the Project would be located within LLCA 1: Estuary corridor, LLCA 3 Industrial – Docks and immediately adjacent to LLCA 2 Wharves and Moorings; LLCA5 Skirbeck Quarter, LLCA6 Industrial (large-scale) and LLCA 8 Skirbeck – Maud Foster Drain.
- 5.8.3 Due to the presence of intervening residential, commercial and industrial buildings together with the current land uses and activities at PoB, the key characteristics of the following LLCAs would not be affected during operation of the Project: LLCA 4 Historic Urban Core and Riverside, LLCA 7 Industrial and Commercial (small-scale), LLCA 9 Skirbeck Hall and Church, LLCA 10 – Skirbeck - Fishtoft Road and LLCA 11 – Agricultural Fenland.
- 5.8.4 Indirect effects on the setting of the Boston conservation area in LLCA 4 Historic Urban Core and Riverside and for the Skirbeck conservation area in LLCA 9 Skirbeck Hall and Church are discussed in the Cultural Heritage Assessment (see ES (Volume 2a): Cultural Heritage Technical Report).

#### LLCA1 Estuary Corridor

- 5.8.5 The barrier structure would be located within LLCA1 Estuary Corridor straddling the river. The character of this LLCA would be directly affected due to the presence of large engineered structures within the river corridor of the Haven, but would be in keeping with the industrialised setting of the adjacent land uses. The barrier structure itself may be perceived by some as an interesting architectural feature in the area through its modern design and neutral black and grey colour scheme. The structure would be a new element within the local landscape but, due to its function and location, it would be characteristic of its riverine and industrial setting. On the occasions when the barrier is raised (for maintenance and at storm surge events, when the operation levels reach 5.3mAOD), the introduction of the raised element of the barrier would not affect the character of the LLCA substantially as the barrier structure would remain in scale with the adjacent PoB facilities. Additional navigational lighting and racons associated with the barrier would be in keeping with the existing character of the channel. Any lighting is assumed to be task focussed and directional.

- 5.8.6 The sheet piled flood walls would be installed along both sides of the channel and within the PoB land (in LLCA 3). The proposed sheet piled and concrete walls would be in keeping with the PoB side of the Haven as the river banks are already piled and the current land use is industrial.
- 5.8.7 On the right bank, downstream of the barrier, the existing grass embankment would be retained. The sheet pile wall would be installed on the river side of the existing crest, but above mean high water spring tide level, retaining part of the existing grass slope to the river's edge. Please see ES (Volume 1) Chapter 2: Project description for more details.
- 5.8.8 The presence of the flood wall along the right bank would introduce a new prominent element into LLCA, changing the character locally but it would not be incongruous in the context of the adjacent industrial estate. Mitigation measures to reinforce the green corridor character of the right bank would include: the reinstatement of the footpath along the embankment crest to create a sinuous path along the reinforced but grassed crest of the embankment; the introduction of wildflower mixes along the crest; saline tolerant plants riverside of the piles; and timber fendering riverside of the exposed sheet piles (where navigation requirements allows). In close proximity to the barrier structure, the new stretch of the flood embankment and sheet piled wall would facilitate the creation of a 10m wide reinforced footpath area, changing the scale of the existing embankment crest. Downstream of the barrier the crest width would be 6m wide. The potential for new artwork, would bring more interest to the LLCA particularly associated with the barrier.
- 5.8.9 Tranquillity levels would be slightly affected by the presence of the barrier structure and the raising of the barrier for the maintenance regime and occasional storm surge events, when the operation levels reach 5.3mAOD.
- 5.8.10 The presence of the new barrier structure and sheet piling in the river channel close to the barrier would introduce new prominent elements into the LLCA and alter existing key features in a small area of the overall LLCA but these elements would not be incongruous within the context of surrounding industrialised setting. Downstream of the barrier, the grass embankment of the new floodwall and intertidal mud areas would be retained and the more rural characteristics of the LLCA downstream of the substation and the electricity pylons would be unaffected. The floodwall would be a new feature in the landscape. Consequently, the overall magnitude of change to the LLCA would be low. The sensitivity of the LLCA is medium and therefore overall, the effect during operation would be minor adverse and permanent.

### **LLCA 2 Wharves and Moorings**

- 5.8.11 The barrier would be a new, prominent element in the landscape but it would not be an uncharacteristic element in the context of the existing structures, such as the cranes and silos, in the PoB. The sheet pile wall on the right bank, upstream of the proposed barrier, would tie into the structures of the Black Sluice. The new barrier and floodwall elements of the Project

would be a new feature, but it would not alter the character of the landscape, where the Black Sluice, the swing-bridge and mooring facilities are already present. The magnitude of impact on the LLCA would therefore be negligible. The sensitivity of the LLCA is high and therefore overall, the effect would be negligible.

### **LLCA3 Industrial – Docks**

- 5.8.12 The reinforced quay, wet dock gate and control kiosk, the barrier control building with associated elements including storage area and a car park as well as the new concrete and sheet piled walls and sheet piling around the knuckle area would be located within the LLCA3. The new elements would not affect the setting or character of the LLCA due to the existing industrial feel of the area which already contains large-scale buildings and sheds, cranes, silos and storage areas and where the river banks are already piled. Although new elements including the control building and the concrete wall would introduce new elements into this LLCA, they would also bring a more orderly feel to the area. The magnitude of change on the LLCA would be low. The sensitivity of the LLCA is low and therefore overall, the effect during operation would be minor adverse and permanent.

### **LLCA5 Skirbeck Quarter**

- 5.8.13 LLCA5 Skirbeck Quarter would not be directly affected by the presence of the new tidal barrier structure as the new structure would be located outside this LLCA. However, the setting of the LLCA would be slightly affected due to the presence of a new structure of an engineering nature and located in close proximity to this residential area. The presence of new elements is unlikely to affect tranquillity of the area. The magnitude of impact on the LLCA would be low. The sensitivity of the LLCA is medium and therefore overall, the effect during operation would be minor adverse and permanent.

### **LLCA6 Industrial (large-scale)**

- 5.8.14 LLCA6 Industrial (large-scale) would not be affected during operation: the area occupied by the proposed construction compound would be reinstated to its former condition. The barrier and floodwall along the right bank would be apparent in the adjacent LLCA but would not alter key characteristics and these elements would not be incongruous within the context of surrounding industrialised setting. The magnitude of impact on the LLCA would therefore be negligible. The sensitivity of the LLCA is low and therefore overall, the effect would be negligible.

### **LLCA 8 – Skirbeck – Maud Foster Drain**

- 5.8.15 LLCA8 Skirbeck – Maud Foster Drain would not be affected during operation: the area occupied by the proposed construction compound would be reinstated to its former condition and the new floodwall element of the Project would be a new feature that would not alter the character of the landscape and would not be incongruous within the context of surrounding

industrialised setting. The magnitude of impact on the LLCA would therefore be negligible. The sensitivity of the LLCA is medium and therefore overall, the effect would be negligible.

### Summary of landscape impacts during operation

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

## 5.9 Visual effects

- 5.9.1 The elements of the Project visible from the areas located close to the new elements include: the tidal barrier structure, sheet piled flood walls along the right bank and around the knuckle area and the new flood walls along the PoB quay. The barrier structure would be visible from the properties on Wyberton Low Road, Marsh Avenue and Marsh Lane, from the Boston public footpath No.14 (Macmillan Way) along the right bank and from the residential and commercial properties along southern sections of London Road. More distant receptors would have partially screened or no views of the barrier structure, as views would be obscured by intervening buildings and vegetation. Table 5.2 summarises the visual effects during operation.
- 5.9.2 Mitigation planting to reduce the visual intrusion of the barrier structure is not proposed due to the limited space to the south of the new structure.
- 5.9.3 Visualisations have been produced to illustrate representative views of the Project in year one of operation. The locations for the visualisations have been selected in consultation with key stakeholders to illustrate the representative views of the Project from a range of distances from the site and views to key landmarks - see Appendix B.
- 5.9.4 The views are:
- Viewpoint P1 – view from the PoB quay looking east towards the new quay (corresponds with baseline viewpoint 8 B and visual receptor 8 Workers and visitors of PoB);
  - Viewpoint P2 – from the Boston public footpath No.14 (Macmillan Way) looking east (corresponds with viewpoint 1 and visual receptor 1 Residents in properties on Wyberton Low Road between London Road and Marsh Lane);
  - Viewpoint P3 – view from the Boston Public footpath No.14 (Macmillan Way) looking west towards the barrier structure (corresponds with viewpoint 3 and Visual Receptor 3. Recreational users of the PRow/ Boston Public footpath No.14 (Macmillan Way) along the right bank of the Haven on flood embankment (looking west));
  - Viewpoint P4 – the Boston Public Footpath No.14 (Macmillan Way) looking east towards the right bank and St Nicholas Church (corresponds with viewpoint 5 and Visual Receptor 3. Recreational users of the Boston Public Footpath No.14 (Macmillan Way) along the right bank of the Haven on flood embankment (looking east); and

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- Viewpoint 5 – view from St Nicholas Church looking west towards the right bank and the barrier structure (corresponds with viewpoint 6 and Visual Receptor 6. Users of the green area within the Skirbeck and the churchyard of St Nicholas and recreational users of the PRow on left bank of the Haven).

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Table 5.2: Visual effects during operation

No	Visual Receptor	Description	Sensitivity	Magnitude	Significance
1	Residents in properties on Wyberton Low Road	Clear views of the new barrier structure, the new flood walls and the section of the new surfaced footpath on the top of the flood embankment, would be possible mostly from the upper windows to the rear of the properties. The new barrier structure (with its grey and black colour scheme), although large, would be viewed in the context of the PoB with its large-scale buildings, gantries and cranes. Barrier structure would constitute a new focal point within the view. Views of the Stump are largely screened by the PoB buildings except for the properties looking along the line of the river; the 'arms' of the barrier would be visible from the properties as new vertical elements in the view, comparable in scale to the taller PoB buildings. The barrier would not impinge on existing clear views towards the Stump. Elsewhere the Stump is screened or views are compromised by the existing PoB facilities. Ground floor views would be partially obscured by existing garden vegetation and flood embankment. The development would be a noticeable feature of the view which is immediately apparent to the receptor.	High	Medium	Moderate adverse
2	Residents in properties on Wyberton Low Road, Marsh Avenue and Marsh Lane	Framed views of the new barrier structure and the new flood walls along the flood embankment would be possible from this location, mostly from the houses on the corner of Wyberton Low Road and Marsh Lane and from Marsh Lane facing north. New floodwall along the right bank would be viewed against the large buildings and associated infrastructure of the PoB and partially obscured by the intervening buildings within the Riverside Industrial Estate. The 'arms' of the barrier would be visible in some locations, again partly screened by intervening buildings but viewed in the context of the taller elements associated with the PoB. The development would be perceptible, but would not alter the overall balance of features and elements that comprise the view.	High	Low	Minor adverse
3	Recreational users of the Boston public footpath No.14 (Macmillan Way) along the right bank of the Haven on flood embankment	Clear views of the new barrier structure and sheet pile/ concrete flood wall on the right bank and new partly surfaced footpath on the embankment crest from the Boston public footpath No.14 (Macmillan Way) along the Haven. Elements on the left bank would be viewed in the context of the PoB facilities with large scale buildings and cranes and existing hard river defences. The 'arms' of the barrier would be visible as new vertical elements in the view, comparable in scale to the taller PoB buildings. The barrier would not impinge on existing clear views towards the Stump. Elsewhere the Stump is screened or views are compromised by the existing PoB facilities. New barrier structure and associated improvements to the public realm would replace some derelict riverside structures and introduce a new prominent feature into the riverside.	High	Medium	Moderate adverse

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No	Visual Receptor	Description	Sensitivity	Magnitude	Significance
		The new floodwall on the right bank would be a noticeable feature of the view which is immediately apparent from the footpath.			
4	Workers at the Riverside Industrial Estate	Clear views of the new barrier structure and flood walls on top of the flood embankment would be possible from the western edges of the industrial estate. They would be viewed against the buildings and structures of the PoB. From further locations, views would be obscured by the intervening industrial sheds and the large-scale buildings and sheds.	Low	Low	Minor adverse
5	Residents in properties in River Way, Fishtoft Road and Maple Road	Views of the new barrier structure, flood walls or knuckle area would be largely screened from this location due to the intervening existing vegetation in front of the houses, the flood embankments and the industrial buildings of Riverside Industrial Estate. Any elements that would be visible would be seen in the context of existing pylons, Riverside Industrial Estate and the PoB facilities. The development would result in an almost imperceptible change to the view.	High	Negligible	Negligible
6	Users of green area within the churchyard of St Nicholas Church and residents and recreational users of the footpath on the left bank of the Haven	Although partly screened by existing vegetation within the green space and around St Nicholas's church and by the raised flood embankments, distant views of the new barrier structure would be seen in the context of existing pylons and the PoB facilities but in the background of the view. From the crest of the flood embankment, the new flood wall on the left bank would be visible but seen in the context of the existing PoB facilities. The new floodwall on the right hand bank would be visible in the middle ground of the view, Loss of a section of soft green embankment on the right bank would be discernible from the footpath on the river front. However, the proposed planting and timber fendering (subject to further consultation with BBC and LCC) would soften the wall's appearance. Floodwall on the PoB site would be in keeping with the existing industrial setting. Views south would be largely unaffected as the temporary sailing club facilities would be reinstated.	High	Low	Minor adverse
7	Residents in properties within The Featherworks and Rectory Road Windsor Bank and Alfred Street	Oblique views of the new barrier structure, quay and sheet piled flood walls would be possible from the upper windows of the properties seen in the context of the PoB facilities and pylons. No ground level views would be available due to the intervening flood bank, vegetation and the fence. The scheme elements would not alter the overall balance of features and elements that comprise the view.	High	Low	Minor adverse
8	Workers and visitors of PoB	Clear views of the new barrier structure and concrete flood walls on the quay edge would be possible from the areas of the port adjacent to the site boundary. Large-scale shed and ancillary structures would obscure views from more distant parts of the PoB. New concrete walls on the quay edge	Low	Low	Minor adverse

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No	Visual Receptor	Description	Sensitivity	Magnitude	Significance
		would obscure views of the new sheet piling on the right bank.			
9	Users of the moorings and hard to the north of Black Sluice (right bank)	Glimpsed views of the top of the barrier structure and the piling would be possible from this location for the section tying into the Black Sluice. They would be seen in the context of the existing PoB buildings, cranes and gantries. Further north, views of the scheme would be obscured by the intervening sheds, buildings and existing vegetation within the PoB. The development would be perceptible but largely in keeping with the existing setting.	Medium	Low	Minor adverse
10	Users of commercial units on London Road	Partial views of the new barrier structure would be possible from the supermarket location close to the Black Sluice, partly screened by the intervening vegetation along the river and buildings within PoB. Further north, views of the Project would be obscured by the intervening sheds, buildings and existing vegetation within the PoB. The development would be perceptible, but would not alter the overall balance of features and elements that comprise the view.	Low	Low	Minor adverse
11	Cycle and vehicle users of London Road (Sustrans route 1),	Glimpsed views of the new barrier structure from the road near the Black Sluice. No views of the sheet piling around the knuckle would be possible from this location due to the intervening sheds, buildings and existing vegetation within the PoB. The development would be perceptible, but would not alter the overall balance of features and elements that comprise the view.	Low	Low	Minor adverse
12	River users of the Haven	<p>All notices would be issued by the harbour master when the barrier is closed during the maintenance checks and prior to a tidal surge. WSC and BDFA would be located at their existing facilities upstream of the barrier and would navigate downstream through the barrier and past the Project towards the Wash and returning back to the moorings.</p> <p>Clear views of the new barrier structure, new sheet piling and flood walls on both banks of the river would be possible from the Haven within the section between the Black Sluice and Lealand Way. The barrier would be prominent in the view but would be in scale with the PoB and the Black Sluice facilities. New elements would be viewed within the context of the PoB, with large-scale buildings and cranes and existing hard river edges particularly for the left bank. The presence of the sheet pile floodwall on the right bank would introduce a more industrial element into the view though some of the existing grass embankment would be retained between the piles and high water mark. The timber fenders proposed as part of the mitigation measures would help top soften the appearance of the piles but the floodwall would be a visually strong linear element in the view replacing up to 600m the existing view of a grass embankment. For the river users, the Project elements would be</p>	Medium	Medium	Moderate adverse

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No	Visual Receptor	Description	Sensitivity	Magnitude	Significance
		noticeable features in the view for the section of the Haven but only for a small part of the whole experience sailing towards and from the Wash. PoB users are discussed under viewpoint 8.			

Source: Mott MacDonald 2016

### 5.10 Summary of visual impacts during operation

- 5.10.1 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 on the flood embankment and for residents in properties on Wyberton Low Road 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.

### 5.11 Construction mitigation measures

- 5.11.1 Construction would be carried out using industry best practice to reduce any potentially adverse effects. The following mitigation measures have been identified within the assessment and should be implemented to mitigate the construction effects identified in this assessment:
- Should additional (over and above that currently operating on the PoB estate) lighting be required during the construction phase of the Project, it 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 uplighting and skyglow. A lighting statement has been prepared separately (see Appendix C of this Technical Report);
  - Existing trees/shrubs, where identified in the EAP 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.

### 5.12 Operation mitigation measures

- 5.12.1 The following mitigation measures are assumed to be part of the Project, developed as part of the iterative EIA process, to mitigate the operational effects identified in this assessment:
- Lighting associated with the barrier and control kiosks would be localised task lighting and designed to 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 the Environment Agency and bodies responsible for maintenance, 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
- In consultation with BBC, 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).

5.12.2 As the detailed design of the Project proceeds additional mitigation measures could include consideration of options to reduce the overall crest width along the right bank where compatible with maintenance requirements. Additionally affording views over the floodwall towards local landmarks such as St Nicholas church could be considered with environmental improvements to create a local focal point with seating and improved accessibility to attract more people onto the Boston Public Footpath No.14 (Macmillan Way).

### 5.13 Cumulative effects

#### Inter-project effects

5.13.1 The inter-project cumulative effects have been assessed 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 here, the relevant project/scheme would revise the potential cumulative effects, as necessary.

5.13.2 The following projects have been considered in the assessment of cumulative effects:

- Residential development (B/15/0213), for 75 dwellings on Broadfield Lane. The site is located to the west of east of the A16 with no access from London Road. No visibility of the barrier screened by residential and business developments, therefore no cumulative impact predicted.
- Residential development (B/15/009) for 60 dwellings off London Road to the south west of the site boundary. No visibility of the barrier screened by residential and business developments, therefore no cumulative impact predicted.
- Residential development (B/15/0100 ), for 108 dwellings on the Boston College De Montfort Campus, Mill Road, Boston, Lincolnshire, PE21 0HF. The land is located to the north east of the Scheme. No visibility of the barrier screened by residential and business developments, therefore no cumulative impact predicted.

- Residential development (B/13/0162) for 32 dwellings off Sir Isaac Newton Drive, Boston, Lincolnshire to the south of the Scheme. No visibility of the barrier screened by residential and business developments, therefore no cumulative impact predicted.
- Residential development (B/15/0196) for 26 dwellings off St Thomas Drive, Boston, Lincolnshire, PE21 7EP to the south west of the Scheme. No visibility of the barrier screened by residential and business developments, therefore no cumulative impact predicted.

5.13.3 The following schemes have been proposed by the Environment Agency to be considered during the Project lifespan but details are not yet confirmed:

- Downstream Grand Sluice left bank piling – potential installation of a piled toe revetment for a few hundred metres of bank toe. No inter-visibility expected between the Project and the above works and not considered further.
- Maintaining Standard of Protection – as part of the Flood Defence Grant in Aid (FDGiA) scheme includes both banks downstream of barrier – works are likely to comprise the filling in of low spots (raising low spots up to a maximum of 0.30m) between Boston and Hobhole Pumping Station to ensure that the 6.35m AOD level is met. No bank widening is anticipated. Works likely to be small scale, locations are likely to be along the left bank downstream of Maude Foster Sluice and unlikely to give rise to cumulative effects.
- Flood defence works (WPD) – proposed works would raise the existing height of the defence to 6.85m AOD tying into the Project and extending downstream past the substation. This is discussed in further in the sections below.

5.13.4 The WPD scheme has not been designed (therefore, the below description is based on Environment Agency assumptions) and there is no start date but an expected completion date has been stated by the Environment Agency of 2020. The WPD would be a separate scheme to the Project, but there is a need for the two projects to come together as they share a common boundary. The proposed works would raise the existing height of the defence to 6.85m AOD tying into the Project and extending downstream past the substation. The works are likely to comprise a mixture of sheet piling and earthworks to achieve the height required between the Project and the substation. Downstream of the substation the works are likely to comprise earthworks and involve widening the embankment by placing material on the back face as well as increasing the height to 6.85m AOD. The existing embankment crest levels are expected to be between 6.2m and 6.6m.

5.13.5 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 tide.

5.13.6 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.

- 5.13.7 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.
- 5.13.8 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.
- 5.13.9 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.

### **In-combination effects**

- 5.13.10 There is the potential for in-combination effects on visual receptors as a result of different elements of the Project (see ES (Volume 1): Chapter 19; Cumulative effects for more information).

### 5.14 Residual effects

#### Construction

- 5.14.1 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.
- 5.14.2 Significant adverse effects during construction are predicted for the following visual receptors:
- 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;
  - 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; and
  - 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.
- 5.14.3 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. 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.

#### Operation

- 5.14.4 Overall, there are no significant adverse effects of the Project predicted on landscape character of the study area during operation.
- 5.14.5 Moderate adverse and therefore significant effects during operation are predicted for the following visual receptors:
- recreational users of the Boston public footpath No.14 (Macmillan Way) (moderate adverse) along the right bank of the Haven on the flood embankment as 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;

- for residents in properties on Wyberton Low Road (moderate adverse) due to the 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; and
- for river users of the Haven (moderate adverse) where 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.

5.14.6 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 matt 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. 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.

5.14.7 As the detailed design develops, options to reduce the overall crest width could be considered where compatible with maintenance requirements. Additionally affording 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).

## 6 Summary

### 6.1 Baseline conditions

- 6.1.1 The Project lies in the Fens National Character Area, with the following characteristics: a flat, open, low-lying wetland landscape with the predominant land use as arable. The open fields, bounded by a network of drains and the distinctive hierarchy of rivers, have a strong influence on the geometric landscape pattern; and large, built structures exhibit a strong vertical visual influence, such as the tower of St Botolph's Church and other modern large-scale industrial and agricultural buildings.
- 6.1.2 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 to the south of the PoB and to the east of the knuckle. The tidal mudflats within the Haven channel area are a constantly changing element in the landscape: at low tide they are exposed and at high tides they are covered by the incoming water. The Haven is bordered by the residential areas of Wyberton Low Road and the Skirbeck Quarter to the south-west, by the industrial areas of PoB to the north and the Riverside Industrial Estate to the south. There is very little vegetation along the river. There are several landscape and heritage related designations within the study area including Conservation Areas, Scheduled Monuments and Listed Buildings; none of these are within the red line boundary of the Project. The Boston Public footpath No.14 (Macmillan Way) long distance path runs along the right bank of the Haven.
- 6.1.3 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).
- 6.1.4 The Project lies within the urban area of Boston. The visual envelope is limited to the south by the residential properties of Wyberton Low Road and the sheds of the Riverside Industrial Estate, to the east by the green space associated with Skirbeck Church, to the north by the Port of Boston buildings and ancillary structures and to the west by the buildings along Smiths Wharf. The Boston Stump is visible from the western end of the flood embankment, by the Black Sluice, and from the eastern part of the PRow, opposite the Church of St Nicholas Church. None of these combine views of both the proposed site and Boston Stump at the same time.

### 6.2 Construction effects

- 6.2.1 Construction activity would occupy a small proportion of the study area and impacts would be contained by the surrounding dense urban development.

- 6.2.2 Overall, once the mitigation measures identified in section 5.11 are implemented, 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.
- 6.2.3 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. Overall, once the mitigation measures identified in section 6.11 are implemented, there would be significant adverse effects during construction for the following visual receptors:
- Residents in properties on Wyberton Low Road between London Road and Marsh Lane (major 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;
  - 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; and
  - 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.

### 6.3 Operation effects

- 6.3.1 The Project, in operation, would occupy a small proportion of the study area and impacts would be contained by the built environment surrounding the site. The new barrier structure would be located to the east of Black Sluice between the flood embankment and the PoB. The new sheet piling on the right bank would extend approximately 900m to the east of the barrier structure. A new concrete wall would be introduced on the PoB quay and improvements to the wet dock gates and existing PoB river edge.
- 6.3.2 Overall, once the mitigation measures identified in section 6.12 are implemented, there would be no significant adverse effects resulting from the Project on landscape character of the study area during operation.
- 6.3.3 The Project would be visible from the areas located close to the new elements including the tidal barrier structure, sheet piled flood walls along the right bank and around the knuckle area and new flood walls along the PoB quay. The barrier structure would be visible from the properties on Wyberton Low Road, Marsh Avenue and Marsh Lane, from the Boston Public Footpath No.14 (Macmillan Way) along the right bank and from the southern sections of

London Road and from the Haven. More distant receptors would have partially screened or no views of the barrier structure, as views would be obscured by the intervening buildings and scattered vegetation.

- 6.3.4 Overall, and notwithstanding the mitigation measures proposed, there would be moderate adverse and therefore significant residual effects during operation predicted on recreational users of the Boston Public footpath No.14 (Macmillan Way) (moderate adverse) along the right bank of the Haven on the flood embankment as 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; and for residents in properties on Wyberton Low Road (moderate adverse) due to the 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; and for river users of the Haven (moderate adverse) where 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.
- 6.3.5 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 matt 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. 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.

## 7 References

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Countryside Agency/Scottish Natural Heritage (2002) Landscape Character Assessment

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Environment Agency (2014) Boston Barrier: Updated Scoping Report

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Landscape Character Assessment of Boston Borough published by Boston Borough Council

(July 2009)

Landscape Institute (LI) with the Institute of Environmental Management and Assessment (IEMA) (2013), Guidelines for Landscape and Visual Impact Assessment, 3<sup>rd</sup> ed

National Character Area (NCA) 46: The Fens published by Natural England in March 2013

The National Planning Policy Framework (NPPF) (2012)

National Planning Policy Framework (NPPF)

Natural England (2014), National Character Area Profiles

South East Lincolnshire (SEL) Local Plan

## 8 Abbreviations

Abbreviation	Definition
BBC	Boston Borough Council
EA	Environment Agency
EH	English Heritage
EIA	Environmental Impact Assessment
ES	Environmental Statement
HE	Heritage England
HER	Heritage Environmental Record
HGV	Heavy Goods Vehicle
IEMA	Institute of Environmental Management and Assessment
LA	Local Authority
LCC	Lincolnshire County Council
LDS	Local Development Scheme
NE	Natural England
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
PoB	Port of Boston
PRoW	Public Right of Way
SFFD	South Forty Foot Drain
LLCA	Landscape Character Area
WLM	Water Level Management
WPD	Western Power Distribution
ZTV	Zone of Theoretical Vulnerability

## 9 Glossary

Term	Definition
Baseline	A description of the present state of the environment with the consideration of how the environment would change in the future in the absence of the plan/programme/project as a result of natural events and other human activities.
Baseline studies/ survey	Collection of information about the environment which is likely to be affected by the project.
Catchment	A surface water catchment is the total area that drains into a river. A groundwater catchment is the total area that supplies the groundwater part of the river flow.
Conservation Area	An area designated under the Town and Country Planning Act, 1990 to protect its architectural or historic character.
Countryside and Rights of Way (CRoW) Act 2000	This Act applies to England and Wales and has five parts: - Access to the countryside Public rights of way and road traffic Nature conservation and wildlife protection Areas of outstanding natural beauty Miscellaneous and Supplementary This act increases the protection of SSSIs. Environment Agency plans/programmes/projects must gain consent for works in or near SSSIs using a CRoW form.
Cumulative Impacts	The combined impacts of several projects within an area, which individually are not significant, but together amount to a significant impact.
Department for Environment, Food and Rural Affairs (DEFRA)	The government department responsible for flood management policy in England.
Environmental Action Plan (EAP)	A standalone report or section within another environmental impact assessment document which ensures that constraints, objectives and targets set in the main Environmental Report/Statement are actually carried out on the ground. Actions are separated into those to be carried out before, during and after construction.
Environmental Impact Assessment (EIA)	“EIA is an assessment process applied to both new development proposals and changes or extensions to existing developments that are likely to have significant effects on the environment. The EIA process ensures that potential effects on the environment are considered, including natural resources such as water, air and soil; conservation of species and habitats; and community issues such as visual effects and impacts on the population. EIA provides a mechanism by which the interaction of environmental effects resulting from development can be predicted, allowing them to be avoided or reduced through the development of mitigation measures. As such, it is a critical part of the decision-making process.” <a href="http://www.iema.net/eiareport">www.iema.net/eiareport</a>
Environmentally Sensitive Area (ESA)	An area of particularly high landscape, wildlife or historical importance within which DEFRA offered inducements to encourage farmers to adopt agricultural practices to safeguard or enhance those features. Payments have now been superseded by the ESS.
Environmental Statement (ES)	The document produced to describe the environmental impact assessment process where statutory environmental impact assessment is required.
Flood risk mapping	A system of maps created by the Environment Agency to show areas that are at risk of a flood that has a 1 in 100 chance (or higher) of occurring in any given year.

Term	Definition
Health impact assessment	“A combination of procedures, methods and tools by which a policy, programme or project may be judged as its potential effects on the health of a population, and the distribution of those effects within a population.” World Health Organisation.
Main river	A watercourse designated by DEFRA. The Environment Agency has permissive powers to carry out flood defence works, maintenance and operational activities on main rivers. Responsibility for maintenance rests on the riparian owner.
Marine Management Organisation	An executive non-departmental public body established under the Marine and Coastal Access Act 2009 with responsibilities including marine licensing and working with Natural England and others to manage a network of marine protected areas (marine conservation zones and European marine sites).
Mitigation measures	Actions that are taken to minimise, prevent or compensate for adverse effects of the development.
National Nature Reserve (NNR)	Nature reserves designated under the National Parks and Countryside Act (1949) for nationally important wildlife or geological features (these may be the best examples in the country). They are controlled by English Nature.
National Rivers Authority (NRA)	A predecessor of the Environment Agency.
Natural Areas	Sub-divisions of England, characterised by wildlife and natural features. There are 120 Natural Areas in England. Designations are managed by English Nature.
Natural England	Natural England is an Executive Non-departmental Public Body responsible to the Secretary of State for Environment, Food and Rural Affairs. Their purpose is to protect and improve England’s natural environment and encourage people to enjoy and get involved in their surroundings. Their aim is to create a better natural environment that covers all of our urban, country and coastal landscapes, along with all of the animals, plants and other organisms that live with us.
Ordinary water course	A watercourse not designated as main river. The local authority or Internal Drainage Board has permissive powers to maintain them.
Ramsar site	Wetland site of international importance listed under the Convention on Wetlands of International Importance under the Conservation of Waterfowl Habitat (Ramsar) Convention 1973.
Scoping	The process of deciding the scope or level of detail of an EIA/ SEA. During this stage the key environmental issues (likely significant effects) of a project/strategy are identified so that the rest of the process can focus on these issues. Issues may result from the proposal itself or from sensitivities of the site.
Screening	(1) For environmental impact assessment, the process of deciding which developments require an environmental impact assessment to be carried out and whether this would be statutory.  (2) For strategic environmental assessment, the decision on which plans, strategies or programmes require strategic environmental assessment to be carried out and whether this would be statutory.
Screening opinion	Statutory opinion from the competent authority as to whether a proposed project requires statutory environmental impact assessment according to the Environmental Impact Assessment Regulations.
Site of Special Scientific Interest (SSSI)	Nationally important sites designated for their flora, fauna, geological or physiographical features under the Wildlife and Countryside Act (1981) (as amended) and the Countryside Rights of Way (CRoW) Act (2000).

Term	Definition
Special Area for Conservation (SAC)	Sites of European importance for habitats and non-bird species. Above mean low water mark they are also SSSIs.
Special Protection Area (SPA) and proposed Special Protection Area (pSPA)	An area designated for rare or vulnerable birds, or migratory birds and their habitats, classified under Article 4 of the EC Directive on the Conservation of Wild Birds (79/409/EEC). They are also SSSIs. Proposed sites receive the same protection as fully protected sites.
Standard of protection (SoP)	The level of protection from flooding, for example a SoP of 1 in 100 means that the flood defences in an area provide protection from floods up to a size of flood with a probability of occurring of 1 in 100 in any year.
Strategic Environmental Assessment	SEA is a process designed to ensure that significant environmental effects arising from proposed plans and programmes are identified, assessed, subjected to public participation, taken into account by decision-makers, and monitored. SEA sets the framework for future assessment of development projects, some of which require Environmental Impact Assessment (EIA). SEA is carried out according to the requirements of the SEA Directive 2001/42/EC.

# Appendices

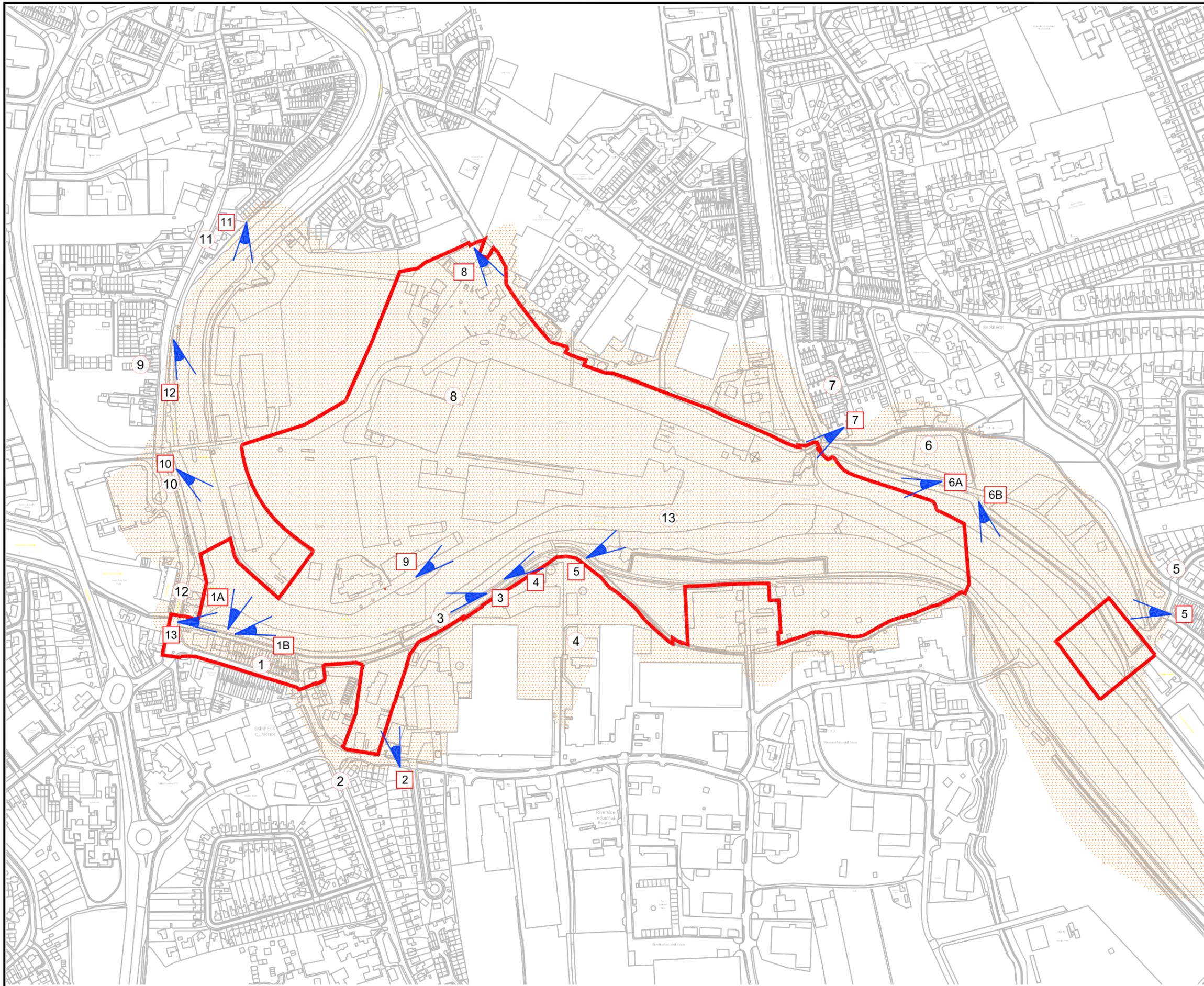
A.	Figures	81
B.	Visualisations	88
C.	Lighting Statement	112

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# A. Figures

**Boston Barrier Tidal Project**

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Notes

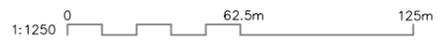
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Key to symbols

- LEGEND:**
-  Development boundary
  -  Visual receptor
  -  Indicative visual envelope
  -  Location of the baseline photographs identified in Landscape and Visual Impact Assessment Report and general direction of the view

**NOTES:**  
Photomontage locations shown on Appendix B

- Visual Receptors:**
1. Residents in properties on Wyberton Low Road between London Road and Marsh Lane
  2. Residents in properties between Wyberton Low Road and Marsh Lane
  3. Recreational users of the PRoW Boston Public footpath No.14 (Macmillan Way) along the right bank of the Haven on flood embankment
  4. Workers at the Riverside Industrial Estate
  5. Residents in properties in River Way, Fishtoft Road and Maple Road
  6. Users of green area within the churchyard of St Nicholas Church and recreational users of the PRoW on the left bank of the Haven
  7. Residents in properties within The Featherworks Rectory Road and Windsor Bank
  8. Workers and visitors of Port of Boston
  9. Residents of properties on London Road
  10. Users of the moorings and hard north of Black Sluice
  11. Users of commercial units on London Road
  12. Pedestrian and vehicle users of London Road
  13. River users of the Haven



P3	05/07/16	SP	For Planning	CP	TS
P2	19/05/16	SP	For Planning	EMS	JM
P1	21/07/15	SP	For Planning	EMS	JM
Rev	Date	Drawn	Description	Chk'd	App'd



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**Title**  
Boston Barrier Project  
Visual Receptors and  
Indicative Visual Envelope  
Figure 2.1

Designed	S Parry	Eng check	-
Drawn	E Spurden	Coordination	-
Dwg check	J Morrison	Approved	-
Scale at A1	1:1250	Status	PRE
Rev			P3

Drawing Number  
**IMAN001470-ES-FIG-505**

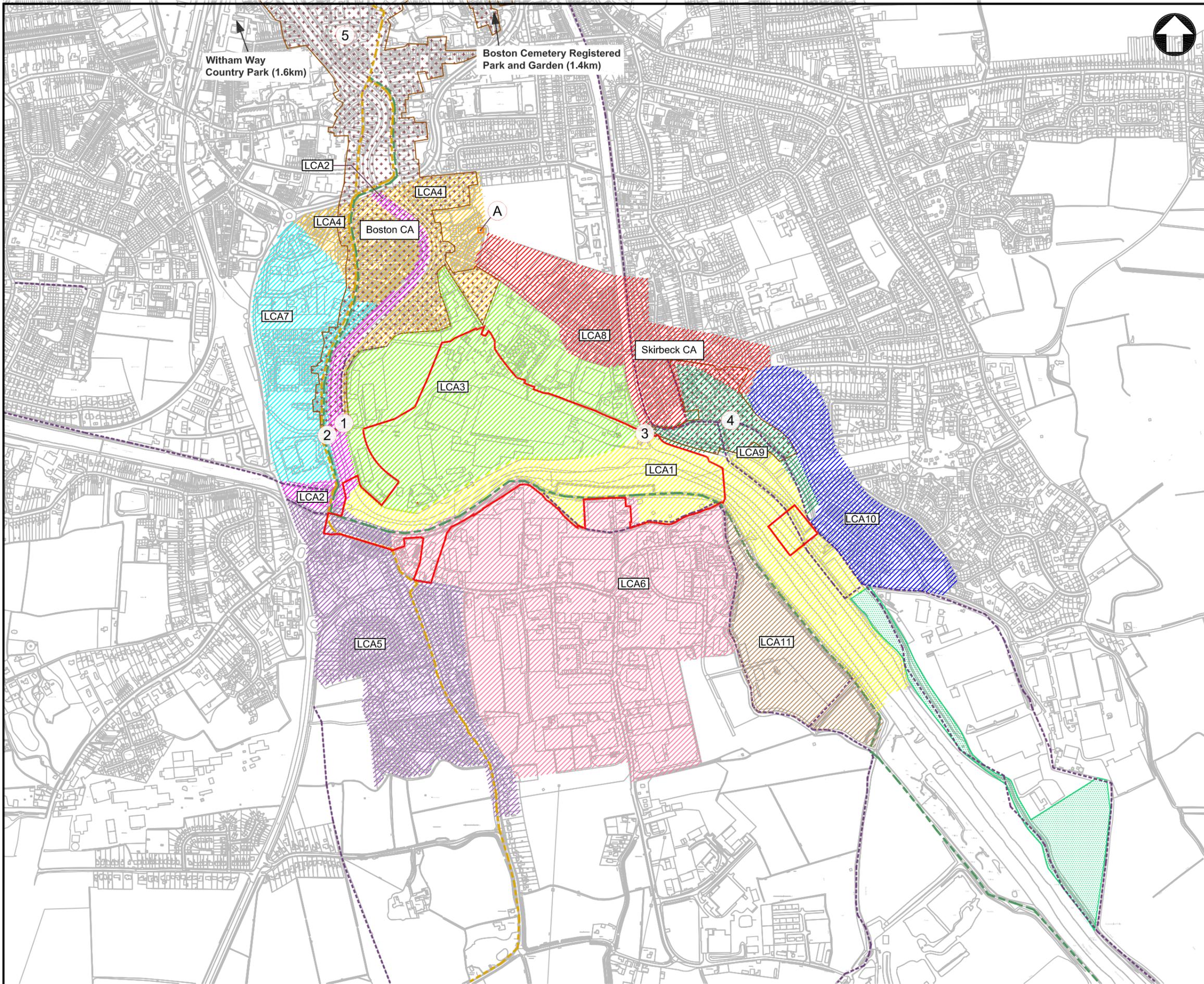
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P:\Cambridge\Demeter\EV1\Projects\339200 Boston Barrier 1\WAC\04 Drawings\Working Drawings\Drawing\EV1-PLG-000\LANDSCAPE\Boston Barrier Scheme Visual Receptors and Indicative Visual Envelope\_505\_P3.dwg Aug 12, 2016 - 6:14PM cou29610

NOTE: PLAN MUST BE PRINTED IN COLOUR

**Boston Barrier Tidal Project**

A17/2a – Volume 2a: Landscape and Visual Impact Amenity Technical Report



Notes

- Key to symbols
- LEGEND:**
- Development boundary
  - Local Landscape Character Areas:**
    - LLCA1: Estuary Corridor
    - LLCA2: Wharves and Moorings
    - LLCA3: Industrial - Docks
    - LLCA4: Historic Urban Core & Riverside
    - LLCA5: Skirbeck Quarter
    - LLCA6: Industrial - Large-scale
    - LLCA7: Industrial & Commercial - Small-scale
    - LLCA8: Skirbeck - Maud Foster Drain
    - LLCA9: Skirbeck Hall & Church
    - LLCA10: Skirbeck - Fishtoft Road
    - LLCA11: Agricultural Fenland

- RELEVANT PLANNING DESIGNATIONS:**
- Conservation Area (CA)
  - Hussey Tower scheduled monument
  - Havenside Country Park

- Listed Buildings:
- 1 Swing Bridge (Grade II)
  - 2 London Road gatehouse and signals cabin (Grade II)
  - 3 Maud Foster Sluice (Grade II)
  - 4 Parish Church of St Nicholas (Grade II)
  - 5 St Botolph's Church (Boston Stump Grade I)
- Public Rights of Way
  - Macmillan Way
  - Sustrans Route 1
- 1: 5000
- 0 250m 500m

P2	20/05/16	SP	For Planning	EMS	JM
P1	21/07/15	SP	For Planning	EMS	JM
Rev	Date	Drawn	Description	Ch'k'd	App'd



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Client



Title

**Boston Barrier Project  
Local Landscape Character Areas  
& Planning Designations  
Figure 4.1**

Designed	S Parry	Eng check	-
Drawn	E Spurden	Coordination	-
Dwg check	J Morrison	Approved	-
Scale at A1	1:5000	Status	PRE
Rev			P2

Drawing Number

**IMAN001470-ES-FIG-504**

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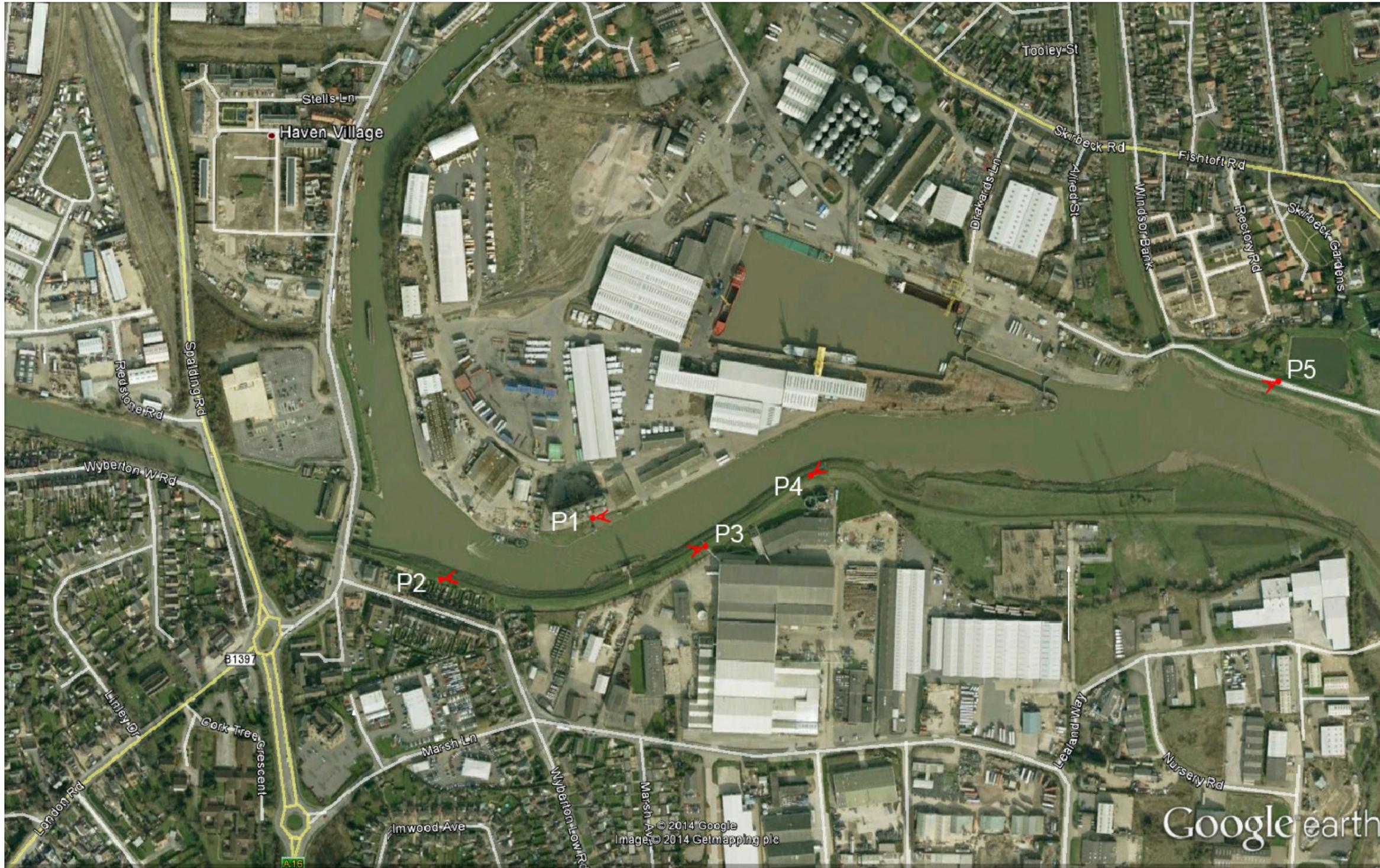
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## B. Visualisations

**Boston Barrier Tidal Project**

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Key  
**P1** Approximate viewpoint location



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									Scale at A3		
									NTS		
									Drawing Number	Status	Rev
									MMD-339200-L-DR-00-XX-0000	INF	P2

**Boston Barrier Tidal Project**

A17/2a – Volume 2a: Landscape and Visual Impact Amenity Technical Report



Existing view - View from north (left) bank of The Haven looking east



Location Plan Key  
① Approximate viewpoint



**Viewpoint P1**

Viewpoint Information:

Grid Reference: 533132, 342866

Focal Length: 35mm (Nikon D3200, 1.5 sensor, equivalent to 50mm field of view)

Camera Height: 6.7m AOD (approximately).

ISO speed: ISO-100

Camera model: Nikon D3200

Lens: Nikon AF-S DX NIKKOR 18-55 mm f/3.5-5.6G VR II

Taken: 11/09/2014 at 12:07 - mid-tide (data from tidetimes.org.uk).

**This visualisation is indicative and for information only based on information as follows:**

The viewpoint height was taken from the OS map published on MAGIC website (magic.defra.gov.uk).

The 3D model of the barriers and wall were placed at the existing ground level across the site.

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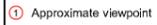
**Boston Barrier Tidal Project**

A17/2a – Volume 2a: Landscape and Visual Impact Amenity Technical Report



Proposed view - View from north (left) bank of The Haven looking east



Location Plan  

**Viewpoint P1**

Viewpoint Information:

Grid Reference: 533132, 342866

Focal Length: 35mm (Nikon D3200, 1.5 sensor, equivalent to 50mm field of view)

Camera Height: 6.7m AOD (approximately).

ISO speed: ISO-100

Camera model: Nikon D3200

Lens: Nikon AF-S DX NIKKOR 18-55 mm f/3.5-5.6G VR II

Taken: 11/09/2014 at 12:07 - mid-tide (data from tidetimes.org.uk).

**This visualisation is indicative and for information only based on information as follows:**

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**Boston Barrier Tidal Project**

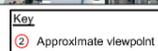
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Existing view - View from the Macmillan Way footpath running along southern (right) bank of The Haven, looking east towards the proposed development



Location Plan



**Viewpoint P2**

Viewpoint Information:

Grid Reference: 532913, 342825

Focal Length: 35mm (Nikon D3200, 1.5 sensor, equivalent to 50mm field of view)

Camera Height: 8.5m AOD (approximately).

ISO speed: ISO-400

Camera model: Nikon D3200

Lens: Nikon AF-S DX NIKKOR 18-55 mm f/3.5-5.6G VR II

Taken: 19/11/2015 at 14:25 - mid to low tide (data from tidetimes.org.uk).

**This visualisation is indicative and for information only based on information as follows:**

The viewpoint height was taken from the OS map published on MAGIC website (magic.defra.gov.uk).

The 3D model of the barriers and wall were placed at the existing ground level across the site.

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**Boston Barrier Tidal Project**

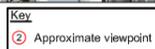
A17/2a – Volume 2a: Landscape and Visual Impact Amenity Technical Report



Proposed view - View from the Macmillan Way footpath running along southern (right) bank of The Haven, looking east towards the barrier (showing barrier in closed position)



Location Plan



**Viewpoint P2**

Viewpoint Information:

Grid Reference: 532913, 342825

Focal Length: 35mm (Nikon D3200, 1.5 sensor, equivalent to 50mm field of view)

Camera Height: 8.5m AOD (approximately).

ISO speed: ISO-400

Camera model: Nikon D3200

Lens: Nikon AF-S DX NIKKOR 18-55 mm f/3.5-5.6G VR II

Taken: 19/11/2015 at 14:25 - mid to low tide (data from tidetimes.org.uk).

**This visualisation is indicative and for information only based on information as follows:**

The viewpoint height was taken from the OS map published on MAGIC website (magic.defra.gov.uk).

The 3D model of the barriers and wall were placed at the existing ground level across the site.

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								INF	P4	

**Boston Barrier Tidal Project**

A17/2a – Volume 2a: Landscape and Visual Impact Amenity Technical Report



Existing view - View from the Macmillan Way footpath running along southern (right) bank of The Haven, looking west towards the proposed barrier location



Location Plan Key  
③ Approximate viewpoint



**Viewpoint P3**

Viewpoint Information:

Grid Reference: 532850, 342839

Focal Length: 35mm (Nikon D3200, 1.5 sensor, equivalent to 50mm field of view)

Camera Height: 8.5m AOD (approximately).

ISO speed: ISO-100

Camera model: Nikon D3200

Lens: Nikon AF-S DX NIKKOR 18-55 mm f/3.5-5.6G VR II

Taken: 11/09/2014 at 14:00 - mid to low tide (data from tidetimes.org.uk).

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		P1	20.01.16	CEC	For information	CP	GH		Checked	CP
		P2	27.05.16	SP	For information	CP	GH		Approved	GH
										Scale at A3
								Drawing Number	Status	Rev
								<b>MMD-339200-L-DR-00-XX-0003</b>	<b>INF</b>	<b>P2</b>

**Boston Barrier Tidal Project**

A17/2a – Volume 2a: Landscape and Visual Impact Amenity Technical Report



Proposed view - View from the Macmillan Way footpath running along southern (right) bank of The Haven, looking west towards the proposed barrier



Location Plan



**Viewpoint P3**

Viewpoint Information:

Grid Reference: 532850, 342839

Focal Length: 35mm (Nikon D3200, 1.5 sensor, equivalent to 50mm field of view)

Camera Height: 8.5m AOD (approximately).

ISO speed: ISO-100

Camera model: Nikon D3200

Lens: Nikon AF-S DX NIKKOR 18-55 mm f/3.5-5.6G VR II

Taken: 11/09/2014 at 14:00 - mid to low tide (data from tidetimes.org.uk).

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		P2	27.05.16	SP	For information	CP	GH		Approved	GH
		P3	22.06.16	OJ	Amendments in line with client comments	CP	GH		Scale at A3	
		P4	01.08.16	OJ	Amendments in line with client comments	CP	GH		<b>NTS</b>	
Drawing Number								MMD-339200-L-DR-00-XX-0003_A	Status	Rev
								INF	P4	

**Boston Barrier Tidal Project**

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Existing view - View from the Macmillan Way footpath running along southern (right) bank of The Haven, looking east



Location Plan   
 Key   
 4 Approximate viewpoint



**Viewpoint P4**

Viewpoint Information:

Grid Reference: 533586, 343010

Focal Length: 35mm (Nikon D3200, 1.5 sensor, equivalent to 50mm field of view)

Camera Height: 8.1m AOD (approximately).

ISO speed: ISO-400

Camera model: Nikon D3200

Lens: Nikon AF-S DX NIKKOR 18-55 mm f/3.5-5.6G VR II

Taken: 19/11/2015 at 15:03 - mid to low tide (data from tidetimes.org.uk).

**This visualisation is indicative and for information only based on information as follows:**

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									Scale at A3		
									<b>NTS</b>		
									Drawing Number	Status	Rev
									MMD-339200-L-DR-00-XX-0004	INF	P2

**Boston Barrier Tidal Project**

A17/2a – Volume 2a: Landscape and Visual Impact Amenity Technical Report



Proposed view - View from the Macmillan Way footpath running along southern (right) bank of The Haven, looking east



Location Plan  

**Viewpoint P4**

Viewpoint Information:

Grid Reference: 533586, 343010  
 Focal Length: 35mm (Nikon D3200, 1.5 sensor, equivalent to 50mm field of view)  
 Camera Height: 8.1m AOD (approximately).  
 ISO speed: ISO-400  
 Camera model: Nikon D3200  
 Lens: Nikon AF-S DX NIKKOR 18-55 mm f/3.5-5.6G VR II  
 Taken: 19/11/2015 at 15:03 - mid to low tide (data from tidetimes.org.uk).  
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Drawing Number <b>MMD-339200-L-DR-00-XX-0004_A</b>								Status	Rev	
								INF	P4	

**Boston Barrier Tidal Project**

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Existing view - View from crest of flood embankment running along northern (left) bank of The Haven, looking west towards the proposed development



Location Plan   

**Viewpoint P5**

Viewpoint Information:

Grid Reference: 532901, 342864

Focal Length: 35mm (Nikon D3200, 1.5 sensor, equivalent to 50mm field of view)

Camera Height: 6.5m AOD (approximately).

ISO speed: ISO-400

Camera model: Nikon D3200

Lens: Nikon AF-S DX NIKKOR 18-55 mm f/3.5-5.6G VR II

Taken: 19/11/2015 at 15:57 - mid to low tide (data from tidetimes.org.uk).

**This visualisation is indicative and for information only based on information as follows:**

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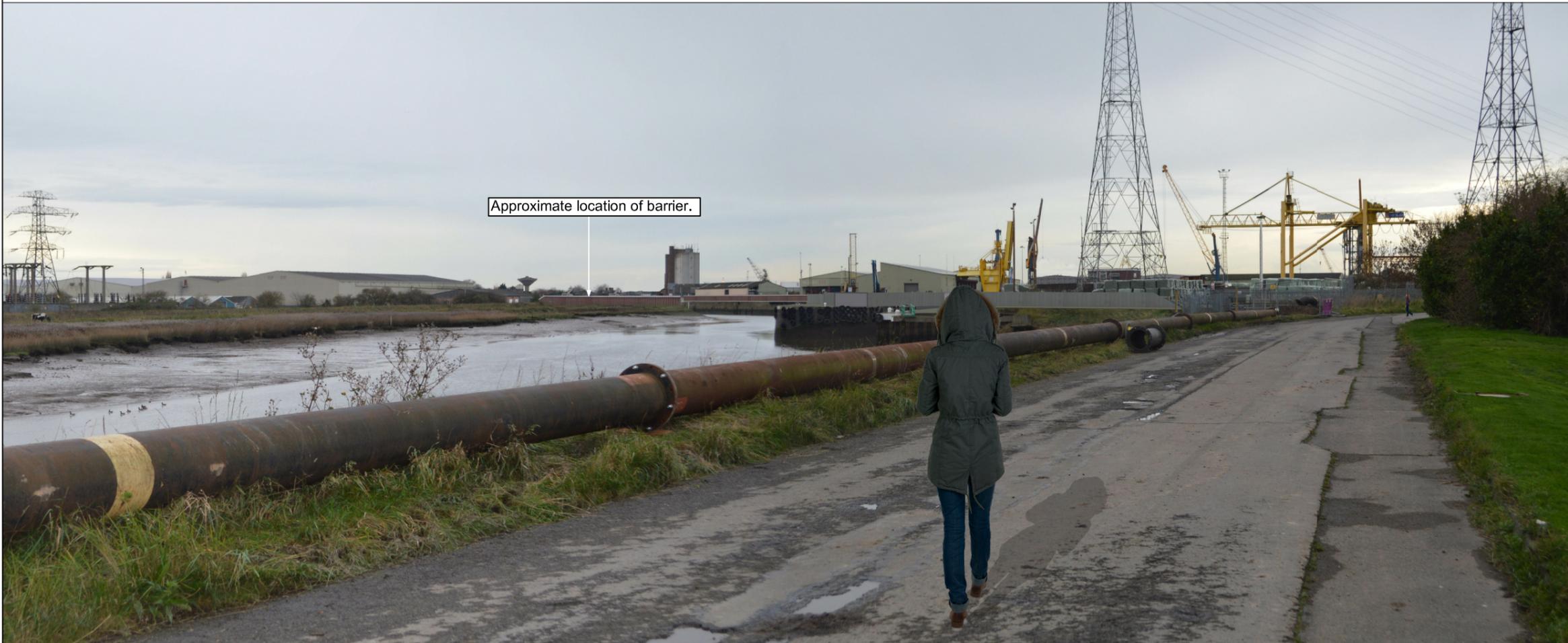
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								Scale at A3	NTS	
								Drawing Number	Status	Rev
								MMD-339200-L-DR-00-XX-0005	INF	P2

**Boston Barrier Tidal Project**

A17/2a – Volume 2a: Landscape and Visual Impact Amenity Technical Report



Proposed view - View from crest of flood embankment running along northern (left) bank of The Haven, looking west towards the barrier



Location Plan  Key  Approximate viewpoint

**Viewpoint P5**

Viewpoint Information:

Grid Reference: 532901, 342864

Focal Length: 35mm (Nikon D3200, 1.5 sensor, equivalent to 50mm field of view)

Camera Height: 6.5m AOD (approximately).

ISO speed: ISO-400

Camera model: Nikon D3200

Lens: Nikon AF-S DX NIKKOR 18-55 mm f/3.5-5.6G VR II

Taken: 19/11/2015 at 15:57 - mid to low tide (data from tidetimes.org.uk).

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<p>Drawing Number</p> <p><b>MMD-339200-L-DR-00-XX-0005_A</b></p>								Status	Rev	
								<b>INF</b>	<b>P4</b>	

**Boston Barrier Tidal Project**

A17/2a – Volume 2a: Landscape and Visual Impact Amenity Technical Report

## C. Lighting Statement

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# Boston Barrier Tidal Project

Lighting Statement

August 2016

Environment Agency





# Boston Barrier Tidal Project

Lighting Statement

August 2016

Environment Agency



# Issue and revision record

<b>Revision</b>	<b>Date</b>	<b>Originator</b>	<b>Checker</b>	<b>Approver</b>	<b>Description</b>
1	August	MC	GH/TS	EL	Final for Issue

**Information class: Standard**

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**Boston Barrier Tidal Project**

Lighting Statement

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# 1 Introduction

## 1.1 Overview

- 1.1.1 This Lighting Statement has been prepared to support the Transport and Works Act Order (TWAO) application for the Boston Barrier Tidal Project (the Project).
- 1.1.2 The Project is located in the Haven, approximately 100m downstream of Black Sluice (National Grid Reference TF 32833 42826) with associated works on the right and left bank of The Haven. The left bank of the Haven at the proposed location is currently used by the Port of Boston (PoB). There is a mix of residential and industrial properties on the right bank.
- 1.1.3 The barrier structure will be operated when extreme high tides are predicted within the Haven. It is therefore assumed that the lighting associated with the area surrounding the barrier structure could be in operation at any time but will not regularly be on throughout the hours of darkness.

## 1.2 Purpose of the report

- 1.2.1 The purpose of this lighting statement is to:
- Outline relevant policy guidelines;
  - Identify potential impacts of the lighting on the surrounding area; and
  - Identify and incorporate lighting best practice during the operations of the Project.
- 1.2.2 This statement does not include navigation lighting and illumination required to any temporary works during project construction.
- 1.2.3 At this stage additional light for construction purposes is not considered to be necessary as the PoB has extensive lighting already in place to allow it to operate 24hours a day. However, upon commencement of the works, the contractor will review the current lighting on the PoB estate and review any requirement for additional illumination based upon the requirement for construction, construction compounds and the 24/7 working to the wet dock entrance area.
- 1.2.4 There is existing floodlighting on the PoB site that covers the access road to the barrier. It is not proposed to modify this and therefore it is not considered further herein.

## 1.3 Relevant standards and guidelines

- 1.3.1 There are a large number of standards and guidelines applicable to lighting designs. Those that are considered to be relevant to this site are listed within Appendix C.
- 1.3.2 Prior to carrying out design work, these documents should be verified as current. If superseded, the standards and lighting levels discussed in this report should be reassessed.

**Boston Barrier Tidal Project**  
Lighting Statement

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## 2 The Project – Lighting Requirements

### 2.1 Lighting performance objectives

2.1.1 The lighting performance objectives for the Project are to:

- Deliver high quality and efficient lighting that provides sufficient illumination to allow safe operation;
- Provide a lighting installation which limits sky glow, light spill and luminous intensity to acceptable levels; and
- Ensure that lighting does not have a detrimental effect on the safety and operations of the port or navigation in the Haven.

### 2.2 The site and its illumination requirements

2.2.1 The various areas of the site and their illumination requirements are outlined below.

#### **Car and HGV parking and loading area**

2.2.2 New lighting will be required for the car park and the heavy goods vehicle (HGV) laybys and the roadway around them. The potentially hazardous loading area (alongside the barrier structure) will have additional illumination requirements.

#### **Barrier control building surrounds, walkways and storage area**

2.2.3 The barrier control building's entrances and exits will need to be illuminated along with the storage area to its west. The lighting at the exits will require battery back-up so that it is suitable for emergency escape use in the event of a power failure. There will be some loss of illumination from the demolition of the buoy repair shop that currently occupies the site.

#### **Barrier structure**

2.2.4 The barrier structure will require illumination to allow its operation to be monitored and maintenance to be carried out by the Environment Agency.

#### **Wet dock entrance gate**

2.2.5 The wet dock entrance gate will require illumination to allow its operation to be monitored and maintenance to be carried out by the PoB.

#### **Wet dock gate control building**

2.2.6 The wet dock gate control building's entrances and exits will need to be illuminated. The lighting at the exits will require battery back-up so that it is suitable for emergency escape use in the event of a power failure.

**Along the left bank – Port of Boston**

- 2.2.7 The PoB's quay wall is currently illuminated by column mounted flood lights that are positioned immediate to the edge of the Haven. It is proposed that, where there is a conflict between these lighting columns and the flood prevention works on left bank, there would be a like-for-like replacement of the affected columns (that is, no change in the overall height of the luminaires or their distribution of light).

**Along the right bank**

- 2.2.8 A public footpath currently follows the crest of the embankment along the right bank of the Haven, downstream of Black Sluice. This forms part of the Boston Public Footpath No.14 (Macmillan Way) long distance route. People walking on the public footpath would be directly adjacent to the proposed location of the barrier structure and the floodwall, which will be constructed adjacent to the existing embankment. However, the path is not currently illuminated and illumination is not considered to be necessary.

**Navigational lighting**

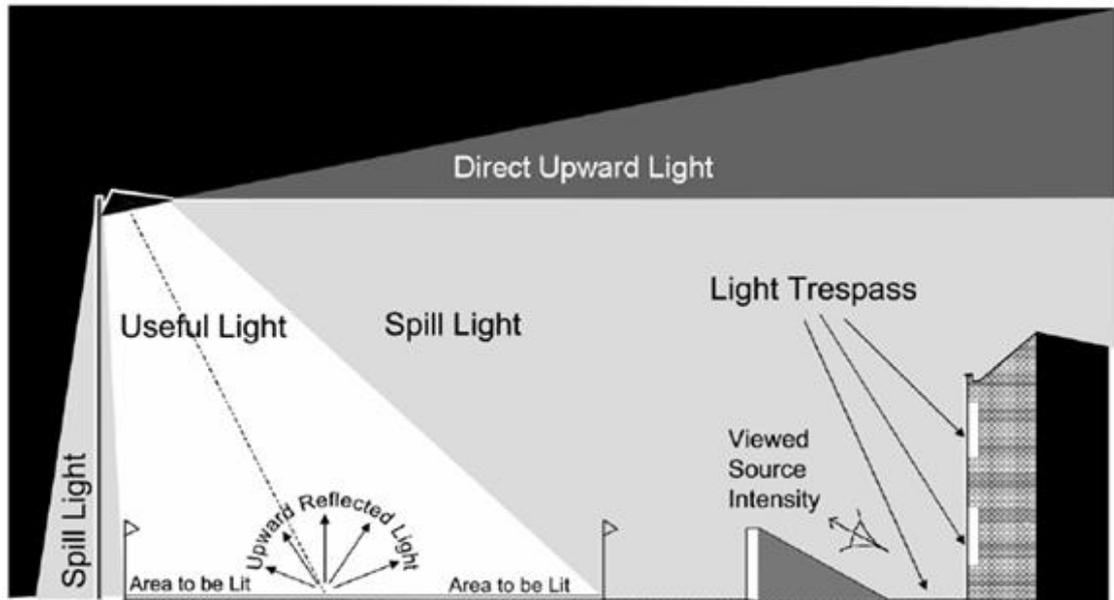
- 2.2.9 Four sets of 'Closed to Navigation Lights' shall be installed on the piers adjacent to the main barrier gate, two facing upstream and two facing downstream. The same requirement is set for the wet dock entrance gate, with two facing into the wet dock and two downstream.
- 2.2.10 The lights shall conform to the International Association of Lighthouse Authorities (IALA) recommendation on Port Traffic Signals.
- 2.2.11 The lights shall illuminate before any gate movement occurs and whilst the barrier gate is not in the fully lowered (open) position and the wet dock entrance gate when closed. The lights shall be LED type and battery backed for a period of 12 hours. The design of the lights shall facilitate ease of maintenance

### 3 Environmental Constraints

#### 3.1 Obtrusive light

3.1.1 Light intensity and distribution needs to be carefully considered to ensure that direct upward light is minimised and light distribution cut-offs from luminaries do not result in severe lighting contrast on light receiving surfaces such as floors and walls. This is shown in Figure 4.1.

Figure 3-1: Types of obtrusive light



Source: ILP Guidance Notes for the reduction of Obtrusive Light (2011)

3.1.2 Lamps, optics and equipment shall be specified and located to minimise any direct upward light component in order to reduce light pollution. In addition, light trespass and spill light will need to be minimised through design.

#### Environmental zone classification

3.1.3 Acceptable levels of obtrusive light depend on the 'Environmental Zone' classification, which equates to the district brightness of the surroundings; see Table 4.1 for environment zone information.

3.1.4 Table 4.1: Environmental Zones

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO Starlight reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark areas	National Parks, Areas of Outstanding Natural Beauty
E2	Rural	Low District brightness	Villages or relatively dark outer

			suburban locations
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town/city centres with high level so night time activity

Source: ILP guidance notes for the reduction of obtrusive light 2011

3.1.5 The site is within the urban area and the floodlighting of the port facilities gives it a high level of brightness. However, residential housing on the right bank would be considered to be suburban. This puts the site on the borderline between environmental zones E3 and E4. In such cases, the ILP guidance states that the more stringent requirements should be applied and it is therefore considered to be zone E3.

**Obtrusive light limitations**

3.1.6 It can be seen from table 4.2 that a lighting installation located in an area deemed to be more sensitive will understandably equate to greater constraints with regard to obtrusive light. See below for maximum levels of obtrusive light associated with an E3 zone.

Table 3.2: Obtrusive light limitations

Environmental Zone	Sky Glow ULR (Max%)	Light Intrusion (into Windows) E <sub>v</sub> (Lux)		Luminaire Intensity I (Candelas)		Building Luminance Pre-curfew
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Average, L (cd/m <sup>2</sup> )
E0	0	0	0	0	0	0
E1	0	2	0	2,500	0	0
E2	2.5	5	1	7,500	500	5
E3	5.0	10	2	10,000	1,000	10
E4	15	25	5	25,000	2,5000	25

Source: ILP guidance notes for the reduction of obtrusive light 2011

3.1.7 The curfew is the time after which more stringent requirements (for control of obtrusive light) will apply; often a condition of use of lighting by the local planning authority. If not otherwise stated, 23:00 is suggested by the ILP. Noting that operation of the site may be at any time, the design shall ensure that the lower, post curfew limits are satisfied.

**3.2 Navigation**

3.2.1 Glare from luminaires and colour confusion with navigation lights may present visibility problems for the crews of vessels. This is particularly relevant to the traffic light system for entering the dock and passing through the barrier.

- 3.2.2 There is potential for conflict to occur where a light source can be mistaken for a navigation light because of its position and/or colour. The type and colour of light sources and the position of the luminaires should therefore be selected to minimise the risk of such confusion. Particular care should be taken with low-pressure sodium lamps, which may emit a red light in run-up and failure modes, and metal halide lamps, which may emit a bright-green light when warming-up.
- 3.2.3 A light source can reduce the visibility of another due to high luminance (brightness) in the field of view. Mounting above normal sighting angles for navigation light would prevent this being a problem.
- 3.2.4 A light source can also cause glare by reflection or refraction of light from other sources, particularly the sun. By using luminaires with zero uplight component in the distribution of the light that they emit, the risk of disruptive reflection of sunlight is reduced.

### **3.3 Wildlife – bats**

- 3.3.1 Commuting and foraging bats are an ecological feature of the wider area and the right bank provides a suitable linear corridor to support them. However, the industrial character of the PoB estate on the left bank means that they are unlikely to present in this location.
- 3.3.2 Poorly designed lighting could have effects such as diverting bats to sub-optimal areas, or cutting off their commuting routes along the bank. The area is classified as “E3 Suburban”. The lighting in this area will be subject to constraints on obtrusive light, brightness, and light spill appropriate to this classification. These constraints, when applied, will reduce the potential adverse effects from lighting on the bats.

**Boston Barrier Tidal Project**  
Lighting Statement

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## 4 Proposed Lighting Installation

### 4.1 Levels of illumination

4.1.1 Based on the recommendations in BS EN 12464-2:2014, the following levels of illumination, uniformity and glare rating should be provided as part of the Project:

Table 4.1: Lighting parameters for given areas

Area	BS EN 12464 Area Type	Average Illuminance (lux)	Minimum Illuminance Uniformity	Glare Rating Limits	Minimum Colour Rendering Index
Loading area	Canals, locks and harbours - cargo handling, loading and unloading	30	0.25	55	20
Car park and HGV laybys	Parking areas - light traffic	5	0.25	55	20
Road around car park and HGV laybys	General requirements for areas - Regular vehicle traffic (max. 40 km/h)	20	0.40	50	20
Walkways	Canals, locks and harbours - gangways and passages exclusively for pedestrians	10	0.25	50	20
Storage area	Industrial sites and storage areas - short-term handling of large units and raw materials, loading and unloading of solid bulk goods	20	0.25	55	20
Barrier structure and Wet Dock gate	Canals, locks and harbours - lock control and ballasting areas	20	0.25	55	20

Source: Extracts from BS EN 12464-2:2014 – Lighting of work places – outdoor work places

4.1.2 The control building exits should be illuminated to 50lux such that there is not too great a contrast between the level of illumination within the building and that immediately outside it.

4.1.3 A plan showing the areas of the site with the different levels of illumination is included in Appendix A.

## 4.2 Luminaires

- 4.2.1 For the loading bay, storage area, loading area, HGV laybys, barrier area and wet dock gate it is proposed to use column mounted floodlights. Twelve metre tall columns would be appropriate to achieve the required spread of light and limit the shadowing effect from obstructions. (The existing floodlighting columns on the port site approximately range in height from 12m to 20m).
- 4.2.2 Eight metre street lighting columns are proposed for the car parking area where insufficient illumination is provided by the new or existing floodlighting. All columns should be hinged so that they can be folded down for maintenance. Additionally, bulkhead luminaires will be provided adjacent to the entry/exit doors of the control building. They will have integral batteries for back-up in the event of power failure.
- 4.2.3 The selection and positioning of luminaires needs to be such that excessive glare is avoided (see Table 5.1 above for limits). This is particularly important where it will be necessary for workers to look above the horizontal plane, for example where lorries may be loaded and unloaded.
- 4.2.4 Examples of luminaires appropriate for the installation can be found in Appendix B. Final luminaire selections and the layout of columns and luminaires will be made at the design stage.

## 4.3 Lamp selection

- 4.3.1 High-pressure sodium (SON) lamps offer poor colour rendition (the ability to distinguish between colours) but it is sufficient to distinguish the safety colours blue, yellow, green and red defined in BS ISO 3864-1:2011 ( $R_a=20$  or better) and is not otherwise thought to be an important consideration for the type of work undertaken at the site. SON lamps offer higher efficiency than metal halides. Although they can also sometimes give a red light on failure, SON lamps do not have the same potential issues with adjacency to the navigation as low-pressure sodium or metal halide types. SON-T lamps (the tubular variant) typically have a lifetime in excess of 16,000 hours. Light emitting diodes (LEDs) offer longer lifetimes but, given that illumination will only be required on an occasional basis, the additional capital cost associated with them over the SON-T would not be justified. It is therefore recommended that SON-T lamps are used for the floodlighting.
- 4.3.2 SON lamps are slow to warm up, cannot be rapidly switched on and off and generally are not available with integral battery backups. Such lamps are thus unsuitable for use as emergency lighting and the bulkhead luminaires around the control buildings should therefore use fluorescent lamps instead.

- 4.3.3 To avoid the stroboscopic effect (that is not being able to distinguish between stationary equipment and that rotating at a multiple of the frequency at which the lamp flickers) high-frequency control gear should be used where machinery might be exposed.

#### **4.4 Control**

- 4.4.1 It is proposed that the lighting to the barrier structure, storage, HGV layby and loading area should be controlled manually from within the control building. Lighting to the car park should be integrated with the existing port lighting controls. The bulkhead luminaires on the control building should have presence detectors and photocells. The wet dock gate illumination should have controls with those for the dock gate.

#### **4.5 Ecological impact**

- 4.5.1 An ecological review has concluded that the lighting installation proposed here is unlikely to result in effects on commuting and foraging bats.

**Boston Barrier Tidal Project**  
Lighting Statement

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## 5 Summary

- 5.1.1 In development of the final design for the lighting scheme at the site, the following should be taken into account:
- The need to limit the sky glow, light intrusion and luminaire intensity from the installation to satisfy the post curfew requirements of environment category E3 (suburban).
  - The constraints on an installation adjacent to a navigation with regard to lamp type, colour and position.
- 5.1.2 The new lighting for the site is proposed to consist of 12m tall column mounted floodlights to the main work area, 8m tall street lighting to the car park and bulkhead luminaires adjacent to the external doors of the buildings. The floodlights and street lighting will use high-pressure sodium lamps and the bulkheads compact fluorescent lamps, all with high-frequency control gear.
- 5.1.3 Controls will be provided so that the lighting need only be on when it is required.

**Boston Barrier Tidal Project**

Lighting Statement

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## A. Proposed Site Plan with Illumination Levels

Please refer to drawing no. IMAN001472-EVT-PLG-003 "Boston Barrier Project Proposed Illuminances".

## B. Example Luminaire Types Proposed

Figure B-1: Floodlight: Philips OptiFlood



Figure B-2: Street Light: Thorn Riviera



Figure B-3: Bulkhead Luminaire: Thorn Eye



## C. Relevant Standards and Guidelines

- i. The proposed lighting will need to be designed in accordance with current versions of relevant European and British Standards. At the time of writing, the following versions apply:
  - British Standard for the Lighting of work places. Outdoor work places BS EN 12464-2:2014.
  - British Standard for Road lighting — Part 2: Performance requirements BS EN 13201-2:2003.
  - British Standard for Emergency Lighting – Part 1: Code of practice for the emergency escape lighting of premises.
- ii. Additionally the following guidelines should be adhered to:
  - Institution of Lighting Professionals (ILP) Guidance Notes for the Reduction of Obtrusive Light, GN01:2011.
  - Bats and Lighting in the UK: Bats and the Built Environment Series (2009). Bat Conservation Trust and Institution of Lighting Engineers.

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