REPORT

# Boston Alternative Energy Facility – Environmental Statement

## Non-Technical Summary

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baef
Boston Alternative Energy Facility

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# 1 Introduction

## 1.1 About this Document

1.1.1 This document is the Non-Technical Summary (NTS) of the Environmental Statement (ES) (document reference 6.2) for the proposed Boston Alternative Energy Facility (the Facility), a land-based power generation facility.

1.1.2 The ES sets out the environmental information which has been gathered to carry out an assessment of the key likely significant effects of the project, from construction through to decommissioning. The NTS provides a summary of the project, the site selection process and the key findings of the Environmental Impact Assessment (EIA).

1.1.3 The Facility is a National Significant Infrastructure Project (NSIP) under the Planning Act 2008. This is because it is a land-based power generation facility generating more than 50 megawatts (MWe). Consent for the Facility requires a Development Consent Order (DCO) to be submitted to the Planning Inspectorate. They will determine the application on behalf of the Secretary of State (SoS) and make recommendations to the SoS regarding the consent. The SoS will make the decision on whether to award consent.

1.1.4 The Facility is considered to be an 'EIA development' under the 'The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017' ('the EIA Regulations'). This NTS is being submitted with the DCO application pursuant to and in accordance with Regulation 14(2)(e) of, and paragraph 9 of Schedule 4 to, the EIA Regulations.

## 1.2 Next Steps

1.2.1 The development consent regime is the process applicants must go through when seeking permission to construct an NSIP. **Plate 1** shows the six stages of the development consent regime for NSIPs.

1.2.2 With submission of this DCO application the Facility has reached the end of the pre-application stage. This has included consulting with all statutory bodies, local authorities, the local community and other potentially affected bodies.

1.2.3 The final results of the EIA have been presented in the ES and a summary of all the consultation responses received will be presented in a Consultation Report (document reference 5.1), both of which accompany this DCO application. After formal submission of the DCO application the Planning Inspectorate must decide within 28 days whether all relevant documentation has been submitted to formally accept the application and to enable the determination of the application to proceed.

1.2.4 If the Planning Inspectorate accepts the application, the process moves to the Pre-Examination stage and the application documents will be published on the National Infrastructure Planning website.


**Plate 1 Six Stages of the National Infrastructure Planning Process**

## 1.3 The Proposed Development

1.3.1 The Application Site for The Facility covers 26.8 hectares (ha) and is split in to two components: the area containing operational infrastructure for the Facility (the 'Principal Application Site'); and an area containing habitat mitigation works for wading birds (the 'Habitat Mitigation Area'). The location and proposed Order limits of the Facility are shown in **Plate 2.** The Facility will generate power from Refuse Derived Fuel (RDF). It will have a total gross generating capacity of 102 MWe and it will deliver approximately 80 MWe to the National Grid.

1.3.2 The 25.3 ha Principal Application Site located at the Riverside Industrial Estate, Boston, Lincolnshire. The site is next to the tidal River Witham (known as The Haven) and down-river from the Port of Boston.

1.3.3 The Habitat Mitigation Area covers 1.5 ha and is located approximately 170 m to the south east of the Principal Application Site, encompassing an area of saltmarsh and small creeks at the margins of The Haven.

1.3.4 The 'thermal treatment' process for generating power converts the solid fuel into steam, which is then used to generate power using steam turbine generators.

1.3.5 The Facility would comprise a range of buildings and structures, indicatively shown on the site layout plan for the Principal Application Site (**Plate 3**). The main of the Facility elements will be:

- wharf and associated infrastructure (including re-baling facility, workshop, transformer pen and welfare facilities);
- RDF bale storage area, including sealed drainage with automated crane system for transferring bales;
- conveyor system between the RDF storage area and the RDF bale shredding plant, part of which is open and part of which is under cover;
- bale shredding plant;
- RDF bunker building;
- Thermal Treatment Plant comprising three separate 34 MWe combustion lines and three stacks
- turbine plant comprising three steam turbine generators and make-up water facility;

- air-cooled condenser structure, transformer pen and associated piping and ductwork;
- lightweight aggregate (LWA) manufacturing plant comprising four kiln lines, two filter banks with stacks, storage silos, a dedicated berthing point at the wharf, and storage (and drainage) facilities for silt and clay;
- electrical export infrastructure;
- two carbon dioxide ($CO_2$) recovery plants and associated infrastructure;
- associated site infrastructure, including site roads and car parking, site workshop and storage, security gate, and control room with visitor centre; and
- habitat mitigation works for Redshank and other bird species comprising of improvements to the existing habitat through the creation of small features such as pools/scrapes and introduction of small boulders within the Habitat Mitigation Area.

1.3.6 A process flow diagram showing the operational processes of the Facility is provided in **Plate 4**.

1.3.7 The construction period for the whole development is anticipated to be up to 48 months.

1.3.8 The Facility will be designed to operate for at least 25 years, after which it may be decommissioned. The wharf structure will replace a section of the current primary flood defence bank and will form a permanent structure that is not anticipated to be decommissioned. The features to be provided on the Habitat Mitigation Area would also not be subject to decommissioning.

1.3.9 This NTS is intended to provide a high-level and stand-alone overview of the environmental impacts of the proposed Facility. For further detailed information, the full ES should be referred to. This can be found at:

https://www.bostonaef.co.uk/ or

https://infrastructure.planninginspectorate.gov.uk/projects/north-east/boston-alternative-energy-facility-baef/

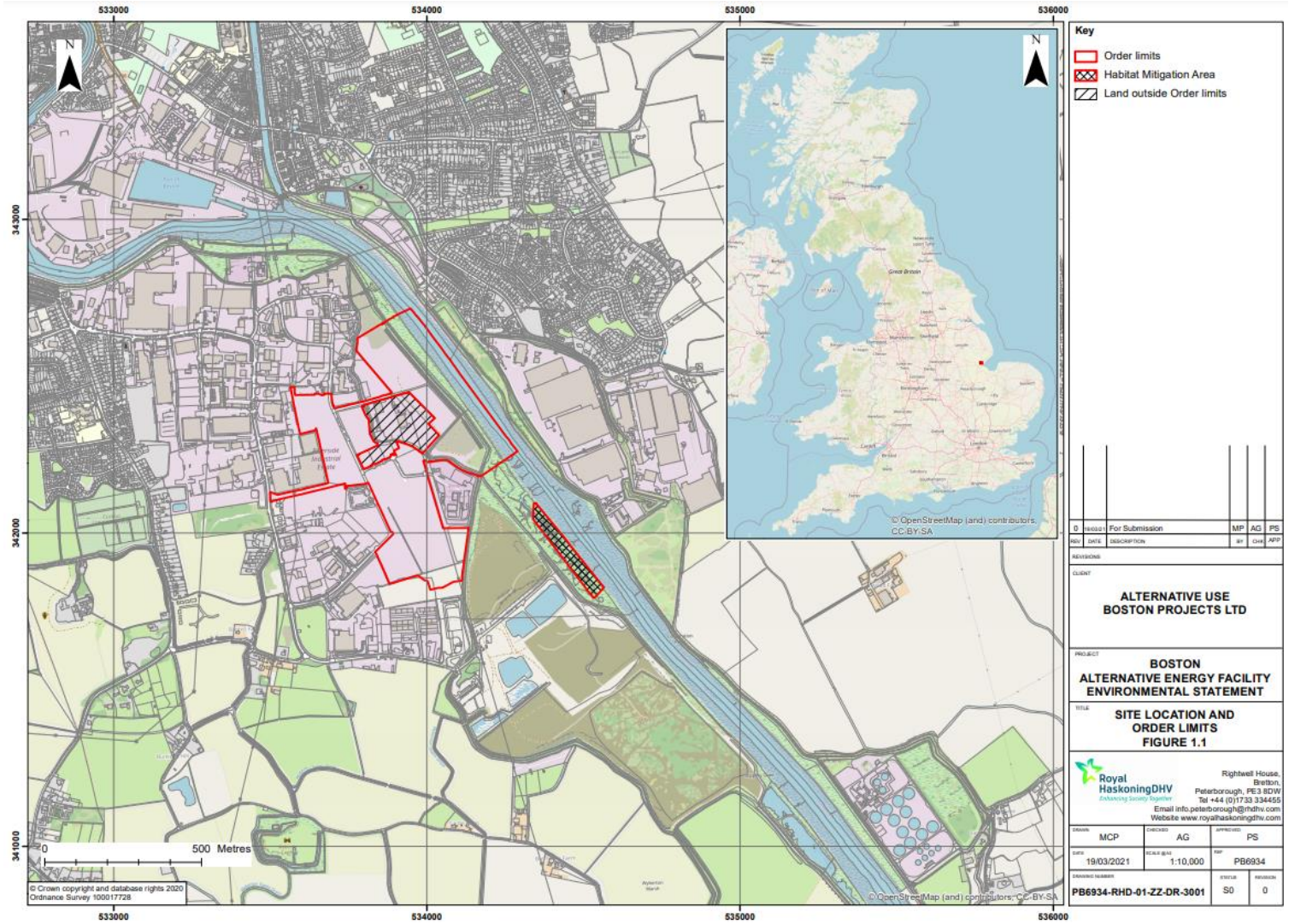


**Plate 2 – Site Location and Proposed Order limits**

# Site Layout

*Not to Scale*

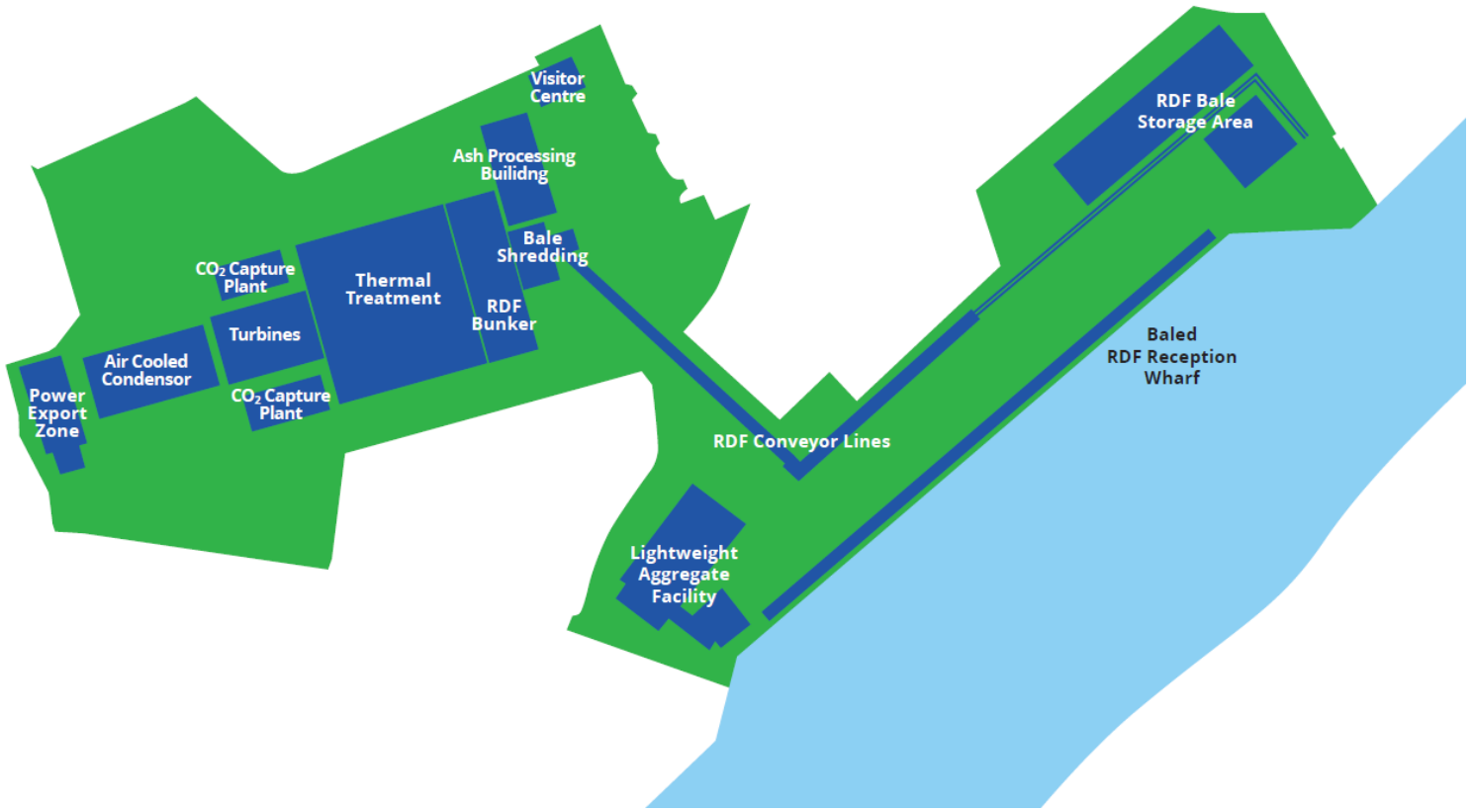


**Plate 3 Indicative Site Layout for the Principal Application Site**

## The process is as follows:

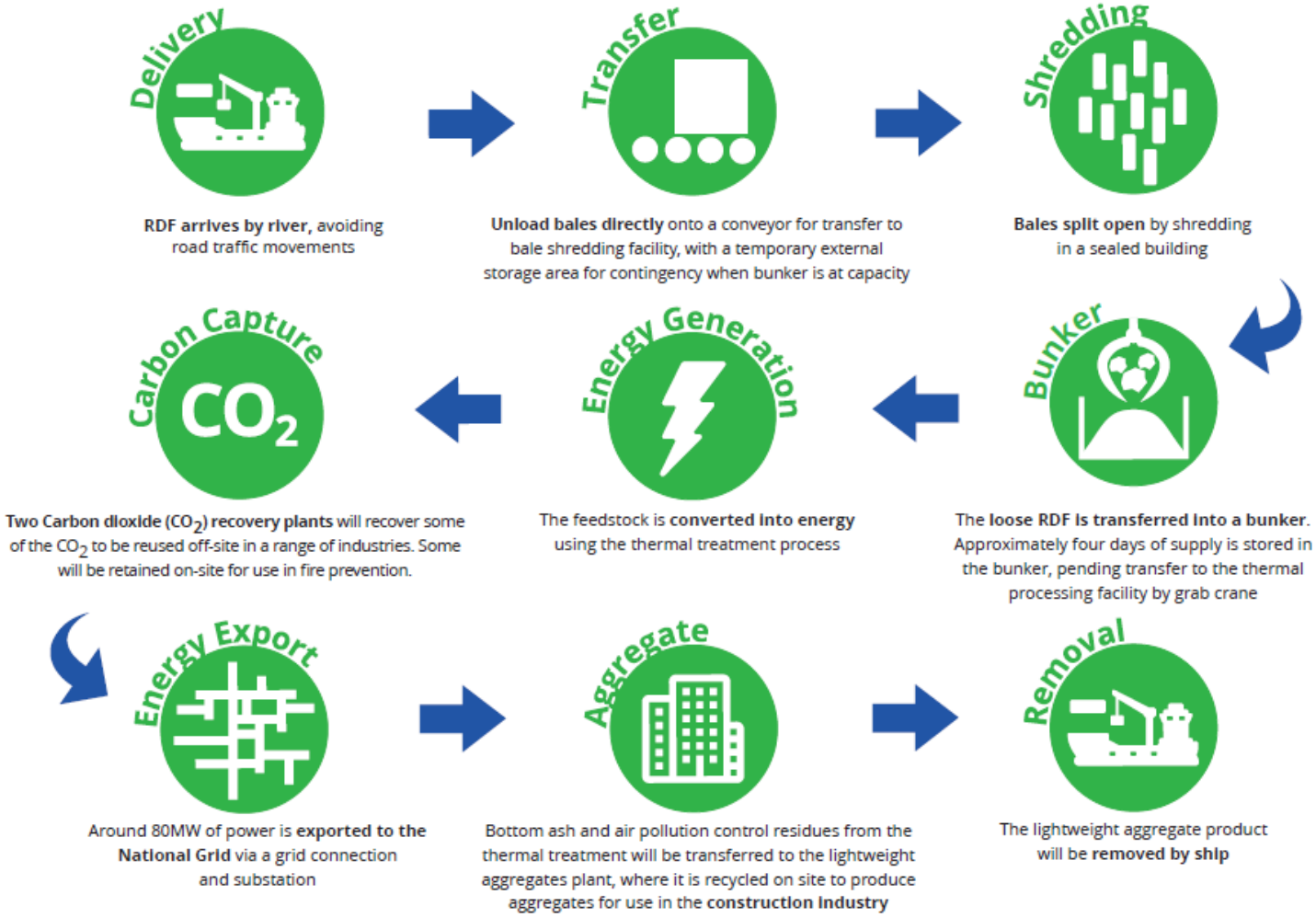


**Plate 4 Process Flow Diagram**

## 1.4 The Developer

1.4.1 Alternative Use Boston Projects Ltd (AUBP) is the Applicant undertaking the development and securing funding for the Facility. AUBP Ltd is a privately-owned company with core business in Energy from Waste, specifically renewable electricity projects.

1.4.2 Royal HaskoningDHV was commissioned by AUBP Ltd to coordinate the DCO process and produce the environmental documentation necessary to consider the Facility's impacts on all environmental receptors.

1.4.3 Royal HaskoningDHV is supported through the EIA process by several additional consultants who are responsible for particular specialist topics.

## 1.5 Project Need

1.5.1 The 'need' that exists for new power generating infrastructure, such as the proposed Facility, is confirmed in National Policy Statements (NPS). The NPSs guide decisions on nationally significant energy infrastructure by the Secretary of State.

1.5.2 The relevant NPS (EN-1 and EN-3) establish an urgent and substantial need for new energy generation infrastructure, with a clear desire for it to be renewable or low carbon, to achieve climate change targets.

1.5.3 The Applicant is mindful of the current waste situation in respect of significant amounts of UK waste being treated overseas, the impact of the restriction on waste imports into far eastern countries and dwindling UK landfill capacity. These factors were key drivers for the Applicant to seek to capture as much currently exported or landfilled RDF as possible, and to develop the cleanest, most efficient facility possible.

1.5.4 There were many reasons for choosing thermal treatment as the technology process for the Facility including economies of scale; diversion of waste from landfill and abroad and the potential for carbon dioxide capture for reuse.

1.5.5 The 'Do Nothing' scenario is not considered appropriate given the established need for new low carbon energy generation in the UK and doing nothing would prevent this significant investment in the local economy and employment.

## 1.6 Site Selection and Consideration of Alternatives

1.6.1 The Principal Application Site is considered appropriate for the following reasons:

- The site is identified as appropriate for this type of facility in Lincolnshire County Council's planning allocation policies, as well as having other local planning policy support;
- The location directly adjacent to a navigable watercourse allows for delivery of RDF and export of materials by water, which significantly reduces the amount of road vehicle trips;
- There is sufficient footprint to accommodate the required plant and equipment;
- It is considered technically feasible to connect to the electricity distribution network within the proposed development boundary;
- The site is not directly situated within any environmental designation. Although it is within a flood zone, it benefits from flood defences; and
- It is located within an existing urban/industrialised environment, with an existing biomass gasification plant located next door.

1.6.2 The process elements required for the function of the Facility would be designed in accordance with the following basic principles:

- resource efficiency in construction methods and use of materials and the reduction of materials needed for construction through the design of simple low technology structures and the use of recycled materials and easily de-constructible techniques where possible;
- ensuring the Facility is built to last and easy to maintain;
- energy efficiency, including greenhouse gas emissions reduction;
- pollution prevention, including indoor air quality and noise abatement, using best available abatement technology and maximising cladding and noise/vibration insulation;
- minimising transport impacts during the construction and operation of the Facility by allowing import and export from the navigable river;
- maximising the waste hierarchy potential for the site by recycling thermal treatment bottom ash and air pollution control residues into an aggregate product in the lightweight aggregates plant;
- providing a footbridge to allow safe and unhindered passage of pedestrians using the local public rights of way;

- providing a visitor centre to allow public access and views of the operation of the Facility for educational purposes;
- harmonisation with the environment, including environmental mitigation for landscaping and ecological planting; and
- keeping the building form simple to respond to the scale and form of the surroundings and distant views of the site.

1.6.3 The scale of development is dictated by the best available technology that could be accommodated within the available land to process the desired amount of fuel. The system consideration starts with the availability of the fuel; and the principle concept was to design to process over 1,000,000 tonnes per year, at 125 tonnes per hour of prepared RDF (with an indicative annual operational capacity of 8,000 hours) for feedstock to the process.

1.6.4 This starting point, combined with the land availability and an indicative calorific value for the RDF from the suppliers of 10.9 kJ/kg at 125 tonnes/hour, led to an indicative power output of 102 MWe.

1.6.5 Three Energy from Waste (EfW) lines were proposed to offer the most efficient long-term operation that will constantly deliver power; and will enable two lines to remain in operation whilst one is undergoing planned annual, or unplanned, maintenance or repair.

1.6.6 The 25.3 ha Principal Application Site shape dictates the arrangement of the main thermal treatment units given that this plant has the largest combined footprint. Design iterations associated with the Order Limits have been made, with the final Order limits associated with the DCO submission reduced to more closely fit the operational requirements of the site at the southern end by the substation to connect to the grid; and also at the northern end of the wharf to contract the boundary to avoid conflict with a mains sewer line.

1.6.7 The aggregate facility is positioned next to The Haven to facilitate export of lightweight aggregate and import of the clay for use in the lightweight aggregate manufacturing process.

1.6.8 The lightweight aggregates facility was included to prevent the disposal of the residues from the thermal treatment process. The alternative options to this facility require sending waste incinerator bottom ash and air pollution control residues off site. This would require significant vehicle movements to remove just over 182,750 tonnes of bottom ash and almost 16,700 tonnes of air pollution control

residues to be sent off site.

1.6.9 While there is an active market for the recovery or recycling of bottom ash, much of the air pollution control residues, which are hazardous waste, are sent for waste treatment followed by hazardous waste landfill disposal.

1.6.10 Therefore, the Applicant identified the need to retain and process these residues within the facility to generate a useable lightweight aggregate. This promotes the waste hierarchy (recycling compared to disposal or recovery); the proximity principle (dealing with waste as close to the source of production) and promotes a sustainable use of aggregate (by reducing reliance on virgin aggregate).

1.6.11 The design of the Facility has evolved to include a series of embedded mitigation measures to militate against potential impact on receptors from dust and odour. The control of odour is integral to the proposed development. With respect to potential odour, the assessment highlights that potential odour impacts associated with construction phase of works are not significant.

1.6.12 Heritage input into the design of the layout of the Facility has been provided, to ensure avoidance of impact to the historic environment where possible. The proposed development has been designed with the historic environment in mind, particularly in minimising any potential impacts to the setting of nearby heritage assets.

1.6.13 The Facility has been designed to incorporate standard industry practices for this type of development. The principles of Best Available Techniques (BAT) have been applied in designing the facility and for any sound emitting mobile and fixed plant. The principle of BAT ensures that suitable mitigation measures are embedded into the design and operation of the installation.

1.6.14 Consultation has been undertaken using stakeholder meetings and Public Information Days. These were used to promote changes in the design of the Facility.

1.6.15 In the early stages of the proposal, the Facility was assumed to use gasification technology. However, the gasification technology provider divested its business. No alternative gasification technology provider was found that was capable of delivering the required power output. Therefore, the Applicant changed the technology to conventional combustion-based thermal treatment EfW. This is because the supplier of this technology has several reference plants across the UK and the world. Conventional combustion-based thermal treatment EfW is

proven at the required scale.

1.6.16 Following this decision, further consideration was made as to how potential impacts associated with the Facility could be reduced. Further design changes were made to the scheme. The change from gasification to conventional EfW also allowed for stakeholder feedback to be incorporated into the scheme, notably reductions to traffic, air quality considerations, use of ships to deliver construction materials and management of odour as shown in **Table 1**. The Habitat Mitigation Area has also been included as part of the Facility, additional to the previous proposal and details of this are provided in **paragraph 2.1.24**.

**Table 1 Design optimisation following technology change**

| Previous Proposal | Project Change (part of DCO submission) |
|---|---|
| **Construction** | |
| **Concrete transported by road**<br><br>High volumes of concrete were needed to be supplied to the Principal Application Site in the early stages of construction to construct six large concrete silos (each were 48,000m$^3$) for storing processed RDF.<br>This was to be transported by road and meant significant peak traffic numbers in the early stages of construction. | **Concrete batching plant on site**<br><br>The six concrete silos are no longer required because there is no need to process and store the RDF before the EfW thermal treatment process.<br>A concrete batching plant will be set up on the Principal Application Site. The raw materials for making concrete can be transported in larger quantities, thus reducing vehicle movements associated with concrete mixer lorries.<br><br>To further reduce road transport movements, which was a concern of the public and Boston Borough Council, there will also be delivery of aggregate (for making concrete) via ship. The original design did not consider any movements by ship during the construction phase, because it was assumed all deliveries would be received into the site by road. To make this possible, part of the wharf will be constructed at an early stage in the construction to allow ships to deliver raw materials whilst the Facility is being constructed. |
| **Operation** | |
| **Supply of Feedstock** | |
| Quantity<br>A worst-case estimate required 1.3 million tonnes of RDF to be supplied to the Facility was identified in the Preliminary Environmental Impact Report (PEIR). However, after publication of the PEIR, discussions with technology providers and RDF suppliers | Quantity<br>A revised worst-case estimate requires 1.2 million tonnes of RDF to be supplied to the Facility. This reduction can be found because conventional EfW is more tolerant to wide variations in the calorific value of the incoming RDF. Therefore, the EfW facility |

| Previous Proposal | Project Change (part of DCO submission) |
|---|---|
| identified that a worst-case position of up to 1.5 million tonnes was considered necessary to cope with variance in RDF composition and calorific value. This is because gasification facilities require input material to be within a very narrow specification range and they have a very low tolerance of non-biogenic material. | does not need rigorous processing of the incoming raw RDF prior to thermal treatment. The reduction will mean the number of operational RDF shipments will be reduced. |
| RDF supply from three ports<br><br>Previously the RDF was expected to be transported (by ship) from three east coast UK ports. | RDF supply from several ports<br><br>The RDF supply is now expected to come from a wider range of UK ports (approximately 12). |
| **RDF Processing** | |
| A large RDF processing facility (135m x 94m x 20m high) was required for separating out items that were not suitable for the gasification process but were potentially recyclable.<br><br>These recyclable items (approximately 300,000 tonnes per annum) were segregated within the RDF processing building into recyclable waste streams (ferrous and non-ferrous metal, glass, medium and high-density inert material, such as stones). These materials were to be transported off-site by HGV for distribution into regional recycling network.<br><br>Processed RDF (meeting the rigorous biogenic specification for the gasification facility) would be stored in six large (48,000m$^3$) concrete silos pending gasification). | There is now no requirement for the incoming raw RDF to undergo rigorous pre-processing prior to the combustion-based thermal treatment process.<br><br>Pre-treatment actions will be limited to a shredding facility to split the bales open and reduce particle size and remove any particles too large for combustion.<br><br>Bales will be conveyed from the wharf to a small shredding facility (footprint 8m x 15m) then transferred to the EfW bunker.<br><br>No silos are required and there will be no segregation of potential recyclables prior to thermal treatment.<br><br>The consequence of this change means that there is a reduction in the number of operational-phase HGV movements because there is no need to remove segregated material off-site.<br><br>Furthermore, there is increased space on site by removing the large RDF pre-processing building and storage silos. This increased space means that the layout can be changed to a simple linear layout compared to that identified previously, which will allow for more efficient and safer construction. It also means fewer bales will be stored behind the wharf, thus reducing potential odour issues, which were a public concern. |

| Previous Proposal | Project Change (part of DCO submission) |
|---|---|
| | |
| **Thermal Treatment** | |
| <u>Gasification Technology</u><br><br>■ Gasification technology was proposed.<br>■ Three individual gasification units formed the total thermal treatment system (‘a three line’ system).<br>■ Each line had a stack, but this was combined in one large stack approximately 5m in width with three cores within, estimated to be 70m in height. | <u>Thermal Treatment (EfW) Technology</u><br><br>■ Combustion-based Thermal Treatment (EfW) technology using three lines.<br>■ The reconfiguration has allowed for repositioning of the air cooled condenser (ACC) and turbine buildings to a linear layout. Both are also located further from the nearest residential receptors, which has enabled potential noise effects from this source to be reduced – noise being a key public concern.<br>■ One individual stack will be provided per line, these stacks are anticipated to be at 80 m tall compared to the previous height of 70 m, to allow for more effective dispersion of the exhaust gases (please see **Chapter 14 Air Quality** of the ES (document reference 6.2.14) for more details). The stacks are not combined in one core (as previously) and will be narrower than the combined core stack in the previous design, thus managing public concerns about effective dispersion of the exhaust gases from the stack.<br>■ The EfW building is taller from base to highest point by approximately 8 m.<br>■ The design will feature more cladding around the main EfW building which will contribute to reducing the noise impact of sources within the building. This will enable potential noise effects from this source to be reduced at the nearest receptor – noise being a key public concern.<br>■ A greater amount of ash (and therefore ash processing) will be produced because there is no pre-processing of the RDF prior to combustion.<br>■ It is anticipated that approximately 5,000 tonnes of ferrous metal will be removed from the bottom ash which will be sent off-site for recycling.<br>■ The residual ash will be ground down to a fine particle size and conveyed to the on-site LWA facility. This will produce an aggregate product from the waste ash and air pollution control residues. Around 10% more aggregate would be |

| Previous Proposal | Project Change (part of DCO submission) |
|---|---|
| | produced and transported off-site via ship for use in the construction industry. |

## 1.7 The Environmental Impact Assessment Process

1.7.1 The EIA considers all relevant topics under the three general areas of physical environment, biological environment and human environment. The specific topics to be included in the EIA were agreed with the Planning Inspectorate and other stakeholders.

1.7.2 As part of the process, a detailed description of the current baseline environmental conditions has been identified, through a combination of desk-based studies, consultation and on-site surveys.

1.7.3 Impacts associated with the construction, operation or decommissioning of the Facility have been identified, and an assessment made of the significance of potential effects using standard methodologies.

1.7.4 Where these assessments have identified that the development may have significant environmental effects, specific measures have been proposed to avoid or reduce ('mitigate') them to acceptable levels and, if possible, to enhance the environment. Mitigation will continue to be agreed through ongoing consultation with the relevant authorities and bodies.

1.7.5 The EIA also considers:

- Inter-relationships, where effects to one receptor may influence another (for example an impact on a fish population may lead to reduced prey for birds or marine mammals);
- Cumulative effects, where impacts of the project are considered alongside the predicted impacts of other major projects in the area; and
- Transboundary effects, where activities in other countries may be impacted.

## 1.8 Structure and Content of the ES

1.8.1 The ES has three volumes:

- Volume 1: Environmental Statement chapters (chapter list shown in **Table 2**);
- Volume 2: Figures; and
- Volume 3: Appendices

**Table 2 ES Chapter List**

| Chapter Type | Chapter Number | Title |
|---|---|---|
| Introductory | 1 | Introduction |
| | 2 | Project Need |
| | 3 | Policy and Legislation |
| | 4 | Site Selection and Alternatives |
| | 5 | Project Description |
| | 6 | Approach to Environmental Impact Assessment |
| | 7 | Consultation |
| Topic-specific Scheme Wide Aspects | 8 | Cultural Heritage |
| | 9 | Landscape and Visual Impact Assessment |
| | 10 | Noise and Vibration |
| | 11 | Contaminated Land, Land Use and Hydrogeology |
| | 12 | Terrestrial Ecology |
| | 13 | Surface Water, Flood Risk and Drainage Strategy |
| | 14 | Air Quality |
| | 15 | Marine Water and Sediment Quality |
| | 16 | Estuarine Processes |
| | 17 | Marine and Coastal Ecology |
| | 18 | Navigational Issues |
| | 19 | Traffic and Transport |
| | 20 | Socio-Economics |
| | 21 | Climate Change |
| | 22 | Health |
| | 23 | Waste |
| | 24 | Major Accidents and Risk Management |
| | 25 | Transboundary Impacts |
| | 26 | Summary |

# 2 Project Description

## 2.1 Construction

2.1.1 The overall construction period will take place between 2022 and 2026. Construction activities will take place six days a week (Monday to Saturday) between 8am and 8pm (with an option of 7am to 7pm), with no bank holiday or public holiday working. There are likely to be between 250-300 construction workers at peak construction.

2.1.2 A brief overview of the construction of the Facility is outlined below:

**Site Preparation**

2.1.3 A water main passes through the middle of the Principal Application Site. A current and separate application has been submitted to Anglian Water to divert the main. This will be completed before construction on the proposed Facility would start.

2.1.4 It is proposed that foul drainage would be collected through a new mains connection to the existing sewer system (which serves the industrial estate on the northern boundary) to provide a sewerage system for use in both construction and operation. The proposed route of this will follow advice given by Anglian Water.

2.1.5 Topsoil will be removed across the Principal Application Site and this site will be graded using excavated material or imported stone. Soil that is suitable for use would be retained for grading use to minimise import and disposal of soil and for preferential use over imported stone to reduce the use of virgin aggregate.

2.1.6 Laydown areas will be prepared for office use (portacabins) and the storage of plant components and equipment in construction. Heras fencing will be erected around the Principal Application Site (an estimated fence distance of 4 km).

**Delivery of Raw Materials**

2.1.7 Delivery of raw materials to the Principal Application Site will be via both ship and road. The first phase of the wharf construction will be undertaken to allow a proportion of the raw materials to be delivered by ship rather than using local roads. It is expected to take approximately six months to construct the first section of the wharf to allow raw materials to be received by ship. The remaining section of the wharf will take a further 12 months (approximately) to complete.

2.1.8 A concrete batching plant will be installed to reduce transport movements associated with concrete. Aggregate brought in by ship will then be transferred to

it from the wharf using a temporary overland conveyor. The concrete batching plant will take approximately four days to install. The temporary aggregate conveyor will take around five months to install. This will be deconstructed when the need for aggregate supply by ship has come to an end.

2.1.9 The bulk of the cement required will come from Ketton Cement works in the County of Rutland. Potential alternative sources are Purfleet or Tyneside. It is not considered practical to deliver cement by ship due to the vessel size required and timetabling.

2.1.10 Other bulk loads including reinforcement materials such as steel and fibre will also be brought in by ship, with on-site vehicle transport to the laydown areas within the Principal Application Site.

2.1.11 It is anticipated that there will be approximately 89 shipments of raw materials during the construction period.

**Footbridge**

2.1.12 A footbridge will be installed early in the construction programme to allow safe passing for the public over the Principal Application Site. This will be installed on the current public right of way which follows the route of Roman Bank (also known as ‘Sea Bank’) where it crosses the Principal Application Site.

**Wharf**

2.1.13 The wharf will be built in a phased manner, replacing sections of the current flood defence bank and will comprise the quay wall, the main area of the wharf and an area behind the wharf for associated infrastructure. The wharf will be used for receiving deliveries of baled RDF by ship; and also, for the dispatch by ship of lightweight aggregate that was manufactured at the Facility.

2.1.14 The wharf facility will include a berthing pocket to allow ships to safely dock without restricting the navigable channel of The Haven. The berthing pocket will be constructed by dredging and excavation of the mud flats and land to the edge of the proposed wharf. Most of these construction works would be carried out by land-based equipment, although some floating plant may be required to complete the excavation towards the edge of the main channel.

2.1.15 An initial phase of dredging will be required to create a slope underneath where the wharf will be later built. The wharf deck structure would be constructed by first driving the piles and then constructing the deck. The Contractor would work from the shore outwards, using the installed piles to support construction of the

structure further offshore.

2.1.16 The construction of the wharf is anticipated to take up to 18 months.

**RDF Storage Area**

2.1.17 The RDF storage area would be constructed as a sealed concrete pad with a sealed drainage system.

**Fuel Conveyors**

2.1.18 The fuel conveyors will be constructed in two phases.

- Phase 1: turntable house will be erected and piled, east to west conveyor and inclined conveyors will be erected; and
- Phase 2: south to north steelwork, conveyor units and conveyor modules will be installed.

**Bale Shredding Plant and Bunker**

2.1.19 The RDF bale shredding building and bunker foundations would be piled, and concrete poured to form the hall base.

2.1.20 The building will be completed with an internal ventilation and fire systems. Following delivery of the conveyor this will be wired which will take approximately five months.

**Thermal Treatment Plant**

2.1.21 The three lines of the combustion plant are proposed to have staggered construction start dates:

- Line 1 (western most combustion plant) would begin first; followed by
- Line 3 (eastern most combustion plant) two months later; and
- Line 2 approximately one month after line 3.

2.1.22 Overall, from the beginning of line one to the end of commissioning and de-snagging, construction of the three lines of Thermal Treatment Plant would take approximately 48 months and therefore will be one of the first construction activities to start.

**Lightweight Aggregate Facility**

2.1.23 Foundations for the LWA facility building will be piled before the base slab is cast. The four kilns will be produced off-site and then transferred by ship to the Principal

Application Site. The LWA forming equipment will then be procured and transferred to this site. Overall, the LWA facility's construction will take approximately 19.

**Habitat Mitigation Area**

2.1.24 Works will be carried out to enhance the habitat within the Habitat Mitigation Area, in order to mitigate the loss of the roosting and foraging habitats for waders, notably redshank at the proposed wharf location. These works will involve the creation of four shallow pools (maximum of 15 cm deep) in the existing marshy habitat; re-profiling the edges of existing pools and a low bank; and, increasing the volume of 'roosting' rocks by translocating rocks to this area that would otherwise be lost due to the development of the wharf. Construction of these features are relatively minor and will take place in advance of the wharf construction. Plant and equipment will be highly limited and is likely to consist of a long reach excavator which may be brought to this site on a floating barge, and a small workforce using hand tools.

**General**

2.1.25 The Principal Application Site incorporates two areas of temporary use during the construction phase, one to the west and one to the east of Nursery Road. These are provided to accommodate all construction laydown, and fabrication; with welfare provision and construction site offices within the Application Site boundary. After construction these laydown areas will not be used for any operating plant. However, the site operational car park is proposed to be located in the western laydown area.

2.1.26 Contracts placed with companies involved in the construction works will incorporate measures to control environmental effects and adhere to health and safety regulations and current guidance with the intention that construction activities are sustainable and that all construction contractors are committed to agreed best practice and meet relevant environmental legislation.

## 2.2 Operation

2.2.1 The Facility is proposed to operate 24 hours a day, seven days a week, and expected to commence operation in 2026. There would be approximately 125 permanent workers employed at the Facility.

**Refuse Derived Fuel Supply**

2.2.2 The Facility will receive up to approximately 1,200,000 tonnes of RDF per year by

ship.

2.2.3 The RDF will be shipped in plastic wrapped bales. The RDF will comprise of residual waste collections from householders. The bales will be labelled to identify the source of the RDF and the location and date of baling.

2.2.4 The material will be delivered to the Facility from UK ports. The specific departure locations will be dictated by market conditions at the time of supply.

2.2.5 The bales will be brick-shaped and have an approximate volume of 1.85 $m^3$, weighing approximately 1.3 to 1.5 tonnes.

**Wharf**

2.2.6 The proposed wharf will comprise a 400 metre long docking facility, loading and offloading equipment and access / egress ramp. The wharf would have two berths for receiving RDF feedstock, and one berth for loading aggregate and receiving sediment and clay (which are required by the LWA plant).

2.2.7 Arriving vessels would navigate up The Haven to the proposed berth over high tide and leave over a subsequent high tide. It is anticipated that vessels will be turned at the Port of Boston, either outside or within the Wet Dock.

2.2.8 Approximately 580 ships per year will be required, which represents up to 12 per week.

**Temporary RDF Storage Area**

2.2.9 When the bunker reaches full capacity the RDF bales will be transferred from the ships to a temporary storage area and stacked in stockpiles before transfer to the shredding facility.

2.2.10 If a bale is damaged when it is loaded onto the wharf, it will be immediately transferred to a covered storage area. The damaged bale would then be re-baled and replaced to the appropriate stockpile.

2.2.11 The storage area will be in the open and will accommodate approximately two days-worth of RDF (approximately 6,500 tonnes). The RDF would be transferred for processing on a ‘first in first out’ basis.

2.2.12 There would not be significant odour issues when the RDF is temporarily stored because the bales are tightly wrapped in plastic and are only stored for a short period of up to five days (once received).

### RDF Bale Conveyors

2.2.13 The two parallel RDF conveyors, each approximately 600 m long, will transport sealed bales from the temporary storage area to the RDF feedstock processing building. The conveyors are open at the point of loading, then enclosed thereafter.

### Bale Shredding

2.2.14 The feedstock bales will be loaded into a shredder from the conveyor lines inside the building. This will reduce the contents of the bale to a maximum particle size of less than 300 mm.

2.2.15 A small quantity of 'massive particles' (bulky items that were not screened from the RDF bale prior to shipping) would be segregated from the shredded material. This is anticipated to be less than 1,000 tonnes per annum.

2.2.16 The remaining shredded RDF will be transferred into a common RDF feed bunker. This would have capacity for four days' supply.

2.2.17 The RDF processing building will operate in a closed environment using measures to ensure no unacceptable odour is released. It will also be suitably insulated to ensure no unacceptable noise levels are experienced outside the building.

2.2.18 The feedstock is then transferred from the bunker into the Thermal Treatment Plant feed chutes using grab cranes.

### Thermal Treatment Plant

2.2.19 The Thermal Treatment Plant is a direct combustion process. The combustion of the waste takes place on the furnace grate. An inclined, moving grate system will be used.

2.2.20 The proposed Thermal Treatment Plant comprises three identical 34MWe combustion plant in parallel (i.e. three 'lines') with associated power station to generate approximately 102 MWe of renewable electricity using the RDF.

2.2.21 Each combustion plant would operate for 8,000 hours per year (with scheduled maintenance planned in) and two lines of the plant would always be running when one is undergoing maintenance.

2.2.22 Some of the energy generated will be used to power the various elements of the Facility. Approximately 80 MWe will be exported to the National Grid for distribution through a 132 kV grid connection point on-site.

2.2.23 An example image of a Thermal Treatment Plant is shown in **Plate 5**.

**Plate 5 Image of a typical energy from waste facility (North Yard, Devonport, Plymouth)**

### Lightweight Aggregate Plant

2.2.24 The ash and air pollution control residues (APCr) from the Thermal Treatment Plant will be processed on site to produce a marketable lightweight construction aggregate pellet. This product will be exported via ship from a dedicated berth at the wharf.

2.2.25 Clay and / or silt will be used in the process primarily as a binder to give strength to the pellet.

2.2.26 Clay will be the primary binder source, delivered by ship. The same ships used to deliver clay will be used to remove the aggregate.

2.2.27 Silt from dredging can also be used as binder material for the LWA. Where silt is used, this will be from dredged material obtained from The Haven from dredging of the wharf berthing pocket, or from other maintenance dredging on The Haven.

2.2.28 The LWA plant will have four lines and a dedicated berth on the wharf for loading LWA product for export by ship to UK markets (locations dictated by market forces).

### Grid Connection

2.2.29 A grid connection point is located within the Principal Application Site to facilitate the net export of 80 MWe (and also an import of 5 MW) of electricity into the local 132 kV overhead line. The connection point and substation will be located in the south-east corner of the Principal Application Site. An additional overhead tower may need to be constructed (by Western Power Distribution (WPD)) to manage the grid connection. The need for this will be determined by WPD.

### $CO_2$ Recovery Plant

2.2.30 The Facility will include the connection of the flue-gas system to two carbon dioxide ($CO_2$) processing and recovery plants. This (food-grade) $CO_2$ can be exported as a product for use in various industries. Some of the $CO_2$ will also be retained on-site for use in fire prevention.

2.2.31 The two $CO_2$ plants will be fully automatic systems designed for constant operation (24 hours per day, 7 days per week).

### On-Site Lighting

2.2.32 The Facility would operate 24 hours a day. Lighting would therefore be required during the hours of darkness on the Principal Application Site only, and at low light levels to fulfil health and safety requirements. Both construction and operational lighting will be designed to reduce light spill up or down The Haven to avoid reducing visibility and impacting navigational safety. Lighting will be designed to comply with the minimum safety standards required on a construction site and as required for a working Facility. The lighting specification will also minimise light impact on bats.

# 3 Environmental Impact Assessment Methodology

3.1.1 The objective of the EIA undertaken for the project is to enable the project environmental data and assessment of impacts to be presented in the final ES submitted with the application for a DCO.

## 3.2 Impact Assessment

3.2.1 The impact assessment considers the potential for significant effects during construction, operation and maintenance, and decommissioning phases of the Facility.

3.2.2 Impacts can be classified as follows:

- **Direct**: these can arise from impacts associated with the construction, operation and maintenance, or decommissioning of the project;
- **Indirect**: these may be experienced by a receptor that is removed (in space or time) from the direct impact (e.g. noise impacts upon fish which are a prey resource for fish or mammals). These equate to inter-relationships highlighted by the Planning Inspectorate guidance (Advice note 17); or
- **Cumulative**: these can occur because of the Facility in conjunction with other operating or planned projects.

3.2.3 Data collected during project-specific surveys and desk studies are used to identify site-specific issues and inform the impact assessments. The magnitude of the effect (which is defined by the spatial and temporal extent, frequency and how reversible the impact is) is then identified along with the sensitivity of each receptor to that effect (e.g. a particular species or population). Sensitivity is dependent on the value, vulnerability and recoverability of the receptor. For each topic, the most relevant and latest guidance or best practice have been used and definitions of sensitivity and magnitude of effect are tailored to each receptor.

3.2.4 Finally, the overall significance of the effect is determined using a matrix approach that considers both magnitude of effect and sensitivity of receptor. Example significance definitions are given in **Table 3.**

**Table 3 Significance Definitions**

| Impact Significance | Definition |
|---|---|
| Major adverse | Very large or large change in receptor condition, both adverse or beneficial, which are likely to be important considerations at a regional or district level because they contribute to achieving national, regional or local objectives, or, could result in exceedance of statutory objectives and/or breaches of legislation. |
| Moderate adverse | Intermediate change in receptor condition, which are likely to be important considerations at a local level. |
| Minor adverse | Small change in receptor condition, which may be raised as local issues but are unlikely to be important in the decision-making process. |
| Negligible | No discernible change in receptor condition. |
| Minor beneficial | The effect is of minor significance but has been assessed as having some environmental benefit. |
| Moderate beneficial | The effect is assessed as providing a moderate gain to the environment. |
| Major beneficial | The effect is assessed as providing a significant positive gain to the environment. |

3.2.5 Only those effects which are assessed as being of moderate significance and

greater are considered ‘significant’ in EIA terms. Where significant effects are identified they result in further analysis and consultation, and suggestions of mitigation measures where practicable.

## 3.3 Embedded Mitigation

3.3.1 The EIA process takes account of a series of embedded mitigation measures which the Applicant has committed to during the design of the Facility. Adverse impacts have been minimised through the evolution of the project design through the following processes:

- Site selection (to avoid key designated or sensitive areas); and
- Operational process requirements (e.g. the use of ash in the LWA facility rather than off-site disposal).

3.3.2 Several plans and strategies (including landscape, navigation, traffic and access and general construction practices) have been produced which outline how the Facility will be constructed and operated in an agreed and acceptable manner. These plans and strategies will be submitted with the DCO application and will evolve further during the determination process. The DCO will contain ‘requirements’ that stipulate that these plans and strategies must be approved by the relevant authorities before construction can begin.

# 4 Consultation

4.1.1 The Applicant has conducted comprehensive and transparent pre-application consultation in relation to the EIA process, with a wide range of stakeholders. The aim of the consultation process is to meet and exceed the requirements of the Planning Act and EIA Regulations and has considered relevant advice and guidance published by the Planning Inspectorate and relevant United Kingdom Government departments.

4.1.2 Stakeholders have been engaged in the development process from an early stage which has influenced the design of the project and the EIA. Wider aspects of consultation associated with the project, including community and landowner consultation are detailed in the Consultation Report (document reference 5.1) submitted with the DCO application.

4.1.3 In June 2018, the Applicant submitted a Scoping Report to the Planning Inspectorate. A Scoping Opinion was issued in July 2018. Since then the Applicant has continued to engage in technical consultation as well as undertaking

four rounds of public consultation (which included three rounds of Public Information Days (PIDs) and further public consultation in 2020, which was carried out using virtual media due to the Covid-19 pandemic).

# 5 Potential Environmental Effects

5.1.1 **Sections 5.2**– **5.18** below outline the key findings of the technical topic chapters presented in the ES.

## 5.2 Cultural Heritage

5.2.1 Cultural heritage comprises archaeological remains, historic buildings and historic landscapes. Some of these are designated sites such as Scheduled Monuments and Listed Buildings. Many are undesignated but are still important to the understanding of the historic environment.

5.2.2 The cultural heritage baseline has been established by a desk-based exercise and supplemented by a programme of non-intrusive surveys to identify potential archaeological features underground (such as magnetometer surveys).

**Plate 6 View of the Roman Bank and New Road Traversing over it, Looking East.**

5.2.3 There are no designated assets within the Application Site. There are six Listed Buildings within 1 km. A further four Scheduled Monuments and 22 Grade II* and I Listed structures are found within 3 km. Non-designated assets within 1 km of the Application Site are predominantly medieval to modern in date, mostly in the form of buried deposits associated with farmsteads. The most notable non-designated asset is the 'Roman Bank' (see **Plate 6** above). This earthwork passes through the centre of the Principal Application Site and is an approximately 2 m

high earthen flood bank. Research suggests it could be of Anglo-Saxon origin. A Public Right of Way follows the length of the bank through the Principal Application Site.

5.2.4 The baseline data indicated that the area surrounding the Application Site include clay deposits which can seal and preserve organic remains (e.g. peat, wood, cloth, vegetation).

5.2.5 A site walkover study suggested that there are no (visible) wrecks within the section of The Haven to be affected by the Facility. Some foreshore structures were evident on the eastern bank, but none on the proposed wharf-side. Overall effects upon heritage assets by the Facility are identified as **negligible** or **minor** following mitigation. These impacts are mostly in the form of changes of setting (the surroundings in which an asset is experienced). There would be a direct impact upon a short section of the 'Roman Bank', and upon any potential buried preserved organic remains and archaeological deposits within the central Application Site and within / adjacent to The Haven.

## 5.3 Landscape and Visual Impact

5.3.1 Landscape effects include both physical effects on a feature (for example loss of existing trees) and effects on the character of the landscape. Visual effects relate to the effect on views and visual amenity experienced by people, whether they are residents or other users of the area.

5.3.2 The landscape and visual baselines have been established through site survey, desk based research, and expert analysis. Visual effects are assessed from a series of viewpoints, selected to represent the range of views people currently experience near to the Application Site and example of which is reproduced in **Plate 7**.


**View 1:** Looking south west from Toot Lane near Hawthorn Tree Primary School
(E534991, N343686, 3mAOD, 212 degrees, 1.5km from site boundary)


**View 2:** Looking south west from Church Green Road near Fishtoft
(E535814, N343277, 2mAOD, 237 degrees, 1.8km from site boundary)

**Plate 7 Example Viewpoints from the LVIA assessment**

5.3.3 With the exception of the Habitat Mitigation Area, The Facility lies within the existing Riverside Industrial Estate which means that the surrounding landscape and associated views are strongly influenced by existing large industrial buildings, busy roads, commercial vessels using The Haven and other features, including very tall electricity pylons that dominate certain local views. Views towards the site are across a flat landscape and are often limited by tree belts, hedgerows and existing buildings. Flood defence banks alongside The Haven help screen views from residential properties to the east but also provide open, close range views of the Application Site from the footpaths that follow the tops of the banks.

5.3.4 The proposed Facility is an extensive development and includes several large-scale industrial buildings, structures, stacks and a riverside wharf. The LWA plant is the tallest proposed building (excluding the stacks) and is located alongside The Haven. No built structures are proposed at the Habitat Mitigation Area and construction works are minor, therefore this assessment focusses on the construction, operation and decommissioning at the Principal Application Site.

5.3.5 The Facility would be seen in context of the existing Biomass UK No. 3 Ltd facility; a facility which also comprises tall buildings and an emissions stack. Given the existing industrial nature of the Principal Application Site and surrounding area the Facility will not cause significant effects to landscape character. Effects are predicted to be **minor adverse** during construction and operation. There will be no significant physical landscape effects.

5.3.6 Effects to views are predicted to be the worst during the construction stage. Views from footpaths along the eastern bank of The Haven will be most affected with close range, open views to construction of the wharf and LWA plant being most prominent and with **moderate/ major adverse** effects. Views from certain residential properties to the west of the site are predicted to be **moderate adverse**, with views of tall cranes and emerging buildings. These visual effects are significant in EIA terms. Visual effects during operation will be slightly less adverse, although close range views of the Facility from The Haven corridor to the east will remain **moderate adverse**.

## 5.4 Noise and Vibration

5.4.1 Noise baseline surveys were carried out to inform the noise and vibration assessment and assess the existing noise environment. Noise modelling was carried out to determine any potential impacts relating to the construction and operation of the Facility at specific sensitive noise receptors (**Plate 8**) agreed with

Boston Borough Council.

5.4.2 An assessment of noise and vibration from off-site construction traffic predicted some adverse impacts along one of the identified road links during peak construction traffic flow. Mitigation is required to reduce the peak traffic flow along Nursery Road/Lealand Way, although the impact is temporary, short-term, infrequent and local. After mitigation, all impacts associated with construction traffic are considered not significant.

5.4.3 An assessment of on-site construction phase noise indicates **minor** effects at all receptors for daytime construction works. A **moderate adverse** effect was predicted at one of the nearby noise sensitive receptor locations during the evenings and weekends, but more detailed analysis identified that covering piles with a full-length shroud will reduce the predicted effect to **minor adverse** and therefore not significant. Vibration impacts from construction works were not considered because the distance between piling activities and the nearest receptors indicate that these will not be significant.

5.4.4 Operational noise levels at nearby receptors due to the Facility were initially predicted to be significant at some receptors, leading to mitigation measures being incorporated into the design. Impacts from noise levels at nearby receptors due to operation of the Facility are predicted to be **minor adverse**. Embedded mitigation in the design prevents any significant sources of vibration and therefore vibration impacts are considered to be non-significant.

5.4.5 Vehicle movements generated by transportation of materials to and from the Facility during the operational phase were assessed in the context of the site and surrounding road network and residual effects were considered to be **minor adverse** and therefore not significant.

5.4.6 An assessment on the noise associated with vessel movements during the operational phase are predicted to be **minor adverse** at worst.

5.4.7 Overall effects associated with noise and vibration impacts are considered not significant.

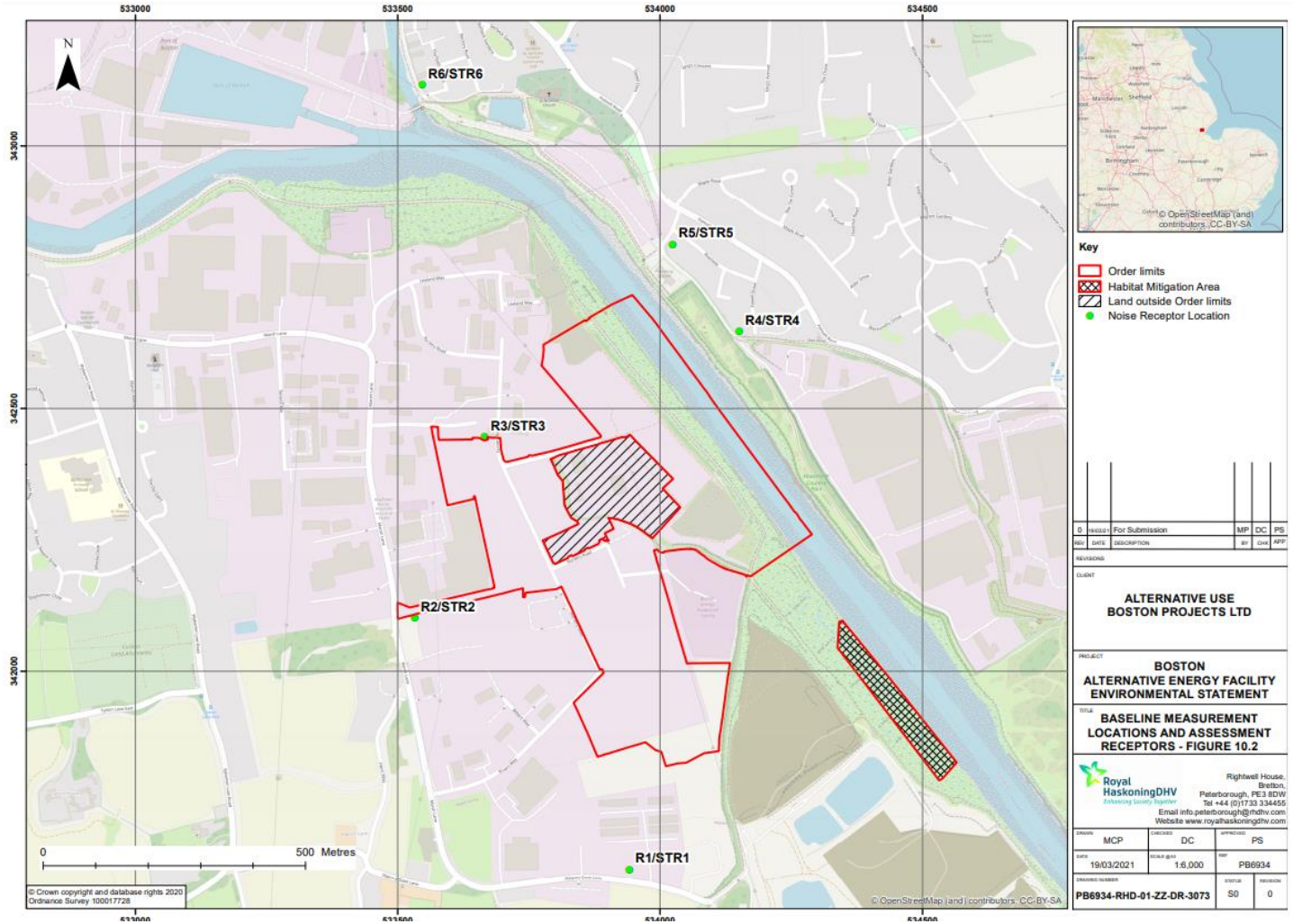


**Plate 8 Baseline Noise Measurement Locations and Assessment Receptors**

## 5.5 Contaminated Land, Land Use and Hydrogeology

5.5.1 This section considers the environmental impacts associated with the Facility interacting with potentially contaminated land and also considers the direct impacts on land use, including the degradation and loss of soil resources. It should be noted that due to its location and influence by water within The Haven the Habitat Mitigation Area is considered within the assessments for Marine Water and Sediment Quality and Estuarine Processes.

5.5.2 Desk based research was used to establish the baseline and identify potential receptors (specifically land use, controlled waters and human health) within the Application Site. **Plate 9** shows current land use within parts of the Principal Application Site.

5.5.3 An assessment of the impact on human health, including construction workers and the general public, during any excavation and construction related activities concludes there would be a **moderate adverse** effect. Mitigation taking the form of further investigation prior to construction to confirm absence of contamination can reduce this risk to **minor adverse**.

5.5.4 The following **minor adverse** effects were also identified for the construction phase of the Facility:

- Impact on groundwater quality from construction related activities;
- Impact on groundwater quantity from construction related activities;
- Impact on surface water quality from general earthworks and construction related activities;
- Impacts to soil quality; and
- Loss of Best Most Versatile (BMV) agricultural land. This is land of particular agricultural value.

**Plate 9 Agricultural Land and Proposed Wharf Site. Photographs Taken 8th August 2020 (Left) and 9th October 2018 (Right).**

5.5.5 The effects to human health and groundwaters during operational and maintenance activities as a result of residual contamination or as a result of new sources of contamination being introduced have been assessed as being **negligible** to **minor adverse**.

## 5.6 Terrestrial Ecology

5.6.1 The terrestrial ecology baseline considers the variety of plants and animals that live mostly or completely on land and was informed by on-site surveys, a desktop study and consultation with stakeholders. Due to its significant estuarine influence the ecology of the Habitat Mitigation Area is covered in **Section 5.11 Marine and Coastal Ecology.**

5.6.2 The survey area is denoted by the Order limits and features of interest are referenced as 'Target Notes' (TN) shown on **Plate 10**.

5.6.3 There are three Local Wildlife Sites within 2 km of the Application Site, the closest being Havenside Local Nature Reserve 0.01 km east (on the opposite bank of The Haven). Legally protected and notable species recorded within 2 km of the Application Site include badgers, water voles, bats, birds and terrestrial invertebrates. Surveys also recorded suitable habitat for reptiles.

5.6.4 **Minor adverse** effects are predicted for the following receptors during the construction phase:

- Havenside Local Nature Reserve (acid/nitrogen deposition);
- Havenside Local Wildlife Site, South Forty Drain Local Wildlife Site and Slippery Gowt Sea Bank Local Wildlife Site (acid/nitrogen deposition);
- Loss of Habitats (all types);
- Foraging and commuting bats (due to changes in habitat);
- Reptiles (that may be encountered during construction);
- Birds (loss of habitat and in turn loss of nesting opportunities); and
- Terrestrial invertebrates (due to changes in habitat).

5.6.5 During the operational phase the disturbance effects associated with maintenance activities, operational lighting and noise is assessed as **minor adverse.**

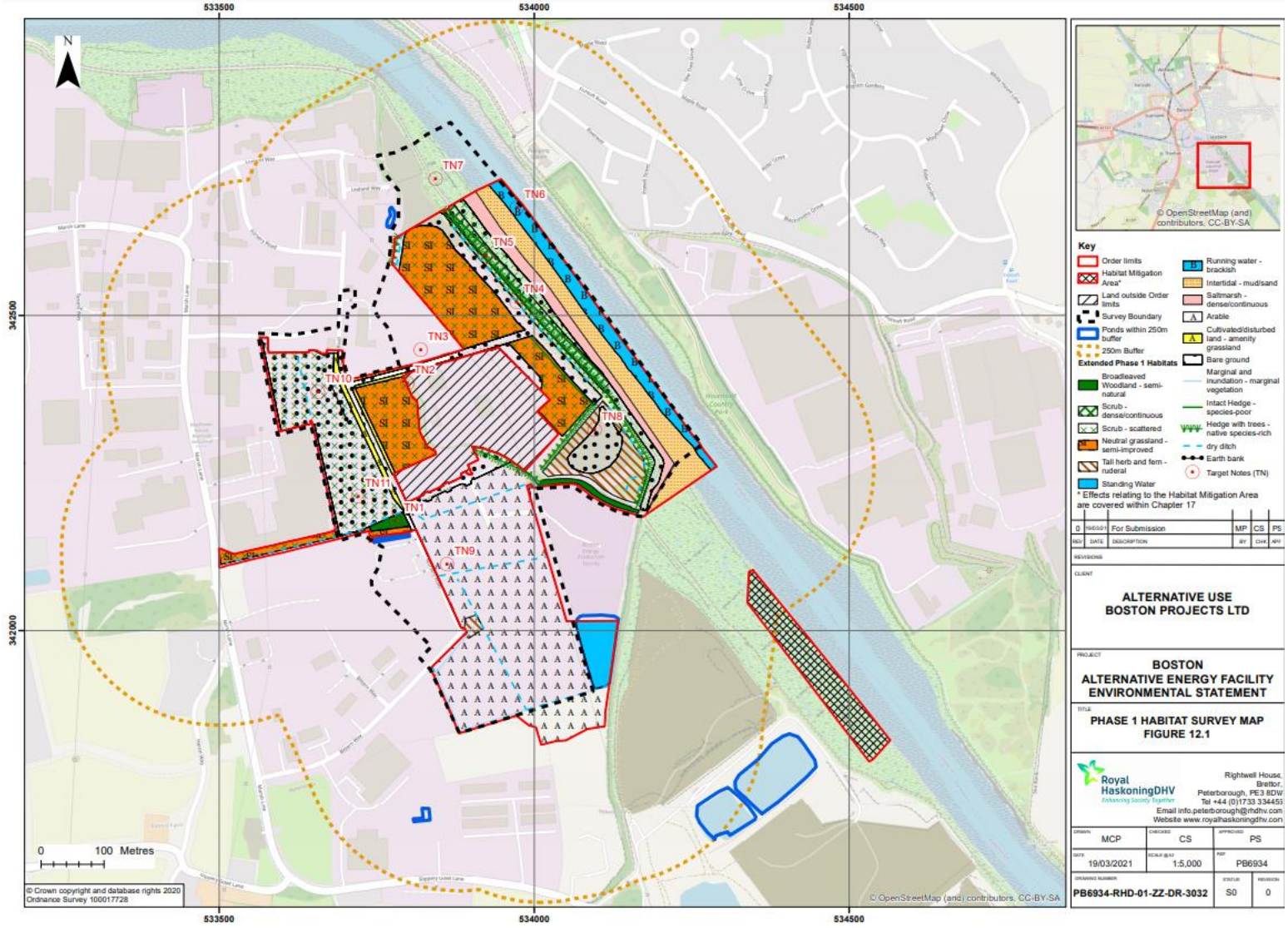


**Plate 10 Habitat Survey Map**

## 5.7 Surface Water, Flood Risk and Drainage Strategy

5.7.1 The study area for surface water resources and flood risk considers the Principal Application Site i.e. excluding the Habitat Mitigation Area. This area is on the tidal side of the primary flood defence and therefore is not considered further in this section, which is focussed on fresh waters. Effects on the water environment relating to the Habitat Mitigation Area are covered within **Section 5.9 Marine Water and Sediment Quality** and **Section 5.10 Estuarine Processes.**

5.7.2 The Facility is in the lower catchment of the River Witham and is drained by a number of watercourses that are maintained by the Black Sluice Internal Drainage Board. The watercourses have been extensively modified or are largely artificial, and the drainage catchment discharges into The Haven through a pumping station. Water quality in the catchment is currently adversely affected by pressures from sewage discharges, agricultural and rural land management, and industrial discharges. Although the Principal Application Site is at risk from tidal flooding (see **Plate 11**, which shows an example of the tidal range of The Haven), flood defences currently provide protection against a 1 in 150-year event. Flood risk from rivers, surface water, groundwater and sewer flooding is low.

**Plate 11 The Haven Facing South (with the Boston Biomass UK No.3 Ltd Gasification Plant on the Right). Photographs Taken 16th August 2018.**

5.7.3 The potential impacts of the construction and operation of the Facility on water resources and flood risk receptors were considered. A Flood Risk Assessment (FRA) was carried out alongside an assessment in accordance with the Water Framework Directive (WFD). The latter was carried out to identify whether the Facility has the potential to cause deterioration in the status for some quality elements associated with the following WFD 'water bodies':

- Witham (GB530503000100) – Transitional Water Body
- Wash Inner (GB530503311300) – Transitional Water Body

5.7.4 WFD classification data indicate that water quality in the surface drainage network is below the required standards. Surface waters are affected by pressures from sewage discharges, agricultural and rural land management and industrial discharges.

5.7.5 The Principal Application Site is located in Flood Zone 3; however, the Environment Agency has confirmed this reflects tidal flood risk rather than fluvial flood risk. A Flood Risk and Emergency Plan will be implemented prior to construction, which will include procedures to receive flood warnings and closure or evacuation of the Principal Application Site and identification of emergency refuge areas

5.7.6 The following key potential impacts were identified for the construction stage:

- Direct impacts on drainage systems.
- Increased sediment supply.
- Accidental release of contaminants.
- Changes to surface water runoff and flood risk.

5.7.7 A Code of Construction Practice (CoCP) will be developed to mitigate the construction activities. Specific measures to control sediment supply that will be captured within the CoCP include:

- On-site retention of sediment will be maximised by routing all drainage through the site drainage system.
- The drainage system will include silt fences at the foot of soil storage areas to intercept sediment runoff at source.
- Changes in surface water runoff as a result of the increase in impermeable area from the development will be attenuated and discharged at a controlled

rate, in consultation with the Lead Local Flood Authority (LLFA), Black Sluice IDB and Environment Agency.

- Release of pollution will be prevented by adhering to construction industry good practice guidance as detailed in the Environment Agency's Pollution Prevention Guidance (PPG) notes
- The controlled runoff rate will be equivalent to the greenfield runoff rate.
- A Surface Water and Drainage Plan (SWDP) will be developed prior to construction and implemented to minimise water within the construction areas and ensure ongoing drainage of surrounding land.

5.7.8 In addition, the following impacts are described for the operation stage:

- Changes to surface water runoff and flood risk.
- Supply of fine sediment and other contaminants.

5.7.9 These will be managed by the conditions of the environmental permit that will be required to operate the Facility.

5.7.10 Following the consideration of mitigation measures to manage sediment, pollution and drainage, these potential effects have been determined as **not significant** during construction and operation.

5.7.11 The Facility is also compliant with the Water Framework Directive requirements; and would not result in increased flood risk on or off the Principal Application Site.

## 5.8 Air Quality

5.8.1 Existing air quality / pollution levels were established via reviewing desk-based assessment air quality monitoring data collected by Boston Borough Council, as well as information provided by the Department of Environment, Food and Rural Affairs.

5.8.2 During the construction of the Facility impacts associated with dust, plant, vehicle and vessel exhaust emissions may occur. Likely significant effects of dust and plant emissions during construction have been assessed using UK best practice. Appropriate site mitigation measures such as damping down, appropriate storage of materials and use of wheel washing systems will be used to minimise dust and pollutant emissions from on-site construction activities, and the impacts are not predicted to be significant. Effects of construction phase odour emissions from the capital dredging works have also been assessed in line with industry guidance

and found to be not significant.

5.8.3 Air quality modelling has been undertaken to predict effects on human and ecological receptors as a result of emissions from construction-generated traffic and vessel movements. The assessment considered receptors within the more sensitive locations in Boston which are statutory Air Quality Management Areas. These effects were also found to be not significant at human and ecological receptors identified in **Plate 12** below.

5.8.4 Emissions from the Facility's stacks, water vessel activities and road traffic exhausts during the operational phase were assessed, together with emissions from the adjacent Biomass UK No. 3 Ltd facility.

5.8.5 Dispersion modelling has been undertaken to predict pollutant concentrations at sensitive human and ecological receptors in the vicinity of the Application Site. Effects at human and ecological receptors were assessed to be not significant overall.

5.8.6 An assessment of odour impacts as a result of refuse derived fuel processing has been undertaken and, because of the control measures built into the design and proposed operation of the Facility, the potential for impacts was considered to be low and any effects would be insignificant.

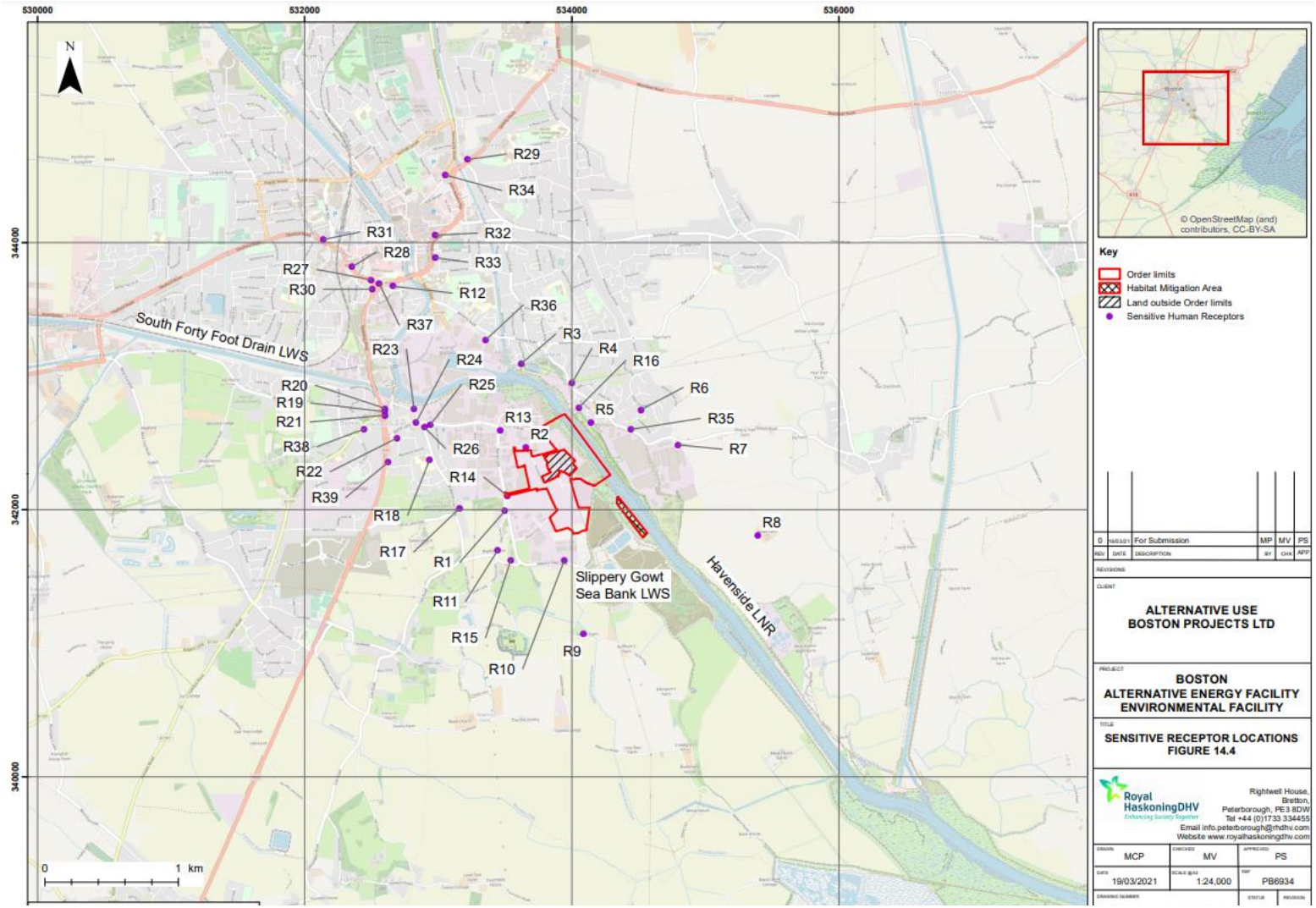


**Plate 12 Sensitive Air Quality Receptor Locations**

## 5.9 Marine Water and Sediment Quality

5.9.1 A desk-based assessment was carried out using data from the last three years to inform the marine sediment and water quality baseline. Whilst data is not available from the dredging footprint, nearby suitable data were used to consider whether there are risks to water quality if sediments are suspended. The assessment focused on the construction phase and dredging as this is the activity most likely to give rise to have an effect, with the capital dredge for the proposed wharf considered the worst case for assessment purposes

5.9.2 The assessment indicates that whilst there could be temporary increases in sediment in the water column during dredging, concentrations are likely to remain within existing natural variations. In terms of chemical contamination, whilst it was anticipated that low levels of contamination are likely to be present, the low concentrations of sediment release reduce the risk of chemical contamination in the water column.

5.9.3 Overall, the assessment concluded that all effects are predicted be **minor adverse** on water and sediment quality for both the construction and operational phase.

## 5.10 Estuarine Processes

5.10.1 Any impacts on estuarine processes such as changes to tidal currents, waves and suspended sediment transport caused by the Facility could lead to changes in patterns of erosion and deposition along The Haven and potentially into the Wash. The estuarine processes baseline was informed by on-site surveys (see **Plate 13** which show erosion patterns and tidal ranges and mudflats affected by sediment change), desk-based studies, and consultation with stakeholders.

5.10.2 The assessment focused on the potential impacts to two receptors which contain valuable designated features. These are The Wash Protected Marine Site and the Havenside Local Nature Reserve.

**Plate 13 Intertidal Mudflats and Subtidal Channel at the Facility. Photographs Taken 8th October 2018 from the South West Bank (Top) and North East Bank (Bottom).**

5.10.3 In all cases for construction and operation, the effect of the reasonable worst case scenario for the Facility on estuarine processes on the identified receptor groups is either **no** or **negligible effect**.

## 5.11 Marine and Coastal Ecology

5.11.1 This section considers impacts the Facility could have on habitats and plants and animals that live mostly or completely in marine or coastal environments.

5.11.2 The marine and coastal ecology baseline was informed by on-site surveys, desktop study and consultation with stakeholders (such as the Royal Society for the Protection of Birds, Natural England, Lincolnshire Wildlife Trust and the Environment Agency). There are five protected sites within the area covered by the assessment, which included The Haven immediately adjacent to the Facility and extended into The Wash, with sensitive receptors including fish, benthic communities, birds, marine mammals, saltmarsh and mudflats.

5.11.3 The main potential impacts arising from the construction period are habitat loss/alteration, increased suspended sediment concentrations and increased

noise and vibration caused by piling and ship movements. To mitigate these impacts: habitat enhancement would be undertaken within a Habitat Mitigation Area; the majority of the sediment would be excavated from land with the remainder by vessel using mechanical dredging methods; dredging would be undertaken to avoid sensitive migratory periods for juvenile fish (March to June); and piling would be undertaken during non-sensitive periods for overwintering birds (May-September) using soft-start techniques. Effects during construction of the Facility have been predicted to be **negligible** to **minor adverse** following the implementation of a mitigation.

**Plate 14 Saltmarshes Adjacent to The Haven and the Site of the Proposed Facility.**

5.11.4 For the operational phase, the key potential impacts are changes in vessel traffic and movement leading to increased ship wash, underwater noise, disturbance and collision risk with marine mammals. The potential impact of an increase in operational air emissions on habitats was also considered. Mitigation measures are proposed to minimise dredging works during operation according to best practice; monitoring of the seabed and habitat level through regular bathymetric and habitat surveys; implementing best practice measures to minimise any vessel disturbance (such as an observer on board each vessel, looking out for marine mammals) and slow speed (max. 4 knots) to be kept for all vessels. Off-site works secured through agreement with environmental stakeholders to achieve biodiversity net gain (an approach to development that leaves biodiversity in a better state than before) would also provide benefit to the birds in the wider area

and this would be secured as a requirement in the DCO (document reference 2.1) by a Landscape and Ecological Mitigation Strategy (LEMS). An outline LEMS is provided with the application (document reference 7.4). Effects during the operation of the Facility have also been assessed as **negligible** to **minor adverse** following mitigation.

## 5.12 Navigational Issues

5.12.1 This study considers the navigation impacts to existing users of The Haven as a result of the construction of the new wharf and the vessels that will visit the Facility. Vessels are shown in **Plate 15** (fishing vessels) and **Plate 16** (commercial vessel, which at approximately 100m length is of similar size to the vessels proposed to be used for the operational Facility). The baseline was informed through desk-based studies and consultation with stakeholders. Four navigational receptors were identified which regularly use The Haven: commercial vessels visiting the Port of Boston; the Port of Boston and its Pilots; the fishermen; and other recreational users.

**Plate 15 Fishing Boats Navigating The Haven. The Biomass UK No.3 Ltd Gasification Plant is shown in the background.**

5.12.2 Potential impacts to navigational safety arising from the construction of the Facility were identified to include the installation of the wharf, capital dredging, installation of scour protection, the presence of lighting and the importation of construction materials by barge. The establishment of a Navigation Management Plan (NMP),

and implementation of Notice to Mariners (NtM), would ensure all mariners were aware of any safety impacts. The use of construction lighting would be designed carefully to reduce any light pollution up or down The Haven. Mitigation measures, included those explained above, were determined to reduce significance of effects to **minor** or **negligible**.

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

5.12.4 Effective use of communication methods, including the NMP, NtM and the installation of message boards on The Haven advising of vessel movements was determined to mitigate the presence of the wharf and potential maintenance dredging requirements. As with construction lighting, operational lighting will be designed to reduce light spill up or down The Haven to avoid reducing visibility and impacting navigational safety. To mitigate any potential impact from the release of material into The Haven, a catch-screen or net will be provided under the movement of the crane-arm to catch any dropped RDF bale, or material that could potentially fall from a damaged bale. These mitigation measures reduce a potential effects arising from these activities to **minor** to **negligible** significance.

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


**Plate 16 Commercial Vessel Navigating The Haven. *Photograph Taken 8th February 2018*.**

## 5.13 Traffic and Transport

5.13.1 A different approach by routing the supply of waste fuel via ship compared to traditional road movements means that there is a significantly reduced impact on transport routes. However, during construction and operation, there will be road movements to and from the Facility.

5.13.2 This section considers transport effects including those associated with pedestrian severance, pedestrian amenity, road safety and driver delay. The baseline for the traffic and transport assessment was informed by site visits and on-site surveys, desktop studies and consultation with stakeholders.

5.13.3 The Facility's traffic demand has been calculated using material and personnel information supplied by industry expertise. During construction, a peak worst-case traffic demand scenario and average worst case scenario has been established and assigned to the highway network.

5.13.4 Where appropriate, mitigation has been proposed to reduce the significance of effects (most notably it is proposed to divert traffic away from the A52 Liquorpond Street during peak construction). Mitigation measures will be secured through

commitments contained in a Construction Traffic Management Plan (CTMP). An outline CTMP is submitted with the application.

5.13.5 For the construction phase of the Facility, the assessment concludes predicted residual effects of:

- **negligible** to **minor** adverse to pedestrian severance and pedestrian amenity; and
- **minor** adverse for effects of road safety and driver delay.

5.13.6 Commitments are contained within the CTMP to reduce the impacts on driver delay associated with single occupancy vehicle travel with measures designed to increase more sustainable forms of travel.

5.13.7 The operational traffic demand was also determined and assessed with input from industry expertise. The operational phase assessment concludes a predicted residual impact of **negligible** to **minor** adverse for the effects of pedestrian severance, pedestrian amenity, road safety and driver delay.

5.13.8 Impacts during decommissioning are assumed to be no worse to those predicted for the construction phase.

5.13.9 The projects that could cumulatively impact with the Facility through spatial or temporal overlaps have been identified and assessed. Two cumulative projects: the Battery Energy Storage Plant and the Viking Link Interconnector UK Onshore Scheme, were assessed in further detail. A commitment for the Facility to liaise with the cumulative projects would be provided within the CTMP after consent to reduce the impacts of peak construction Heavy Goods Vehicle (HGV) movements that could potentially occur between cumulative projects.

## 5.14 Socio-Economics

5.14.1 The socio-economic assessment considers a large number of factors including employment, housing market, community infrastructure (including primary and secondary education and health) and tourism during both the construction and operational phases of the Facility. It also considers potential impacts on energy security/reliability due to the operational Facility. The sources of information to describe the baseline were extensive, with the assessment drawing on a desk-based study of publicly available data.

5.14.2 The assessment has considered the potential for impact and finds that the majority of effects will be of **negligible significance**. An overview of the effects of the Facility (with and without mitigation) during construction, operation and decommissioning identified that:

- Beneficial employment effects are expected to be observed during construction, operation and decommissioning;
- Beneficial effects with respect to energy security/reliability are anticipated during operation;
- A temporary, short term and minor adverse effect is anticipated in relation to secondary education during construction, but it is considered that this would be effectively mitigated throughout the course of the operational phase through the commitment identified in the South East Lincolnshire Local Plan Infrastructure Delivery Plan to deliver a new secondary school within Boston (to be provided by others and not associated with the Facility); and
- All other effects are anticipated to be negligible in scale.

## 5.15 Climate Change

5.15.1 The EIA considers the contribution of the Facility to regional and national greenhouse gas emissions, and its resilience to the projected effects of climate change. The baseline for the assessment includes consideration of greenhouse gas emissions with the Boston area along with the current climate in the region.

5.15.2 The results of the assessment show that net greenhouse gas emissions, accounting for the offset savings elsewhere in the UK energy generation sector, will not result in a significant effect on the UK's ability to meet its 2050 carbon reduction targets.

5.15.3 The climate resilience assessment identified that the climate change parameters most likely to affect the Facility were increased temperature, drought conditions, and surface and tidal flooding. The key components of the Facility were not considered to be vulnerable to increased temperatures or drought conditions. Due to the ongoing improvements to the flood defences near the site though the Boston Combined Strategy, which accounts for climate change, the Facility is not considered vulnerable to flood risk.

## 5.16 Health Impact Assessment

5.16.1 The Health Impact Assessment (HIA) assesses the activities which may have an impact on human health and wellbeing during the construction and operation of the Facility.

5.16.2 The existing health baseline has been informed by census statistics and Public Health England data. The health effects that were considered during the construction and operation of the Facility were outdoor amenity (i.e. physical activity and access to biodiversity), journey times/reduced access/safety, air quality, noise, ground and water contamination, flood risk and employment.

5.16.3 The HIA includes outcomes of assessments that have been considered in the following technical chapters of the ES: Chapter 10 Noise and Vibration; Chapter 11 Contaminated Land, Land Use and Hydrogeology; Chapter 12 Terrestrial Ecology; Chapter 13 Surface Water, Flood Risk and Drainage Strategy; Chapter 14 Air Quality; Chapter 17 Marine and Coastal Ecology; Chapter 19 Traffic and Transport; Chapter 20 Socio-Economics; and Chapter 21 Climate Change.

5.16.4 The HIA brings together the conclusions of these assessments (i.e. residual effects) and the relevant information in terms of population health (i.e. statistics on relevant population groups, Public Health Outcomes Framework, health asset profiles, etc.), thereby assisting in identifying any potential factors associated with the Facility which may affect health.

5.16.5 With the implementation of the mitigation measures identified within the separate technical chapters (e.g. best practice measures to minimise construction noise and dust (also detailed in the Outline Code of Construction Practice, traffic mitigation measures (also detailed in the Outline Construction Traffic Management Plan (OCTMP)), etc.); and also the stringent measures that the Facility will be required to comply with as conditions to the Environmental Permit for the operation of the Facility and demonstration that the Facility will have to use Best Available Techniques to comply with emission standards, **no significant impacts** were predicted throughout the construction or operational phase of the Facility on health.

## 5.17 Waste

5.17.1 The waste assessment considers waste generation during the construction and operation of the Facility in accordance with the Waste Hierarchy (**Plate 17**), and the capability of the existing local or regional waste management facilities to

manage the waste.

5.17.2 The baseline data on existing waste management infrastructure shows that there are numerous waste management facilities providing a wide variety of waste management options at a regional scale, including provision for hazardous waste landfill, however, options are limited at a local level.

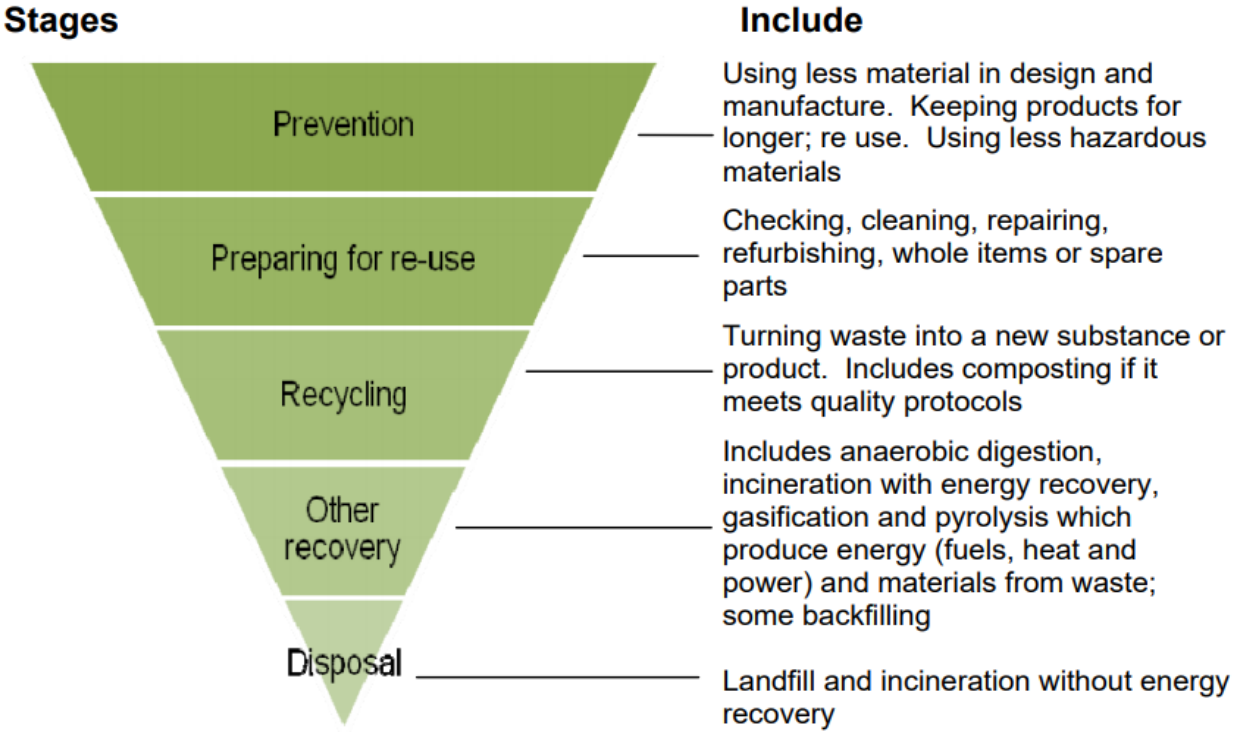


**Plate 17 The Waste Hierarchy (Defra, 2011).**

5.17.3 Waste management measures will be implemented as mitigation to eliminate or reduce the anticipated quantity of waste sent to landfill by implementing the Waste Hierarchy. These measures would increase reuse; recycling or recovery opportunities.

5.17.4 **No significant** effects associated with waste management are predicted for the construction or operation of the Facility.

5.17.5 A Site Waste Management Plan (SWMP) will be prepared prior to construction to record any decisions given to materials resource efficiency when designing and planning the works. Any assumptions on the nature of the project; its design; the construction method or materials employed, to minimise the quantity of waste produced on-site; or maximise the amount of waste reused, recycled or recovered, will be captured within the SWMP.

5.17.6 The operation of the Facility will be governed by the Conditions associated with an Environmental Permit issued by the Environment Agency. This will set specific standard associated with the management of wastes produced on-site (amongst other things) to ensure the wastes are handled in accordance with Best Available Techniques.

## 5.18 Major Accidents and Risk Management

5.18.1 An assessment of the risk of major accidents for the Facility was carried out.

5.18.2 The potential major accidents and risks that were identified include:

- Geophysical – landslide / instability;
- Tidal flooding and storm surges;
- Climatological – extreme temperatures (fire risk);
- Widespread electricity failure;
- Infrastructure failure; and
- Transport accidents (vessel to vessel collision and ship grounding).

5.18.3 Embedded mitigation measures will reduce these impacts, which include flood defence and resilient design, land based dredging methodologies and general environmental best practice. In addition, the Code of Construction Practice will provide a mechanism by which the potential major accidents and risks during the construction phase of the Facility will be formally controlled and mitigated. These issues are also generally covered in other topic assessments, for example Contaminated Land, Land Use and Hydrogeology; Surface Water; Flood Risk and Drainage Strategy; Estuarine Processes, Navigational Issues and Climate Change.

5.18.4 An Environmental Permit will be required for the Facility. The Environmental Permit application will include an Accident Prevention and Management Plan and Contingency Plans to minimise and prevent impacts. A Fire Prevention Plan will also be included alongside the Environmental Permit. The Environmental Permit application will run in parallel with the determination of the Development Consent Order application.

## 5.19 Transboundary Impacts

5.19.1 Transboundary impacts look at how a project might have an impact across borders. As the Facility is located within the UK and is far removed from any

international boundaries it is not anticipated that there will be any transboundary impacts.

### 5.20 Decommissioning

5.20.1 The Facility is anticipated to have an operational lifetime of 25 years, which is a typical assumption for such facilities. A decision would be made at the appropriate time as to whether it would be 're-powered' after 25 years based upon an investment decision considering the market conditions and technical requirements prevailing at that time. If the operating life were to be extended the Facility would be upgraded and re-permitted in line with the legislative requirements at that time.

5.20.2 At the end of its working life, the Facility would be decommissioned and removed, and the site reinstated to an agreed condition. Decommissioning impacts are anticipated to be broadly similar to those experienced during construction phase, with no anticipated significant adverse effects.

5.20.3 The wharf structure would replace a section of the current primary flood defence bank (without impacting on the integrity of the bank) and would form a permanent structure that is not anticipated to be decommissioned. Similarly, the Habitat Mitigation Works would remain as these relate to the provision of the wharf.

## 6 Conclusions

6.1.1 The ES details the findings of the EIA that has been undertaken for the Facility based on the baseline information gathered and design details.

6.1.2 Following assessment of a comprehensive range of environmental topics as agreed through the EIA Scoping and consultation, the following potential significant residual effects (i.e. effects after implementation of mitigation, where measures are identified) have been found:

- visual effects at specific viewpoints during construction and operation; and
- an effect during operation of the Facility on fishermen due to an increased in the number of vessels using The Haven and the use of the vessel turning circle.

6.1.3 In addition to the EIA, a Habitats Regulations Assessment (HRA) has been undertaken. This assessment has considered impacts arising from the construction and operation phases of the Facility on The Wash Special Protection

Area (SPA) and Ramsar site and The Wash and North Norfolk Coast Special Area of Conservation (SPA) together with functionally connected habitats within The Haven. No Adverse Effects on the Integrity on any of these sites is predicted.

6.1.4 A number of environmental impact avoidance, design and mitigation measures have been identified to mitigate and control environmental effects during construction and operation of the Facility. Where these are not embedded in the design of the Facility, they will be secured through a number of requirements contained within the draft DCO (document reference 2.1) or through other regulatory regimes such as environmental permitting.