



Immingham Green Energy Terminal

TR030008

Volume 6

6.1 Environmental Statement: Non-Technical Summary

Planning Act 2008

Regulation 5(2)(q)

Infrastructure Planning (Applications: Prescribed
Forms and Procedure) Regulations 2009

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1. INTRODUCTION

1.1 Who we are

- 1.1.1 We are Associated British Ports, the owner and operator of the Port of Immingham, located on the southern bank of the Humber Estuary. We also own and operate the ports of Hull, Grimsby and Goole on the Humber.
- 1.1.2 The Port of Immingham is the largest and busiest of our four Humber ports.
- 1.1.3 We are bringing forward proposals to construct, operate and maintain the Immingham Green Energy Terminal – a nationally significant infrastructure project comprising a new multi-user liquid bulk green energy terminal within the Port of Immingham.
- 1.1.4 Air Products, the world's largest hydrogen supplier, will be our first customer to use the new facility and are also building a hydrogen production facility as part of our proposals under this application.

2. BACKGROUND

2.1 Development Consent Order

- 2.1.1 The Immingham Green Energy Terminal constitutes a Nationally Significant Infrastructure Project under the Planning Act 2008, which means that permission is required to build and operate our proposed facility. This permission is called a Development Consent Order (DCO).
- 2.1.2 We have submitted an application to the Planning Inspectorate seeking consent for the development. The Planning Inspectorate will be responsible for examining our application and reporting its findings to the Secretary of State for Transport, providing them with a recommendation on whether consent should be granted.

2.2 Environmental Impact Assessment

- 2.2.1 Due to the nature and scale of the development, we have carried out an Environmental Impact Assessment. This is a process undertaken to ensure that decisions on planned developments are made with full knowledge of their likely significant effects on the environment.
- 2.2.2 The findings of this process have been reported in a document called an Environmental Statement which forms part of our application. The Environmental Statement describes: our proposals and the reasonable alternatives considered in the development of their design; the environmental setting; the likely significant effects of our development on local communities and the environment; and the mitigation measures identified to avoid, prevent, reduce or offset these effects.

2.3 Non-Technical Summary

- 2.3.1 This document comprises the Non-Technical Summary of the Environmental Statement, the purpose of which is to present the key issues and findings of the Environmental Impact Assessment process in a non-technical and easily accessible standalone document.
- 2.3.2 The Non-Technical Summary enables anyone with an interest in the development to understand how our proposals could affect them and the environment in which they live.
- 2.3.3 Schedule 4, paragraph 9 of the Infrastructure Planning (EIA) Regulations 2017 states that 'A non-technical summary of the information provided under paragraphs 1 to 8' must be included in the Environmental Statement. Paragraphs 1 to 8 comprise the list of information for inclusion within the Environmental Statement therefore, through complying with this requirement, this document represents a comprehensive non-technical summary of all the key elements contained within the Environmental Statement.

3. THE DEVELOPMENT

3.1 Location

- 3.1.1 The site of our proposed development is located on the eastern side of the Port of Immingham, situated in north east Lincolnshire on the south bank of the Humber Estuary.
- 3.1.2 The site covers an area of approximately 121 hectares, of which approximately 13 hectares would be used temporarily for construction.
- 3.1.3 The layout of the development site is shown on **Figure 1**.

3.2 Need for the Development

- 3.2.1 The National Policy Statement for Ports states that there is a “compelling need for substantial additional port capacity” over the next 20–30 years (i.e. to 2032 - 2042), to be met by a combination of consented and new development (paragraph 3.4.16). The need for the specific infrastructure including our Project aligns with the following factors:
 - A. The national need to provide port capacity** - there is a national demand for additional port capacity. This capacity is crucial for serving various purposes, including supporting the energy sector in the Humber region, ensuring energy security through diverse technologies, hydrogen production, and implementing carbon capture and storage (CCS) technologies.
 - B. The need for port capacity to serve the energy sector in the Humber** - there is an imperative need for port infrastructure to support the energy sector, especially for importing and exporting hydrogen and CO2. This is required to help meet the legally binding net-zero target by 2050 and to aid the decarbonization efforts in the Humber region.
 - C. The need to achieve energy security through a diversity of technologies** - to ensure energy security, there’s an urgent need to diversify energy technologies, fuels, and supply routes. This includes developing low-carbon hydrogen production capabilities, which are crucial for achieving clean energy goals.
 - D. The urgent need to scale up hydrogen production capability** - there is a pressing national need to significantly increase low-carbon hydrogen production. This includes “green hydrogen” from renewable sources and “blue hydrogen” with reduced emissions through carbon capture storage.
 - E. The urgent need for carbon capture and storage technologies** - the UK needs CCS technologies to capture and store carbon dioxide from various sources, including power generation, hydrogen production, and industrial processes.
- 3.2.2 Various government policies, such as the National Policy Statement for Ports, the UK Hydrogen Strategy, and the Energy Security Strategy, emphasize the importance of infrastructure development to support clean energy and decarbonization goals.

- 3.2.3 The factors outline above, outline the compelling national and regional needs that are supported by bringing our development forward for port infrastructure to support energy production, diversification of energy sources, scale up hydrogen production and carbon capture storage technologies, all in line with the goal of achieving a net-zero economy by 2050.

3.3 Development Objectives

- 3.3.1 Our objectives for the development are:
 - A. To provide essential port infrastructure, capacity and resilience to support the growth and changing strategic needs of the energy sector to support decarbonisation within the Humber Industrial Cluster and the Humber Enterprise Zone.
 - B. To provide capacity to support the import and export of a range of liquid bulk energy products including (i) ammonia (NH3) (to produce green hydrogen) to help the decarbonisation of industrial activities and in particular the heavy transport sector and (ii) carbon dioxide (CO2), to facilitate carbon capture and storage, both of which will assist the UK’s transition towards net zero.
 - C. To deliver and operate new port infrastructure in a safe, efficient and sustainable manner by making effective use of available land, water, transport and utility connections which exist in and around the Port of Immingham.
 - D. To minimise adverse impacts on the environment and safeguard the health, safety and amenity of the surrounding community.
 - E. To enhance both the local and regional economy through direct investment in and around the Port of Immingham and by partnering with the supply chain, provide opportunities for training, upskilling, apprenticeships and local employment.

3.4 Description of the Development

Development Infrastructure

- 3.4.1 Our development comprises both marine and landside infrastructure.
- 3.4.2 The landside works will be located on land under the administration of North East Lincolnshire Council. The marine works extend seaward outside the Council’s boundary and will take place in the bed of the Humber Estuary, which is owned by the Crown Estate.
- 3.4.3 The marine works comprise:
 - A. A jetty, consisting of an approach trestle, approximately 1.2 kilometre in length, leading to a single berth including a loading platform, topside infrastructure, berthing and mooring dolphins with link walkways, and related landside infrastructure including jetty access ramps.
 - B. Topside infrastructure on the jetty for the handling of liquid bulks, including loading arms and pipelines.

- 3.4.4 The landside works comprise:
- A. An access road to the jetty from Laporte Road.
 - B. Two operational sites supporting hydrogen production facilities (referred to as the East Site and West Site).
 - C. Pipe and cables between the jetty and the East Site, between the East and West sites and between process equipment and buildings on both sites.
 - D. A large ammonia storage tank (on the East Site).
 - E. Hydrogen production units that convert ammonia to produce green hydrogen (on both East and West Sites).
 - F. Hydrogen liquefiers units (on West Sites) to liquify the hydrogen for temporary storage (on the West Site).
 - G. Loading bays (on the West Site) to fill road tankers with liquified hydrogen which would then be distributed to hydrogen filling stations located throughout the UK .
 - H. A hydrogen refuelling station and bulk hydrogen trailer filling station (on the West Site)
 - I. Ancillary buildings and works.
 - J. Process packages to provide utilities such as nitrogen, steam and cooling water.
 - K. Access from the public highway to the two hydrogen production sites.
 - L. Temporary construction areas.
 - M. Various works (connections or diversions) to utilities including on highways land.

3.4.5 The works listed above are proposed to take place within spatially defined areas known as works numbers, of which there are 10 in total. Some of the work number areas are further split down into sub-work areas to differentiate between works taking place within one work number. The works numbers are referenced throughout the DCO application, within the Works Plans [TR030008/APP/4.2], Schedule 1: Authorised Project of the draft DCO [TR030008/APP/2.1] and Chapter 2 of the ES [TR030008/APP/6.2].

Construction

- 3.4.6 The following works within the marine environment will be required during construction of the development:
- A. Dredging and removal of material to form a berthing pocket for vessels.
 - B. Piling and use of a jack-up barge.
 - C. Installation of headstocks and decking works.
 - D. Formation of an approach ramp.
 - E. Formation of an approach jetty and jetty head, supported by berthing and mooring dolphins.
 - F. Installation of cathodic protection to protect steel from corrosion.
 - G. Grouting works.

- 3.4.7 We expect that construction of our development's landside components will involve the following activities:
- A. Vegetation removal, topsoil stripping and excavations.
 - B. Installation and use of temporary contractor cabins and buildings.
 - C. Installation and use of temporary road accesses.
 - D. Installation of drainage, culverts on the land side and utilities.
 - E. Transportation of modules, equipment materials and labour to the construction area.
 - F. Potential use of on-site concrete batching.
 - G. Ground works.
 - H. Piling and foundation construction.
 - I. Installation of structures and pre-assembled modules, equipment, pipe and cables.
 - J. Construction of a large tank.
 - K. Testing and commissioning.

3.4.8 Construction will be carried out in six phases, and over an indicative 11 year period.

3.4.9 Phase 1 of the development is when most construction activities will occur. This phase will run for approximately three years and will involve construction of (i) the terminal which includes the jetty and its related infrastructure, as well as the pipelines and (ii) the hydrogen production facility (comprising the Ammonia Storage tank, two hydrogen production units, a liquefier, liquid hydrogen storage tanks and supporting buildings and facilities). Phase 1 will also involve other works, such as the temporary diversion of a bridleway, and the formation of temporary construction areas, welfare facilities, drainage, utility connections and access roads.

3.4.10 The development would become operational following completion of Phase 1, with the remaining five phases gradually increasing the production of the facility over an indicative eight-year period, in response to growing UK demand for hydrogen. These phases will involve the development of up to a further four hydrogen production units and three more liquefiers. The exact duration of the subsequent phases will depend on market conditions.

Operation

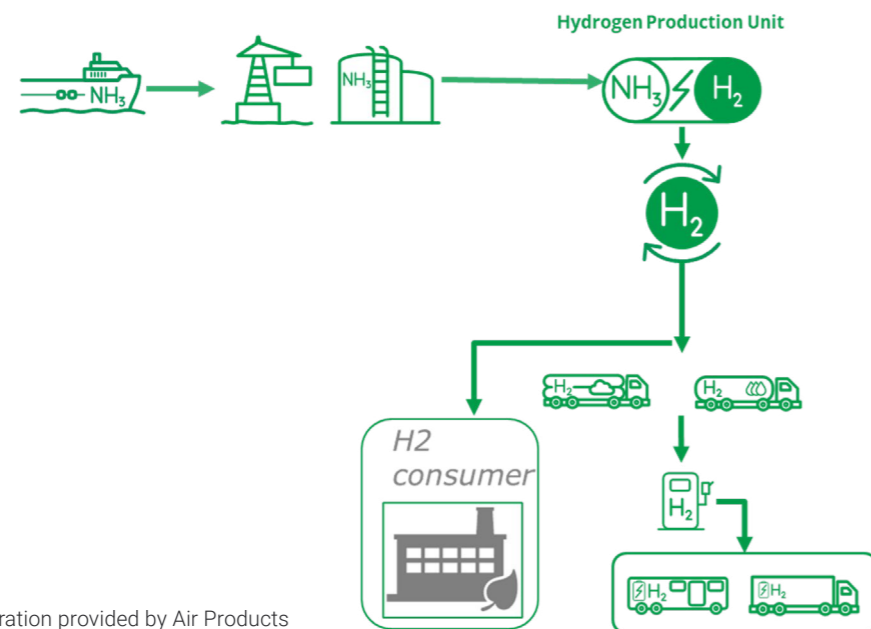
Terminal Operation

- 3.4.11 The operation of the terminal would operate 24 hours a day, seven days a week and 365 days a year. The Terminal would have capacity of approximately 11 million tonnes per annum and be able to accommodate up to 292 ship calls per year, with 12 of these calls being associated with the hydrogen production facility.
- 3.4.12 The ships which make up the remaining 280 calls to the terminal are expected to serve the future carbon capture and storage market and other liquid bulk energy product markets. Operational staff numbers for the Terminal are likely to be up to 14 people with at least some staff working in shifts.

Hydrogen production facility

3.4.13 Specifically in relation to the hydrogen production facility, ammonia will be brought to the terminal via ship. The ammonia will be kept refrigerated at -32°C so that it is a liquid, making it easier to transport. The ammonia will then be pumped from the ship into a very large tank. The liquid ammonia in the tank will be constantly 'boiling'. The vapours produced will be continuously collected, refrigerated back into liquid, and then put back into the tank.

The liquid ammonia will then be pumped into a hydrogen production unit, where heat from a furnace is used to chemically split the ammonia molecules into nitrogen and hydrogen. The hydrogen gas produced will then be purified and transferred via pipe to the hydrogen liquefier unit. In this unit, the hydrogen will be refrigerated into a liquid to make it easier to store and transport. The liquid hydrogen is initially stored in bullet-shaped vessels before being loaded onto road tankers at the loading stations for onward delivery to hydrogen refuelling stations around the country and directly to industry. The Nitrogen (which makes up 98% of the composition of ambient air) would be used across all operational areas to purge pipelines, pipes and vessels. The hydrogen production facility operational process is illustrated in the Figure below.



Process illustration provided by Air Products

- 3.4.14 The terminal and hydrogen production facility will operate 24 hours a day, seven days a week and 365 days a year.
- 3.4.15 The development will operate in accordance with a Hazardous Substances Consent due to hazardous materials needing to be stored on site. The production facility will also be regulated in accordance with the Control of Major Accidents and Hazardous Regulations, and other legislation.
- 3.4.16 The hydrogen production facility would comply with the Environmental Permitting (England and Wales) Regulations 2016 under an Environmental Permit, which we will obtain from the Environment Agency.
- 3.4.17 The hydrogen production facility and the jetty would operate in line with appropriate standards and the operator would implement and maintain an Environmental Management System (EMS) which would be certified to International Standards Organisation (ISO) 14001. There would be a separate EMS for each aspect of the Project and they would outline requirements and procedures required to ensure that the Site operates to an appropriate standard.

Decommissioning

- 3.4.18 The main elements of the terminal / marine side of the development will not be decommissioned. This is because the marine infrastructure will become part of the fabric of the Port and will continue to be maintained and used for port activities. It is however anticipated that plant and equipment on the jetty topside associated with hydrogen production may be decommissioned in parallel with the decommissioning of the related landside elements.
- 3.4.19 The landside elements of the development have a design life of up to 25 years, although this could be extended depending on the integrity of infrastructure and the market conditions at the time. Decommissioning of the landside elements of the Project will likely involve leaving underground infrastructure such as pipelines, piles, foundations, culverts and drainage in place and making them safe. All above ground landside infrastructure will likely be dismantled, and the materials removed will be reused or recycled where possible or disposed of in accordance with the relevant regulations at that time. The land will be restored to a satisfactory state.
- 3.4.20 Decommissioning will be undertaken in accordance with a Decommissioning Environmental Management Plan, which will be prepared prior to decommissioning taking place. An early version of this document, called the Outline Decommissioning Environmental Management Plan has been prepared as part of this application and will be updated before decommissioning or demolition works are undertaken.

Measures to avoid, prevent, reduce or offset significant effects

- 3.4.21 In developing the marine and landside elements, we have sought to avoid and reduce the environmental effects of the development by incorporating features into its design. These include, but are not limited to, the following:
- Reduce the footprint of direct and indirect habitat loss by the reduction to the Site Boundary, the number and layout of the piles and the alignment of the jetty.
 - Minimising the dredge requirements as far as possible to avoid and minimise impacts and effects to marine transport and navigation and the Humber Estuary.
 - Retaining existing vegetation, where possible, and minimising the loss of trees within the Long Strip woodland.
 - Careful layout and designing of plant and infrastructure to help reduce noise and minimise effects on habitats and species and minimise impacts and effects to terrestrial ecology.
 - The delivery of marine elements by ship, rather than by road, to reduce transport-related impacts during construction.
 - Including measures to protect the development from the risk of flooding and the use of sustainable drainage systems.
 - Designing the development in a way that prioritises waste prevention, re-use and recycling of materials to reduce waste disposal.
 - Use of a closed system for ammonia handling, incorporating leak detection technology to minimise risks to health.
- 3.4.22 Further details of mitigation measures considered inherently within design (embedded mitigation) are contained within each environmental statement topic chapter where relevant.

- 3.4.23 Construction works and activities will be undertaken by our contractor in accordance with a Construction Environmental Management Plan. We have developed and included within the DCO application an outline version of this Plan, which details the best practice working methods are adopted to control and minimise environmental effects. Similarly, the future decommissioning of the landside elements of the development will be undertaken in accordance with the measures contained in a Decommissioning Environmental Management Plan, an outline version of which forms part of our DCO application.

3.5 Alternatives

Overview and approach

- 3.5.1 We identified and considered a number of alternative locations, sites, designs, layouts and technologies at key stages during the development of our proposals.
- 3.5.2 We took into account operational efficiency; availability of land and a deep-water port; how close we need to be to markets for the products; transport connections; avoiding and minimising effects on the environment and communities; and planning policy.
- 3.5.3 Options considered during the development of our proposals are summarised below.

Step 1 – Considering broad options

Do nothing option

- 3.5.4 If our proposals were not brought forward, the need for the development and its objectives would not be met, nor would the demand from the energy sector for port infrastructure to help meet the Government's net zero obligations and decarbonise the Humber Estuary be met.
- 3.5.5 This option would also mean our facilities could not produce green hydrogen from ammonia, meaning that a key development to assist the UK in meeting its net zero target by 2050 would not be available. For these reasons, we discounted the do nothing option.

Location of the terminal in the UK

- 3.5.6 We identified in the early stages of developing our proposals that the Humber is one of the UK's main industrial clusters which emits more carbon dioxide than any other region in the UK, meaning there is a need for decarbonisation. The need for additional port capacity to serve the energy sector at this location was also acknowledged.
- 3.5.7 The Humber was identified as being ideally located to help deliver carbon capture and storage projects, given that the Humber is already a focal point for net zero initiatives and opportunities. Furthermore, as the Humber lies in close proximity to the North Sea, it offers opportunities to re-purpose existing oil and gas infrastructure, for example for future carbon storage.
- 3.5.8 We considered the potential to deliver our proposals at alternative locations outside of the Humber; however, we discounted these locations as these would not meet the need for the Project or the development objectives.

Alternative technologies for hydrogen production

- 3.5.9 Large scale global deployment of refrigerated green ammonia is emerging as the safest and most efficient way to transport green hydrogen from locations where sustainable solar and wind energies are significantly more available than in the UK. Although its transportation can be achieved in different ways, the risks, costs and scale achievable make alternative transport methods less viable and more hazardous.
- 3.5.10 We identified the need for a green hydrogen production facility in the early stages of developing our proposals. As a production facility is required to store ammonia and subsequently produce and temporarily store green hydrogen from this ammonia, limited alternative technologies are available to deliver this.
- 3.5.11 As this technology will result in the lowest environmental impact, highest efficiency, and is the most mature technology available to incorporate into our development, we concluded this to be the most appropriate option.

Step 2 – Considering alternative port locations within the Humber

Alternative port locations within the Humber

- 3.5.12 Following selection of the Humber as the preferred development area, we identified and considered options for where our proposals could be sited. Three possible sites within the Humber we identified and ruled out as they did not meet the Project need and objectives, these were: Port of Hull; Port of Grimsby; and Port of Killingholme.
- 3.5.13 Other locations within the Humber Estuary were not considered suitable due to the lack of suitable marine access and the undeveloped nature of the location.
- 3.5.14 Following consideration of the three port locations above, we determined that the Port of Hull, Port of Grimsby and Port of Killingbolme were unsuitable for a variety of reasons. These included, Insufficient water depths, limited land availability, potential residential and commercial disruptions, the need for extensive deepening of the approach channel, insufficient land for marine infrastructure, challenges in relocating existing trade activities, constraints related to marine access, insufficient landside space, and existing development approvals.
- 3.5.15 Following our analysis described above, we reached the conclusion that the only potential solution to meet the Project need and objectives was the provision of a new multi-user green energy terminal at or in close proximity to the Port of Immingham. As a result, consideration of the project location within and in the direct surrounding of the Port of Immingham were assessed further as discussed below.

Step 3 - Consideration of the Project location at the Port of Immingham

Alternative sites for the terminal within and surrounding the Port of Immingham

- 3.5.16 We identified and considered a number of sites within and surrounding the Port of Immingham to accommodate our development infrastructure.
- 3.5.17 We initially looked at siting our marine infrastructure to the west of the existing Immingham Oil Terminal; however, this would have required a longer jetty approach to reach deeper water or a large dredge to allow ships to berth close to the shoreline. We also identified that the Immingham Eastern Ro-Ro Terminal is planned to be developed in this area.
- 3.5.18 In order to develop our deep water jetty, it was necessary to locate this immediately east of the Immingham Oil Terminal outside the existing operational port site, but as close to it as possible. We established that siting

this any further east of this location would significantly increase the length of our Jetty, extending it further into the estuary resulting in increased environmental impacts on protected sites.

- 3.5.19 Our proposed jetty location, just to the east of the existing boundary of the port, is therefore considered suitable as it enables us to reach the deep-water channel. It also offers space on the adjacent landside to support the new pipeline corridor, storage and production facilities, and allows us to make best use of existing infrastructure and services in proximity to the jetty.

Location of the Ammonia Storage and Hydrogen Production Facility

- 3.5.20 We identified our preferred location for the ammonia storage and hydrogen production facility following consideration of: available space; existing development plans at the port; existing ground conditions; the presence of existing structures and services (including transport corridors); the proximity to residential conurbations; accessibility; and proximity to the jetty.
- 3.5.21 The East and West Sites were identified as the preferred locations for the facility due to:
- A. The availability of predominantly brownfield land for the hydrogen production facility, including land for pipelines to connect with those on the jetty trestle.
 - B. The West Site being allocated for employment use in the North East Lincolnshire Local Plan.
 - C. The proximity to the jetty, which will minimise onshore transport distances for ammonia for safety reasons.
 - D. There being a limited residential population nearby.
 - E. The ground conditions being suitable for the installation of process plant.
 - F. Having local access to existing gas and electrical connections.
 - G. The Site being well served by the strategic and local road network

Step 4 – Design refinement

Alternative designs and layouts

- 3.5.22 We identified and considered a number of options for our development infrastructure, the designs and layouts for which were informed by feedback from our statutory consultation exercises.

Jetty

- 3.5.23 All of our alternative jetty layouts comprised a jetty with the underlying basic arrangement which would incorporate; the requirement for a 1.1 to 1.2 km approach jetty that crosses the southern shore of the Humber to a jetty head situated in, or adjacent to the natural deep water channel of the Humber Estuary in the form of a trestle supported on a series of groups of piles leading up to a berth capable of accommodating ships of different storage capacities. The alternative designs were driven by factors including, the flexibility of the berth to accommodate future users, including a variety of ship sizes, the number of berths and safety exclusion zones.
- 3.5.24 Two berths were considered necessary for the jetty; however, through design development we established that a single berth would provide the required capacity.

- 3.5.25 We also explored other design options relating to the approach jetty and its alignment, the size of piles, the deck span and the deck arrangement. Our preferred design is one that will have a neutral impact on construction and will minimise the loss of intertidal habitat.

Jetty access road, pipe-rack and electrical control building

- 3.5.26 The jetty access road and pipe-rack are located together in a corridor through, and adjacent to, the Long Strip woodland. Due to the location of this woodland between Laporte Road and the jetty structure, and the presence of a veteran tree in the woodland, we identified and considered a number of different design options to minimise potential tree loss.
- 3.5.27 The options for the design of the jetty access road considered the alignment of the road in respect of the Long Strip woodland, implications for land ownership, need for watercourse diversions and environmental impact. The placement of road alignment outside of the long strip woodland both east and west was reviewed. The option to place the road entirely to the west of the Long Strip woodland was determined not be viable due to operational, security and safety reasons and it conflicted with the operation of the Immingham Oil Terminal. Whilst this option would not result in tree loss within Long Strip woodland nor impact on Public Rights of way, the reasons above were considered sufficient to discount this option. An option to place the road to the east of Long Strip on third party land also has a number of constraints. Two existing water outfalls would need relocating, further impacting the intertidal zone, a veteran tree may be impacted by the design and impacts to a Public Right of Way, requiring it to be relocated or diverted.
- 3.5.28 Both options could have potential safety and security issues around restricting public access to the Project site when operational and would also require a longer jetty, having a greater impact on the intertidal zone than the preferred design that has been taken forward.
- 3.5.29 Due to the constraints of the other options reviewed, we focussed on how options that run through our own land could minimise tree loss in the Long Strip woodland. Two options were reviewed, one option that went straight through the Long Strip woodland entirely within our land and an alternative option that used both our land and land within the East Site to reduce the loss of trees in the Long Strip woodland. The option that would result in the loss of fewer trees, avoiding the veteran ash tree and less impact on the Public Right of Way was taken forward and now forms part of this application.

Hydrogen production facility

- 3.5.30 In identifying the layout of the hydrogen production facility, a key consideration was the need to construct the ammonia storage tank as close as possible to the jetty to provide a direct pipeline connection.
- 3.5.31 The need to retain some distance between this facility and non-industrial land uses, including residential development, was also a factor due to the need to store and use hazardous substances.

4. CONSULTATION

- 4.5.1 We have consulted with a range of statutory bodies, interest groups, landowners, businesses and communities (referred to as stakeholders) at key points in the development and environmental assessment of our proposals.
- 4.5.2 Prior to submitting our application for development consent, we formally sought the views of stakeholders on our proposals through two rounds of consultation:
- A. First Statutory Consultation – held between Monday 9 January 2023 to Monday 20 February 2023.
 - B. Second Statutory Consultation – held between 24 May 2023 and Thursday 20 July 2023.
- 4.5.3 Stakeholder feedback gathered from both consultations has been used to:
- A. Inform and refine the design of our proposals, and how they will be built.
 - B. Obtain further information about the baseline environment.
 - C. Focus our environmental assessments on relevant issues.
 - D. Identify environmental mitigation, control and protection measures to be implemented across the different phases of the development.

5. ENVIRONMENTAL EFFECTS OF THE DEVELOPMENT

5.1 Approach to the Environmental Impact Assessment

- 5.1.1 Under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, our development is defined as being of a type and scale that requires an Environmental Impact Assessment to be carried out.
- 5.1.2 The environmental impact assessment undertaken and reported in this ES addresses the requirements of this legislation. The environmental impact assessment process has identified the likely significant effects on the environment predicted to arise from construction, operation and decommissioning of the development:
- A. The construction phase assessments address both the temporary activities involved in building the development and the effects associated with its subsequent permanent presence, upon completion of construction.
 - B. The operational phase assessments have considered the situation following construction, when the development will be operational and in use.
 - C. Where relevant, our assessments have considered and identified the likely significant effects of the decommissioning phase, relating to activities associated with the future shutdown and removal of the above-ground landside components of the development.

5.2 Assessment Stages and Methods

- 5.2.1 We identified the issues and matters to be covered in the Environmental Impact Assessment through a process called scoping, during which the views of the Planning Inspectorate and consultees were sought to confirm the environmental topics requiring assessment.
- 5.2.2 In carrying out our assessments, we have applied and followed industry standard methods, best practice guidance and policy advice to identify and assess the likely significant effects of the development across the identified environmental topics.
- 5.2.3 The methods we have followed as part of this process have involved the following for each environmental topic assessed:
- A. Gathering information to establish the environmental setting (referred to as the baseline) and locations, sites and features which may be sensitive to change (referred to as receptors).
 - B. Identifying and considering the potential impacts and effects of the development.
 - C. Identifying and developing mitigation measures.
 - D. Assessing the likely significant effects of the development on local communities and the environment.

- 5.2.4 Certain topic assessments have been undertaken against both the current (existing) baseline and the future baseline. The future baseline considers how the existing environmental conditions may potentially change between the time of assessment and the time that the development would be constructed and/or operational. Future changes to the baseline, without the development, could result from natural events (such as the movement of species) or from human activities (such as changes to the way land is used).
- 5.2.5 There are a number of residential and part residential properties within the Site on Queens Road. Given their proximity to the hydrogen production facility on the West Site, their acquisition is proposed in order to secure cessation of the residential use before operation of that part of the facility. Discussions are taking place with affected owners and occupiers. The effects associated with the residential use during construction or the loss of the residential use of those properties is considered on a worst case basis within the relevant environmental topic assessments. For example, it is assumed that residents are still present during construction works (even though residents may have relocated by that time).
- 5.2.6 The assessments have also considered how environmental effects can interact together (such as air quality and visual impacts) on the environment and communities. Similarly, the assessments have also considered how the effects of our development may combine with those associated with other projects and developments in the area (referred to as cumulative effects).
- 5.2.7 The following sections provide topic-specific summaries of our assessments. Environmental receptors, features and sensitivities within and surrounding the development site are illustrated on **Figure 2**.

5.3 Air Quality

Baseline

- 5.3.1 An assessment has been undertaken to identify the effects of our proposals on air quality. This has considered different types of pollutants and dust that may arise during its construction and operation, including emissions associated with road traffic and ships.
- 5.3.2 Our assessment has identified several locations and receptors that are sensitive to changes in air quality. These include but not limited to residential dwellings off Queens Road and properties on Kings Road in relation to the human health and amenity, and some designated nature conservation sites associated with the Humber Estuary.
- 5.3.3 To understand existing levels of pollution, we have reviewed existing data and have undertaken surveys and monitoring in the area of our development. This has confirmed that:
- A. Air Quality Management Areas have been declared adjacent to the A180 through Grimsby (North East Lincolnshire Council), and at Scunthorpe (North Lincolnshire Council), as pollutant concentrations in these areas are above the levels set by the Government.
 - B. Pollutant concentration levels at locations sensitive to changes in air quality near to our development site are generally within acceptable levels and are expected to improve in the future.
 - C. Existing dust levels in the area vary and are associated with industrial and commercial activities.

Construction assessment

- 5.3.4 Without mitigation, construction of our development could temporarily impact air quality at sensitive locations as a result of dust from construction activities such as earthworks, and emissions from construction traffic and equipment.
- 5.3.5 To minimise these impacts, we will implement a range of measures detailed in the Construction Environmental Management Plan. These measures include dust suppression, controls on the operation and use of certain equipment, and managing construction traffic.
- 5.3.6 Following implementation of mitigation measures, no significant air quality effects on sensitive receptors are likely during construction of our development.

Operational assessment

- 5.3.7 Operation of our development is expected to result in emissions from ships and road traffic, combustion and process emissions, and odours which could affect locations sensitive to changes in air quality.
- 5.3.8 During the operational phase, we will implement process and management controls and monitoring of development-related emissions in accordance with an Environmental Permit, regulated by the Environment Agency. We will also put in place a management plan containing measures to manage odour and will prohibit unnecessary vehicle and ship movements.
- 5.3.9 By implementing these measures and controls, no significant air quality effects are likely during operation of our development on sensitive receptors.

Decommissioning assessment

- 5.3.10 We agreed with the Planning Inspectorate that the effects associated with the future decommissioning of our development did not require consideration in the air quality assessment.

5.4 Noise and Vibration

Baseline

- 5.4.1 In assessing the potential for our development to generate noise and vibration, we have undertaken studies, computer modelling and sound monitoring to identify existing noise and vibration sources and levels in the area surrounding the development site.
- 5.4.2 We have established that receptors potentially sensitive to changes in noise comprise residential dwellings along Queens Road, and properties along roads within the eastern part of Immingham including Chestnut Avenue, Waterworks Street, Spring Street and Somerton Road.
- 5.4.3 Our studies have identified that existing noise sources in the area are from road traffic, industrial and commercial activities, port-related activities and occasional aircraft passing by.

Construction assessment

- 5.4.4 Our assessment of construction-related impacts identified that noise and vibration could occur from general operations within the development site (such as site clearance and plant installation), the movement of traffic on local roads, and from marine piling. These activities are expected to result in varying levels of noise and vibration at different stages of construction.

5.4.5 We will implement a range of mitigation measures to minimise and control construction noise and vibration. These include fitting acoustic covers and silencers to engines and equipment, routing construction vehicles along access tracks to reduce traffic noise, and by undertaking regular community engagement to notify residents of operations that may result in higher levels of noise and vibration, including a means of communicating any complaints. These measures will be delivered through the Construction Environmental Management Plan.

5.4.6 With the implementation of these measures, no significant noise and vibration effects are likely during construction of our development.

Operational assessment

5.4.7 Operational noise and vibration effects on residential receptors will be experienced by residential receptors located on the eastern edge of Immingham and those located adjacent to routes used by operational development traffic.

5.4.8 To control and minimise operational effects, noise limits will be set for certain plant and equipment within our development. We will also install acoustic barriers and screening to help contain operational noise within the development site.

5.4.9 By installing these measures and controls, no significant noise and vibration effects are likely to occur from the operational development.

Decommissioning assessment

5.4.10 We expect that the effects of decommissioning the landside elements of our development will be comparable to those identified during its construction.

5.5 Nature Conservation (Terrestrial Ecology)

Baseline

5.5.1 The scale and location of our proposals means that our development is likely to impact land-based ecological species and sites designated for their nature conservation value. We have therefore carried out surveys on land within and surrounding our development site to identify whether any protected species are present, and to identify areas of habitat used by them.

5.5.2 Our surveys have confirmed that most of this land is of low ecological value, comprising grassland, scrub, arable land, ditches, ponds and hedgerows. The only exception is the Long Strip woodland which is covered by a Tree Preservation Order, protecting individual trees and tree groups due to their value in the local area. A small number of bats, water voles and otters have been recorded close to the development site.

5.5.3 The closest designated sites of nature conservation value are associated with the marine environment in the Humber Estuary, some of which are of international importance. The nearest land-based designation is a local wildlife site at Laporte Road, which is of County-level importance and value, but which is unconnected to our development site.

5.5.4 We have identified opportunities within the development site to deliver measures that will mitigate or compensate the impacts of our proposals on ecology.

Construction assessment

5.5.5 We have tried to minimise the impact on the Long Strip woodland as far as possible and minimise the amount of land we need. As some loss is unavoidable, we are working in partnership with North East Lincolnshire Council to develop a woodland compensation strategy. Notwithstanding this, our development will result in tree losses within this woodland, the effect of which will be significant.

5.5.6 The impact of our proposals on protected species during construction mainly relates to noise and visual disturbance, and loss of or damage to habitats. These impacts will be mitigated using a range of measures including the use of licences, which will set out how we will protect bats, water voles and otters and apply best practice when working in or around areas where they could be present. These measures will ensure that the effect on habitats and species is not significant.

Operational assessment

5.5.7 Our development is likely to cause some impact to the identified protected species through operational lighting, noise and visual disturbance. These impacts will be addressed using measures such as minimising light spill into sensitive habitats adjacent to our development site, and applying buffers between the operational infrastructure and habitats such as drains. With these measures in place, no significant operational effects on ecology are likely.

Decommissioning assessment

5.5.8 Comparable measures to those identified for the construction phase will be put in place during the decommissioning of the landside components of our development to minimise effects on habitats and protected species, ensuring that any effects are not significant.

5.6 Nature Conservation (Marine Ecology)

Baseline

5.6.1 The scale and location of our proposals means that our development is likely to impact marine-based ecological species and sites designated for their nature conservation value. Our development is located within the Humber Estuary, which is an important designated area for a number of species and habitats. As such, surveys have been undertaken to identify habitats and species close to our proposals.

Construction assessment

5.6.2 Our proposals have the potential to impact local habitats, fish and marine mammals due to construction work taking place within the Humber Estuary. The potential impacts on these interests will be limited as much as possible by applying best practice construction measures. We will also be undertaking further work on the design of our proposals to minimise the need for dredging.

5.6.3 The impact of our proposals on marine ecology relates to direct loss of habitats from piling work, and from changes to the seabed and sediment transport in the area. These impacts will be mitigated by applying seasonal and night-time restrictions on piling activities to avoid common species migration movements, as well as the use of 'vibro piling' for marine activities which produces less noise than other types of piling. With the implementation of these measures, all construction effects are likely to be not significant.

Operational assessment

5.6.4 Once operational, our assessment identified potential for impacts on local habitats and species in the Humber Estuary from periodic dredging that is necessary to allow for the safe passage of ships, as well as from the presence of a new jetty. As the estuary has a significant shipping presence, maintenance dredging activities and the passage of ships are already a common feature in the area.

5.6.5 The effects of the operational development on marine habitats, species and designations will not be significant.

Decommissioning assessment

5.6.6 Our development will become part of the fabric of the Immingham port estate and will continue to be maintained, so that it can be used for port related activities to meet a long-term need. As such, we agreed with the Planning Inspectorate that decommissioning effects on marine ecology did not require consideration in our assessment.

5.7 Ornithology

Baseline

5.7.1 The scale and location of our proposals means that our development has the potential to impact upon birds that make use of the Humber Estuary. A wide range of breeding, wintering and passage birds make use of the Humber Estuary at various times of the year. Due to this, surveys have been undertaken in the estuary from winter 2022 to summer 2023 to identify birds making use of the estuary and to inform our assessments.

Construction assessment

5.7.2 Our assessments identified potential for impacts to occur on coastal waterbirds and breeding birds during construction, due to the loss of habitat these species use for feeding and roosting and from noise and visual disruption. To mitigate these impacts, we will limit construction noise where possible using measures such as noise suppression systems, construction restrictions and the use of barriers and screens.

5.7.3 Due to the permanent loss of trees in the Long Strip woodland, a significant effect is predicted for breeding birds that use this woodland. A compensation strategy for the loss of trees in this woodland is being agreed with North East Lincolnshire Council.

5.7.4 All other construction effects on birds are not expected to be significant.

Operational assessment

5.7.5 Given portside infrastructure is already present in the Humber Estuary, and the area's existing industrial nature, any additional noise or visual disturbances from the new operation infrastructure will not have a significant effect on coastal waterbirds.

Decommissioning assessment

5.7.6 Decommissioning effects on ornithology did not require consideration in our assessment for the reasons given for the topic of Nature Conservation (Marine Ecology).

5.8 Traffic and Transport

Baseline

5.8.1 As our development will generate additional traffic on the road network, we have carried out an assessment to identify how the number and type of vehicles will change and how this might affect receptors in terms of safety, fear and intimidation, amenity, severance (where traffic separates people from places). We have also considered the impact of any hazardous loads on receptors.

5.8.2 Receptors we've considered in the assessment include people at home, sensitive groups and locations (such as disabled people, hospitals and schools), walkers and cyclists making journeys, and road users.

5.8.3 Our studies have confirmed that the existing road network is set within a largely industrial area with few residential properties, with many local roads being of single carriageway design carrying local traffic and heavy goods vehicles. Key routes providing connectivity in the local area include the Kings Road, Queens Road and Laporte Road. The A180 and A160 routes are strategically important, providing connections to the wider area. No existing road safety issues have been identified on routes that will be used by development-related traffic.

5.8.4 Pedestrian facilities are limited on the local road network. There is, however a single bridleway which commences on Laporte Road and runs north to the Humber.

5.8.5 There is a limited bus service between Immingham and Grimsby, with two bus stops located on Queens Road. No railway stations are located in the area associated with our development.

Construction assessment

5.8.6 Our construction assessment has identified that impacts from changes in traffic flows are expected on a number of routes.

5.8.7 We plan to manage and control traffic during construction by minimising waste generation as far as possible to reduce the need for vehicle journeys to and from the development site. Materials deliveries will be minimised as far as possible by using pre-fabricated development components and transporting these to the site as large items, thereby reducing the number of journeys and associated construction periods.

5.8.8 We will also implement a Construction Traffic Management Plan and Construction Worker Travel Plan. These will set out measures to limit the number of journeys on roads during peak hours and mitigate the impacts on receptors.

5.8.9 By implementing these measures, no significant traffic and transport effects are likely during the construction phase.

Operational assessment

5.8.10 Due to the low number of journeys expected to be made during the operational phase of our development, and the limited likelihood of adverse impacts arising on receptors, operational effects were not considered in our assessment.

Decommissioning assessment

- 5.8.11 The decommissioning of the landside components of our development have not been considered in the assessment, in agreement with the Planning Inspectorate. This is because the future number of vehicles and baseline conditions of the road network cannot be predicted for this phase. Mitigation measures relevant to the decommissioning phase are included in the Outline Decommissioning Environmental Management Plan that has been prepared as part of this application and will be updated before decommissioning or demolition works are undertaken.

5.9 Marine Transport and Navigation

Baseline

- 5.9.1 We identified that our proposals will interact with existing port activities within the estuary. A marine transport and navigation assessment has therefore been carried out to establish current shipping and other vessel activity within the estuary, and the potential risks that our development may have to navigation and safety.
- 5.9.2 Our assessments identified that existing shipping movements are mainly associated with tankers, passenger ferries, cargo vessels, service and research crafts, and recreation. Existing records confirm that the majority of incidents in the area relate to equipment failure within vessels.

Construction assessment

- 5.9.3 During construction, there is the potential that ships might collide with existing port infrastructure, passing vessels and vessels within the wider estuary. Measures and risk controls will be implemented to ensure the construction of our development does not compromise the safety of navigation in the port. These include marine traffic management, updating port controls and procedures, weather monitoring, and planning for the passage of ships and vessels.
- 5.9.4 With these measures in place, construction effects will be 'as low as reasonably practicable' and not significant.

Operational assessment

- 5.9.5 Our operational development could impact navigation and transport within the estuary in a similar way to that identified during its construction. These impacts will be mitigated through the adoption of similar measures, which will reduce hazards to 'as low as reasonably practicable'. The effects will therefore not be significant.

Decommissioning assessment

- 5.9.6 Decommissioning effects have not been considered in our assessment given that jetty would become part of the fabric of the Immingham port estate.

5.10 Landscape and Visual Impact

Baseline

- 5.10.1 To understand how our development may affect the landscape and existing views, we have carried out an assessment to identify the character of the landscape and seascape, and to establish locations from which our proposals may be visible.

- 5.10.2 The character of the area varies at different levels and scales. Our development site comprises an area which is surrounded by existing industrial development and contains very few important landscape features. These features do not contribute strongly to the value of the local landscape or seascape. The setting of the area surrounding our development site is also influenced by industry, alongside port infrastructure, houses and transport routes.

- 5.10.3 Using computer software and observations of the local area we identified and assessed several viewpoints, these being receptors such as roads and public rights of way from where our development is likely to be viewed. We also identified existing night-time views showing lighting from roads, industry and aviation.

Construction assessment

- 5.10.4 Our construction assessments identified that the development could result in impacts such as vegetation loss which could affect the local character of the area. They also identified that general construction activity, such as the use of temporary lighting and operation of taller equipment will be viewed as new features into the existing landscape.
- 5.10.5 In designing our proposals, we identified that planting new trees and woodland would not significantly reduce the visual impacts of the development. As such, we have sought to protect and retain as much existing established vegetation as possible, as this already contributes to the local character of the area and will help to screen development works taking place. We also intend to implement best practice measures during the construction period, such as controlling lighting to reduce any light spillage in the surrounding area.
- 5.10.6 Notwithstanding this, there will be a significant effect on the surrounding landscape especially during the construction period. We expect some significant effects to the local landscape of the development site due to the introduction of construction activity, the use of farmland for temporary laydown of materials and equipment, and from the unavoidable removal of vegetation. There will also be short-term significant visual effects on viewpoints located adjacent to our development site, mainly resulting from construction activity featuring in views and the gradual introduction of new infrastructure during this period.

Operational assessment

- 5.10.7 Once our proposals are implemented and operational, their influence will be limited to the local landscape immediately adjacent to the development site. No significant effect on landscape or seascape character is anticipated.
- 5.10.8 For the identified viewpoints, there will be long-term significant effects for receptors at two recreational locations, these being on users of the public rights of way network.
- 5.10.9 The effects on viewpoints located further from our development site will not be significant due to existing vegetation and infrastructure screening many views, and because our development will appear as part of the existing industrial landscape.

Decommissioning assessment

- 5.10.10 Our assessment has concluded that the landscape, seascape and visual effects of the future decommissioning of the landside infrastructure within the development will be similar to those identified for its construction.

5.11 Historic Environment (Terrestrial)

Baseline

- 5.11.1 To understand the likely impact of the landside components of our development on the historic environment, we have undertaken a review of available archaeological and built heritage records within and surrounding the landside area. We have also carried out detailed archaeological surveys of areas of land within the development site and have identified designated and non-designated sites and features in the area that might be affected by our proposals.
- 5.11.2 One designated asset – a single Grade II listed building (the Immingham War Memorial) – is present within 2km of the landside area. Evidence also exists of non-designated Roman and medieval period assets within 1.6km of the landside area.
- 5.11.3 Our investigations have confirmed that the landside components will occupy an area that is of relatively low archaeological significance. Records indicate that assets within and surrounding our development site are largely of the post medieval / modern period, many relating to the industrial development of the docks and the World War II defence of the east coast of Britain. These assets are typically of low value and of local interest.
- 5.11.4 We have also confirmed that the local area has been subject to construction and groundworks over many years, meaning there is low potential for below-ground archaeological remains to survive within the landside area.

Construction assessment

- 5.11.5 During construction of our development, both temporary and permanent impacts are expected to occur on identified features within the historic environment. Temporary impacts will be associated with activities including the presence and movement of construction machinery, operations within construction compounds, and the use of traffic management measures. Permanent impacts will be associated with the partial or total removal of known and/or unknown assets through operations including piling, surface levelling and excavations.
- 5.11.6 A programme of archaeological evaluation works was undertaken across the Site to further understand the potential for the presence of archaeological and paleoenvironmental remains. The potential for archaeological remains to actually be physically present is considered to be very low to low, therefore, further archaeological field work to offset the impacts of the Project upon archaeological remains is not considered necessary. There is however, further mitigation in the form of “do no harm” construction methods and requirements for further (laboratory) analysis of the peat and organic alluvium to provide useful information to mitigate against direct impacts as outlined within the outline construction environmental management plan.
- 5.11.7 Following implementation of these mitigation measures there will be no significant effects on the historic environment from construction of the landside components of our development.

Operational and decommissioning assessment

- 5.11.8 We have agreed with the Planning Inspectorate that operational or decommissioning assessments are not required. This is because these development phases will not have additional impacts or effects on buried archaeological remains or heritage assets arising from changes such as traffic, noise and light pollution.

5.12 Historic Environment (Marine)

Baseline

- 5.12.1 To understand the likely impacts of the marine side components in the marine historic environment, we have carried out a review of marine archaeology databases covering the Humber Estuary. Our search revealed nine potential marine heritage receptors, including three shipwrecks, five obstructions and one anti-submarine defence.
- 5.12.2 Geophysical surveys for our development were also undertaken, and these identified 162 potential features (known as anomalies) within the vicinity of the development.

Construction assessment

- 5.12.3 Our proposals have the potential to impact upon marine heritage receptors directly via damage or destruction caused during construction or indirectly due to changes in sediment and water processes. A number of measures have been applied to mitigate this, including the assessment of survey data to obtain a greater understanding of receptors within the vicinity of the development. These receptors can then be avoided during construction, and exclusion zones put in place where appropriate. All effects are expected not to be significant as a result.

Operational assessment

- 5.12.4 There could potentially be impacts on marine heritage receptors due to damage or destruction during maintenance dredging activities, and indirectly through changes in sediment and water processes associated with the presence of new port infrastructure. As this area will have already been dredged during the construction phase, any maintenance dredging taking place will be over a smaller area, and accordingly the effects are expected not to be significant.

Decommissioning assessment

- 5.12.5 Once constructed, the marine infrastructure will become part of the fabric of the Immingham port estate and will continue to be maintained so that it can be used for port related activities. As such, decommissioning effects on the marine historic environment have not been considered in our assessment.

5.13 Physical Processes

Baseline

- 5.13.1 Due to the location and scale of our proposals, there is the potential for the development to impact upon marine physical processes that take place within the estuary. Physical processes within the estuary include hydrodynamics (the movement of water), sediment transportation, plume dispersion (the disruption of sediment due to activity on the seafloor), and waves.
- 5.13.2 The processes currently taking place have been confirmed by using information sources and modelling of the Humber Estuary. As part of this, we have reviewed information about the shape of the estuary, tides, water levels and sediments. This has allowed us to identify the likely impacts that our development will have on marine physical processes in the estuary.

Construction assessment

- 5.13.3 Our development has been designed to minimise dredging requirements and the size of the jetty as far as possible. These measures will mitigate any construction-related impacts and effects associated with sedimentation, seabed changes and changes to hydrodynamics to levels which are not significant.

Operational assessment

- 5.13.4 The presence of operational infrastructure in the estuary means there is potential for our development to impact upon similar physical processes to those identified during construction, as well as other impacts on existing features such as estuary banks and channels and also changes to waves from dredging activities.
- 5.13.5 Based on the measures we've incorporated into the design of our development, operational effects on physical processes will not be significant.

Decommissioning assessment

- 5.13.6 We have not assessed a decommissioning scenario as the jetty, jetty head, loading platforms and access ramps would, once constructed, become part of the fabric of the Port estate.

5.14 Marine Water and Sediment Quality

Baseline

- 5.14.1 Our development could affect marine water and sediment quality within the Humber Estuary as a result of construction-related accidental spillages, and from piling, dredging and disposal activities.
- 5.14.2 We have therefore undertaken studies to identify marine water quality (including bathing waters), and to establish whether aspects of the marine environment are protected or designated. We have also examined existing data relating to water quality and sediment quality.
- 5.14.3 Two designated bathing waters (Cleethorpes and Humberstin Fitties) are located over 10km south east of our development site, both of which are classified as having good water quality.
- 5.14.4 Our development will be located within the Humber Lower Water Body, which has been heavily modified due to coastal and flood protection and navigation. There are no Shellfish Water Protected Areas surrounding our development.

Construction assessment

- 5.14.5 We intend to implement a range of measures to manage any environmental impacts our development may cause during construction. These include the application of industry guidelines and general good practice to prevent, avoid and minimise risks to water and sediment quality from activities such as piling, dredging and material disposal.
- 5.14.6 When these measures and controls are accounted for, construction of our development will not have a significant effect on marine water and sediment quality.

Operational assessment

- 5.14.7 Our assessment has identified that maintenance dredging and disposal activities could affect oxygen concentrations in the marine environment, and potentially alter the chemical water quality and sediment

contaminants. As with the construction phase, we will implement standard measures to mitigate any impacts on marine water and sediment quality, such that their effects on these receptors are not significant.

Decommissioning assessment

- 5.14.8 Decommissioning effects have not been considered in the assessment as the main elements of the terminal / marine side of the development will not be decommissioned and will become part of the fabric of the Immingham Port estate and would, continue to be maintained so that it can be used for future port related activities. Therefore, potential effects on marine water and sediment quality receptors from decommissioning have been scoped out of the assessment.

5.15 Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage

Baseline

- 5.15.1 Our studies into how the development may affect the water environment have considered the following:
- A. Water use (ensuring there is an adequate supply of water for the development to operate).
 - B. Water quality (at receptors).
 - C. Coastal protection (including how our proposals will interact with flood defences).
 - D. Flood risk (in relation to how our development may lead to flooding or be at risk of flooding).
 - E. Drainage (how water will be removed from our development).
- 5.15.2 As our development may impact waterbodies associated with both the marine environment and those on land, we have examined different information and have carried out sampling of watercourses near to the development site. This has identified the following receptors:
- A. The Humber Estuary.
 - B. North Beck Drain, Middle Drain and Habrough Marsh Drain.
 - C. On-shore Water Framework Directive water bodies.
 - D. Various ecological sites, including the Humber Estuary and habitats considered important for biodiversity conservation purposes.
- 5.15.3 Our sampling of two drains near to the development site recorded elevated levels of contaminants present.
- 5.15.4 As our development site is located in an area which is at high risk of flooding, if the current flood defences were to fail we have undertaken a Flood Risk Assessment. This has taken account of existing tidal flood defences that are in place along the south bank of the estuary, and defences that are in place on some drains near to the development site.

Construction assessment

- 5.15.5 Our assessment has identified that construction of our development will interact with the water environment, resulting in potential impacts on receptors. This includes the accidental spillage of materials that could affect waterbodies, contamination within surface runoff, changes to existing water flow paths, blocking of drains and increased risk of tidal flooding.

5.15.6 We plan to implement mitigation measures to prevent, control and minimise these impacts. These will include measures within our Construction Environmental Management Plan that relate to materials storage, bunding (to contain any potential pollutants and contaminants) and providing emergency spill kits. We will also put in place a Flood Response Plan and Drainage Strategy to reduce flood risk on the development site and ensure water is removed from the site in a safe and consistent way.

5.15.7 Taking account of these measures, we have assessed the construction effect of our proposals as not being significant.

Operational assessment

5.15.8 The design of our proposals includes measures to make the development more resilient to potential flood events, and to enable the development to be shut down in the event of flooding.

5.15.9 Operational impacts that have been considered in our assessment include accidental spillages and higher rates of runoff due to the introduction of new areas of concrete and hardstanding, which could affect identified receptors. Similar measures to those identified for the construction phase will be put in place to avoid, control and reduce any impacts relating to contamination and pollution. Delivery of these measures will ensure any related effects on receptors within the water environment are not significant.

5.15.10 Through the implementation of our Drainage Strategy, surface water runoff will be managed, stored and retained within the boundary of our development. This will have a beneficial effect when compared with the existing situation.

Decommissioning assessment

5.15.11 As decommissioning of the landside components of our development may potentially impact the water environment, our assessments of this phase has concluded that any such impacts would largely reflect those identified for the construction phase. Comparable measures will be put in place to control and mitigate these impacts, meaning that any effects of receptors will not be significant.

5.16 Climate Change

Baseline

5.16.1 Our assessment of the impacts and effects of the development relating to climate change has considered three elements:

- A. A greenhouse gas impact assessment, which has identified the emissions created by our development and their impact on climate;
- B. A climate change resilience assessment, which has identified how our development responds to the potential effects of future climate change (for example sea level rise).
- C. An in-combination climate change impact assessment, which has identified the impacts of our development together with the predicted effects of climate change on the environment.

5.16.2 In establishing the current conditions and those which are likely to exist in the future, we have examined existing climate data and UK climate change projections.

Greenhouse gas assessment

5.16.3 The greenhouse gas assessment has considered the whole lifecycle of the development, and this has concluded that construction and operation of our development will have a significant beneficial effect.

5.16.4 The emissions resulting from the construction and operation of our development will be outweighed through the production of low carbon hydrogen energy to support the UKs effort towards achieving net zero.

5.16.5 By the time the landside components of the development are decommissioned, the UK will have achieved net zero emissions and therefore any greenhouse gas effects associated with this phase are likely to be reduced in comparison to those identified during construction.

Climate change resilience assessment

5.16.6 We have incorporated measures into the design of our development to make it more resilient to future potential climate-related events, such as flooding. The effects of our development from a climate resilience perspective in both the construction and operation phases of the development will therefore not be significant.

In-combination climate change assessment

5.16.7 As we intend to implement a range of good practice mitigation measures during construction and operation of our development, no significant effects will occur during either of these phases.

5.17 Materials and Waste

Baseline

5.17.1 We have carried out an assessment to identify the likely impacts that materials and waste associated with our development will have on receptors relating to landfill capacity, sites that are allocated or safeguarded, and the consumption of key materials.

5.17.2 The baseline conditions for our assessment have been identified at the regional and national level by taking account of: the likely volumes of construction and operational waste that our development will generate; the types, quantities and availability of materials required; and how waste will be managed and disposed of (including hazardous waste capacity).

Construction assessment

5.17.3 We have designed our development to prioritise waste prevention rather than its re-use, recycling, recovery or disposal to landfill where possible. We intend to implement a Site Waste Management Plan to manage and control materials and waste.

5.17.4 Our assessment has identified that activities associated with site clearance, preparation, earthworks, remediation and construction will require materials (for example steel, concrete and aggregates) and will also generate different types of waste associated with excavated material. Impacts associated with these activities are expected to change available landfill capacity (for both hazardous and non-hazardous waste) and increase demand for materials.

5.17.5 Based on the implementation of measures to control and manage materials and waste, the effects of construction of our development will not be significant.

Operational assessment

- 5.17.6 Impacts are only expected to occur in relation to changes in landfill capacity. These will result from waste generated from sources including the operation of our hydrogen production units and liquefiers, and from general waste.
- 5.17.7 Effects due to the operation of the development will therefore be limited to reductions in landfill capacity, and these are not expected to be significant.

Decommissioning assessment

- 5.17.8 Due to the amount of time between the assessment and when the decommissioning phase is likely to occur it is not possible to assess waste and material resources effects of decommissioning of landside elements at the present time. This is because waste infrastructure, technologies and good practices are likely to be substantially different to those currently in place.
- 5.17.9 Our assessment has taken a worst-case scenario, which assumes that the Project elements would be fully removed and that the potential impacts during the decommissioning phase would be similar to those encountered during the Project construction phase. Based on the measures we've incorporated to control and manage materials and waste, decommissioning effects on materials and waste will not be significant.

5.18 Ground Conditions and Land Quality

Baseline

- 5.18.1 The nature of our development means that it could have impacts and effects on existing ground conditions and the quality of land. We've therefore considered how our proposals will interact with existing geology, soils and groundwater receptors, and have identified whether there is a risk of people working at or visiting our development being exposed to contaminants.
- 5.18.2 We have undertaken surveys and sampling to establish whether our development site has any contamination present, and to confirm whether groundwater exists. We have also looked at how the land is currently used, and how this has changed over time.
- 5.18.3 Our studies have confirmed that existing soils within our development site are of medium agricultural value. Existing geology is varied, but no geological faults are present and there are no sites designated for their geological importance present.

Construction assessment

- 5.18.4 Our construction environmental management plan will include specific plans, for example a materials management plan, which will contain measures to manage and control contamination risks during construction of our development. Measures and plans will also be implemented to manage pollution risk to groundwater and surface water and to protect soils. With these measures and controls in place, no significant effects are likely on sensitive geological, groundwater, surface water, soils or human receptors.

Operational assessment

- 5.18.5 Once operational, any potential effects on human health, geology, groundwater and surface water will be limited to contamination. Our development will operate in accordance with the Environmental Permit and Hazardous Substances Consents process, which will include measures designed to limit potential effects on

people and other environmentally sensitive receptors.

- 5.18.6 Accordingly, the effects of our development during the operational phase will not be significant.

Decommissioning assessment

- 5.18.7 Management plans and best practice mitigation measures will be put in place during the decommissioning of the landside components of our development. Any risks or effects relating to possible contamination will therefore be mitigated to levels that are not significant.

5.19 Major Accidents and Disasters

Baseline

- 5.19.1 We've carried out an assessment into the potential for major accident and disaster scenarios to occur within the different phases of our development, which could affect human health, welfare and the environment. Our assessment has also considered how vulnerable the development may be to such event scenarios.
- 5.19.2 In identifying the current risks in the area, we have established that the local area surrounding the development site is already home to several major accident hazard sites such as oil refineries, which are regulated under the Control of Major Accident Hazards Regulations. We've also reviewed the relationship of the development site to nearby populated areas from a health and safety perspective, environmentally protected sites and how the area is expected to change as a result of other planned development.
- 5.19.3 Our proposals incorporate equipment and techniques, procedures and management measures designed for process safety, containment and emergency shutdowns which have been identified through detailed hazard identification reviews.

Assessment

- 5.19.4 A number of potential hazardous scenarios (called Risk Events) have been identified, and these Risk Events include incidents such as fire, explosions, gas release and climate change events which could occur as a result of our development. Our assessment has established that the potential consequences of these Risk Events are harm caused to people at the development site and in the immediate area surrounding it, including harm to nearby habitats and species in the Humber Estuary.
- 5.19.5 To minimise these risks during construction, we will use suitably experienced contractors, undertake risk assessments, prepare working method statements and identify and implement operating procedures and personnel training. Some of these measures will be delivered through our Construction Environmental Management Plan.
- 5.19.6 Air Products have applied for a Hazardous Substances Consent, covering the land side facilities and will also secure approvals from the Health and Safety Executive and permits from the Environment Agency for our operational development. Collectively, these will ensure that our development includes appropriate control, monitoring and management measures to minimise the potential risk of accidents and disasters, including risks to our workers.
- 5.19.7 Process safety studies and risks assessments will also be carried out as part of the decommissioning of landside infrastructure.
- 5.19.8 These measures will mitigate Risk Events and reduce them to 'as low as reasonably practicable' during all phases of the development, meaning that no significant effects are likely in relation to major accidents and disasters.

5.20 Socio-Economics

Baseline

- 5.20.1 As our development is expected to impact the local community, recreational routes and private assets such as homes and businesses, we've carried out an assessment to identify its effects on socio-economics.
- 5.20.2 To establish the current conditions of the area, we have examined existing land uses and reviewed local population and workforce information. We have also looked at the public rights of way network, and the relationship of residential properties, businesses, community and healthcare facilities to our development.
- 5.20.3 We have identified that our development site is located in a sparsely populated area characterised by industry, with Immingham town centre being approximately 1km away and Grimsby town centre being approximately 5km away. A number of residential and commercial properties are located along Queens Road.
- 5.20.4 Data indicates that the population of the North East Lincolnshire area has declined in recent years. Two public rights of way are located within our development site, and most nearby community facilities are found within Immingham.

Construction assessment

- 5.20.5 Our construction assessments have found that adverse and beneficial impacts are likely on employment, the local community, public rights of way users and private assets.
- 5.20.6 There will be temporary adverse impacts on the use of a bridleway which runs from Laporte Road to the River Humber. Although this bridleway will need to be closed during the first phase of construction, we will install a temporary route diversion to reduce disruption and ensure the effect on users is not significant.
- 5.20.7 There will also be temporary adverse impacts on accessibility to the sea front and on the capacity of local healthcare and accommodation facilities from an influx of workers, the effects of which will not be significant.
- 5.20.8 There is a need to acquire a number of residential properties located on Queens Road permanently to support operational safety as there would be a significant effect on safety if these properties remained in residential use.
- 5.20.9 We anticipate that at the peak employment phase (phase 1) employment numbers for the landside will require 792 workers and 220 workers for the marine side, totalling 1,012 workers. As a result, we expect significant beneficial effects to occur in relation to employment generation and North East Lincolnshire's economy during construction.

Operational assessment

- 5.20.10 Similar to the construction phase, once operational our development is expected to have a significant beneficial effect on North East Lincolnshire's economy due to employment generation.

5.21 Human Health and Wellbeing

Baseline

- 5.21.1 To understand the impacts of our development on the health and wellbeing of people and communities, we have assessed how its construction, operation and decommissioning may affect factors including: noise, pollution, dust, odour and electromagnetic frequency exposure; access to healthcare and open spaces; access to employment and training, and climate change threats to health.
- 5.21.2 Our studies have involved a review of information relating to housing, population, employment and health in the local area, and has drawn on the findings of other environmental assessments to identify the areas of which different types of impact are likely to occur. This has established that the health and wellbeing of local residents, visitors to the area, and users of the public rights of way network and local facilities within 5km of our development could potentially be affected.

Construction assessment

- 5.21.3 Adverse construction phase impacts will be associated with placing increased demands on healthcare services, increasing traffic and reducing accessibility to healthcare and community facilities, reducing air quality and increasing noise, and disruption to users of public rights of way and open spaces.
- 5.21.4 Our development is, however, expected to bring wider economic benefits to North East Lincolnshire through employment, training, income and supply chain opportunities.
- 5.21.5 Mitigation identified within other environmental topics will be delivered to minimise impacts during the construction phase, for example best practice measures to control dust emissions and equipment noise which may adversely affect human health and wellbeing.
- 5.21.6 This mitigation will ensure no significant adverse effects will occur on human health and wellbeing during construction of our development.

Operational assessment

- 5.21.7 We have taken account of sensitive receptors during the design of our development by, for example, positioning infrastructure in a way that avoids receptors such as residential properties and communities as far as possible.
- 5.21.8 Our assessment of the development's operational impacts has identified no significant effects in relation to the accessibility of healthcare and social infrastructure, traffic related air and noise emissions, social cohesion and climate change. Once operational, our development will have a significant beneficial effect on health and quality of life specifically around opportunities for local residents.

Decommissioning assessment

- 5.21.9 Whilst similar adverse and beneficial impacts to those identified during the development's construction phase are expected during its future decommissioning, none of these are likely to result in significant effects on human health and wellbeing.

5.22 Cumulative Effects and In-Combination Assessment

Approach

- 5.22.1 The effects of our development have the potential to interact with the likely effects of other planned projects in the area and result in new, greater or different effects (cumulative effects). Similarly, the individual effects of our development, such as air quality and noise, may also come together to cause a greater overall effect on receptors (in-combination effects). We have therefore undertaken assessments to understand these possible interactions.
- 5.22.2 Our cumulative studies involved a review of planning applications and development allocations within a defined area surrounding our development site. A total of 29 development applications that had a sufficient level of environmental information available were considered in our cumulative assessment.
- 5.22.3 Our in-combination studies involved a review of the effects reported within each individual assessment topic to identify common receptors. For example, if a public right of way user was identified in our assessment as likely to experience multiple impacts, this receptor would be taken forward into the in-combination assessment to identify the combined effect on them.

In-Combination assessment

Construction

- 5.22.4 During construction, the potential for in-combination impacts have been identified at a number of receptors and locations in the area surrounding our development.
- 5.22.5 Whilst mitigation measures will be implemented within individual topics that will, together, reduce the significance of construction-related in-combination effects on receptors, some significant in-combination effects are unavoidable.
- 5.22.6 The majority of these significant effects will be temporary, affecting residential receptors along Queens Road, commercial receptors along Queens Road, users of the nearby public rights of way network, and the Long Strip woodland. These effects will principally occur as a result of their distance from construction operations and exposure to visual changes, dust and noise; however, the effects at the Long Strip woodland will be permanent in nature due to the combination of tree loss and impacts on its historic value.

Operation

- 5.22.7 In-combination effects are expected during operation of our development, but these will not be significant.

Decommissioning

- 5.22.8 The in-combination assessment for the decommissioning phase of our development focused on those topics where decommissioning was a relevant assessment scenario. This concluded that any such effects will not be significant.

Cumulative assessment

Construction

- 5.22.9 We considered how the 29 identified development applications may interact with our development in the cumulative assessment during the construction phase.

- 5.22.10 This identified a likelihood of significant adverse cumulative landscape and visual effects occurring from viewpoints and character areas we had assessed. These effects are due to construction activity and/or infrastructure associated with our proposals being seen in the landscape and also viewed alongside activities and infrastructure associated with other identified developments.

- 5.22.11 In reviewing these interactions, we concluded that the significance of the identified cumulative landscape and visual effects will be no different or greater than the individual effects identified for our development on its own.

- 5.22.12 Our assessment also identified a significant beneficial cumulative effect for socio-economics. This effect is due to the likely increases in employment opportunities arising from multiple developments being built at the same time as our development. Whilst the significance of this beneficial cumulative effect is no different or greater than the individual effect identified for our development on its own, it is expected that the combined delivery of several developments at the same time will boost employment opportunities further.

- 5.22.13 No significant adverse or beneficial cumulative effects were identified for other environmental topics during construction.

Operation

- 5.22.14 Significant adverse cumulative visual effects were identified on a small number of viewpoints because of our development being operational and being visually apparent alongside activities and infrastructure associated with other identified developments. The significance of these effects will, however, be no different or greater than the individual effects identified for our development on its own.

- 5.22.15 As with the construction phase, a significant beneficial cumulative effect is expected for socio-economics due to increases in employment opportunities from our operational development and those associated with other identified developments in the area.

- 5.22.16 No significant adverse or beneficial cumulative effects were identified for other environmental topics during operation.

Decommissioning

- 5.22.17 It is not possible to identify and assess the potential for cumulative effects to arise from decommissioning the landside components of our development due to uncertainty surrounding future development plans and allocations. Such effects will, therefore, be considered prior to decommissioning being undertaken.

5.23 Summary of Effects

- 5.23.1 The assessments summarised above indicate that the Project has the potential to generate some adverse environmental effects, a limited number of which have the potential to be significant after impact avoidance measures and mitigation is applied. These effects are outlined below in Table 5.1.

- 5.23.2 Following statutory consultation, the Applicant has considered any comments received in order to identify opportunities for the refinement of the Project design, and confirmation of mitigation approaches. The environmental effects associated with the resultant Project design have been assessed in detail within the Environmental Statement.

Table 5.1: Summary Table of Significant Effects

Chapter	Project Stage	Effect
Chapter 8: Terrestrial Ecology	Construction	Pipe-rack and jetty access road construction resulting in permanent loss of woodland from the Long Strip Woodland – moderate adverse
Chapter 10: Ornithology	Construction	Permanent loss of woodland habitat within Long Strip affecting breeding birds (non-SPA/Ramsar) – moderate adverse
Chapter 13: Landscape and Visual	Construction	Impact on landscape character to the Site and its immediate setting – moderate adverse
		Changes in visual amenity for recreational users of public rights of way/bridleway and proposed England Coastal Path Route – major adverse
		Changes in visual amenity for residential receptors on Queens Road – major adverse
	Operation	Changes in visual amenity for recreational users of public rights of way/bridleway and proposed England Coastal Path Route – Moderate adverse
Chapter 19: Climate Change	Operation	Impact resulting from operational greenhouse gas emissions – beneficial
Chapter 23: Socio-Economics	Construction	Employment generation during the construction phase – major beneficial
		Loss of residential properties on Queens Road – moderate adverse
		Gross Value Added ("GVA") generated during the construction phase – moderate beneficial
	Operation	Employment generation during the operational phase – moderate beneficial
Chapter 24: Human Health & Wellbeing	Operational	Health and quality of life in relation to access to employment and training opportunities for local residents – moderate beneficial
Chapter 25: Cumulative and In-combination Effects	Construction	In-combination effect from construction dust, noise (landside construction and construction traffic), vibration, visual effects, traffic and transport and increases in flood risk to 31 Queens Road and other residential properties along Queens Road, at the eastern end – large adverse
		In-combination effect from construction dust, noise (landside construction and construction traffic), vibration, visual effects, traffic and transport and increases in flood risk to 1 Queens Road and other residential – large adverse
		In-combination effect from construction visual effects and increases in flood risk on commercial receptors along Queens Road - large adverse
		In-combination effect as a result of visual and socio-economic combined effects on Bridleway 36 and the proposed England Coastal Path - large adverse
		In-combination effect from the construction of the pipe-rack and jetty access road causing loss of the woodland habitat, combined with the effect on the setting of the asset from a historic environment perspective on the 'Long Strip' woodland – moderate adverse

Chapter	Project Stage	Effect
Chapter 25: Cumulative and In-combination Effects	Construction	Cumulative socio-economic effect due to the construction of the Project together with ten other developments (ID 13, ID18, ID22, ID25, ID29, ID35, ID37, ID 94, ID102, ID115), due to the increase in employment opportunities during the construction phase – large beneficial
		Cumulative landscape effects on the Site and its immediate setting due to construction of the Project together with ID5 and ID115 due to the cumulative developments introducing construction activity on land immediately to the south of the West site and within the Humber Estuary to the north east – moderate adverse
		Cumulative visual effects on View-point 2 as a result of the construction of the Project together with ID13, ID18 and ID115. The construction of the stacks associated with the cumulative developments would be visible in the distance, above the line of trees and dredging would be visible in the foreground - large adverse
		Cumulative visual effects on View-point 3 as a result of the construction of the Project together with ID21, ID37, ID115 and ID116 as construction of the stacks associated with the cumulative developments would be visible in the distance, above the line of trees and dredging would be visible in the foreground - large adverse
		Cumulative visual effects on View-point 11 as a result of the construction of the Project together with ID13, ID18 and ID116, due to the construction of the stacks associated with the other developments being visible in the middle and far distance from this point - large adverse
		Cumulative visual effects will occur on Viewpoint 2 as a result of the visibility of characteristic built structures slightly intensifying due to the operation of the Project cumulatively with three other developments (ID13, ID18 and ID115) – moderate adverse
		Cumulative visual effects on View-point 3 as a result of the visibility of characteristic built structures slightly intensifying due to both the operation of the Project together with other developments (ID21, ID37, ID115 and ID116) due to the presence of the stacks associated with the identified cumulative developments slightly intensifying the visibility of characteristic built structures from this location – moderate adverse
		Cumulative socio-economic effects due to the operation of the Project together with other developments (ID22, and ID116) due to the increase in employment opportunities during the operational phase – moderate beneficial

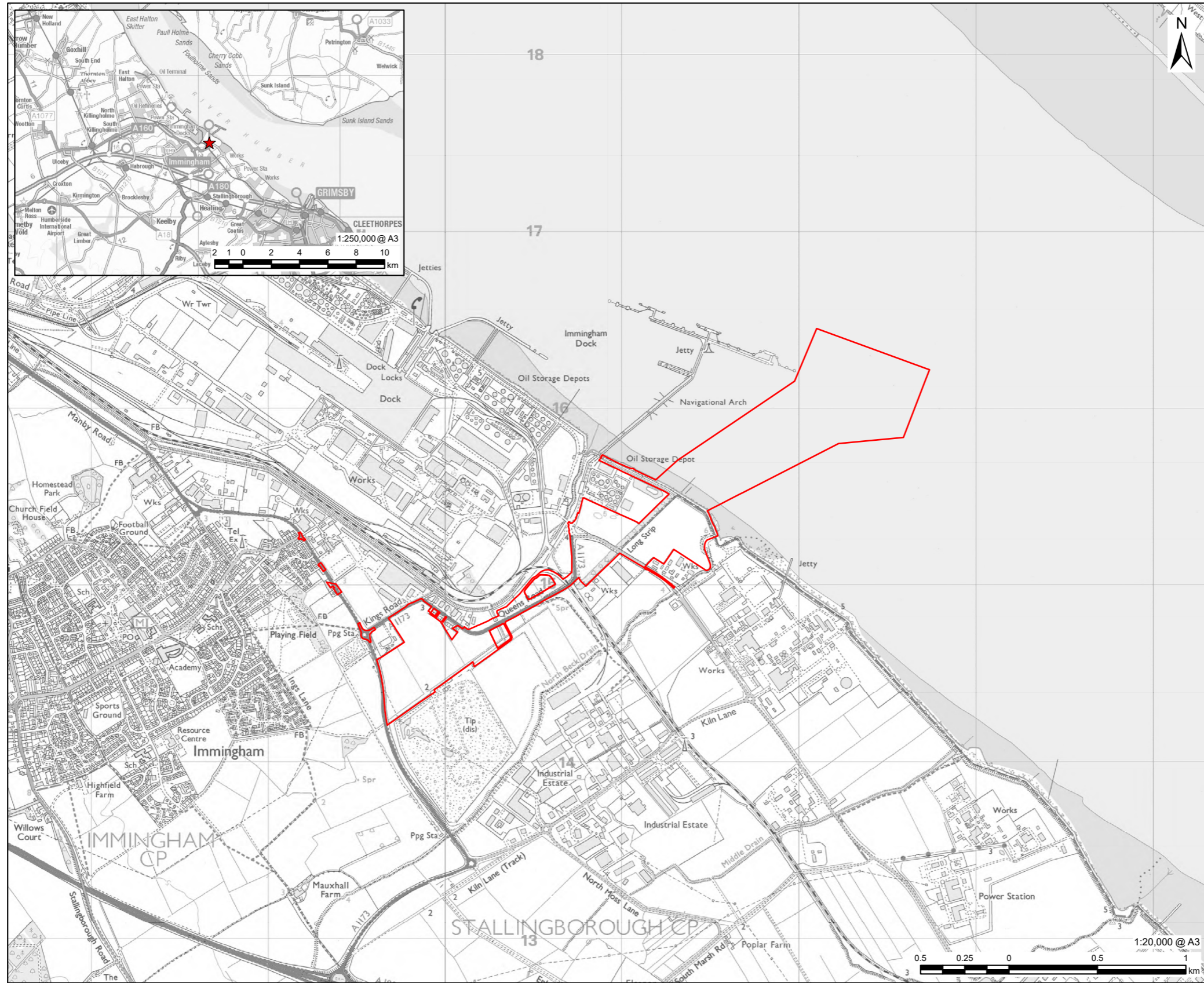
6. NEXT STEPS

- 6.25.1 The Planning Inspectorate will now consider, on behalf of the Secretary of State, whether our application for development consent should be accepted for examination.
- 6.25.2 If accepted, the documents accompanying the application will be publicly available on the Planning Inspectorate's website.
- 6.25.3 Interested parties will be able to make relevant representations about the development and its likely environmental effects. Representations received by the Planning Inspectorate will be considered as part of the application examination process.

FIGURE 1: DEVELOPMENT SITE LOCATION

Revision: 1 Drawn: EB Checked: DF Approved: DC Date: 2023-09-06

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AECOM

PROJECT
Immingham Green Energy Terminal

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LEGEND
 Order Limits
★ Site Location

NOTES
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ISSUE PURPOSE
 Non-Technical Summary

PROJECT NUMBER
 60673509

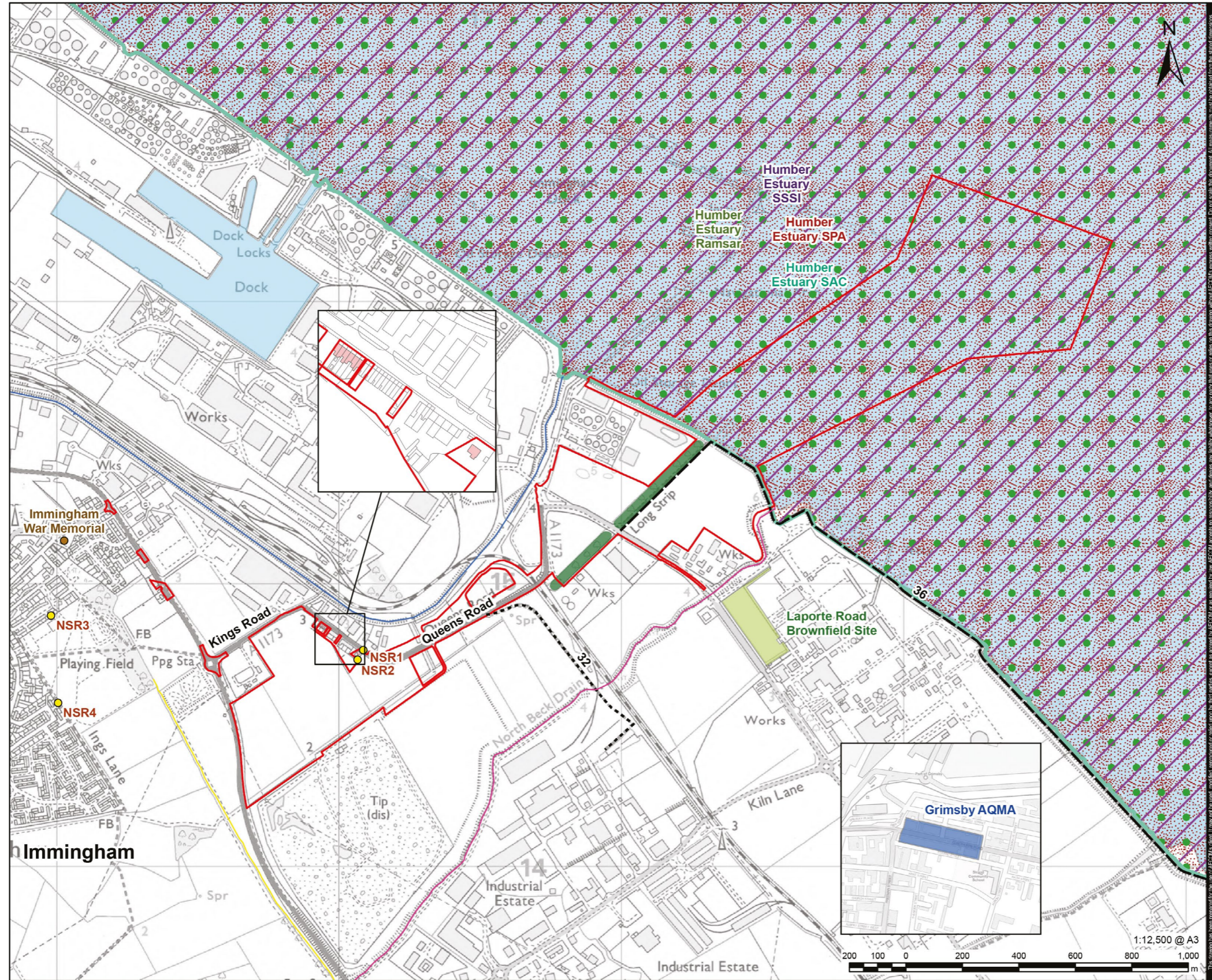
DEVELOPMENT CONSENT ORDER NO
 TR030008

FIGURE TITLE
 Site Location Plan

FIGURE NUMBER
 Figure 1

FIGURE 2: ENVIRONMENTAL CONSTRAINTS PLAN

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LEGEND

- Order Limits
- Listed Building
- Noise Sensitive Receptor (NSR)
- Habrough Marsh Drain
- Immingham Pump Drain
- Stallingbrough North Beck
- Public Footpath
- Bridleway
- Residential Properties on Queens Road
- Long Strip Woodland
- Air Quality Management Area (AQMA)
- Local Wildlife Site (LWS)
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Site of Special Scientific Interest (SSSI)
- Ramsar
- Humber Lower Waterbody

NOTES

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ISSUE PURPOSE
 Non-Technical Summary

PROJECT NUMBER
 60673509

DEVELOPMENT CONSENT ORDER NO
 TR030008

FIGURE TITLE
 Environmental Constraints

FIGURE NUMBER
 Figure 2

