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1.0 NON-TECHNICAL SUMMARY

1.1 Introduction

1.1.1 This is a Non-Technical Summary (NTS) of the Preliminary Environmental Information (PEI) Report that has been prepared in support of a future Development Consent Order (DCO) Application for the construction, operation (including maintenance) and decommissioning of the H2Teesside project (the Proposed Development). The Proposed Development comprises a Hydrogen Production Facility (the Production Facility) with associated works and hydrogen transport pipeline network in Teesside.

1.1.2 H2Teesside will be one of the UK's first commercial-scale (blue) hydrogen production facilities, intended to produce hydrogen as a low-carbon fuel source for both nearby industrial installations via an integrated pipeline network and for export to third-party users. The Production Facility will also also be a Carbon Capture and Storage (CCS) project with a connection to the Northern Endurance Partnership (NEP) offshore storage facility, thereby reducing carbon emissions from the use of natural gas in the production of hydrogen. H2Teesside will therefore make a significant contribution to the UK reaching its net zero greenhouse gas emissions target by 2050.

1.1.3 The Proposed Development comprises:

- an approximately 1.2 Gigawatt thermal (GWth) blue hydrogen production facility (including on-site hydrogen storage);
- carbon export, natural gas, water and wastewater, electricity, oxygen and nitrogen connections; and
- hydrogen pipeline connection to export hydrogen to a wider network of future users.

1.1.4 The NEP high-pressure compression equipment on the adjacent Net Zero Teesside (NZT) site and the associated high-pressure CO_2 Export transport pipeline and offshore Endurance CO_2 store do not form part of the Proposed Development and are being consented separately.

1.1.5 While the Proposed Development is designed for the future distribution and use of hydrogen as an energy/fuel source for third-party industrial users on Teesside, the use of this hydrogen would not form part of the DCO Application and is not considered in this PEI Report, save for considering greenhouse gas (GHG) emissions savings arising from the use of fuel provided by the Proposed Development compared to the continued use of natural gas. Third-party connections to the wider hydrogen distribution network would be the subject of separate consent applications.

1.1.6 The Proposed Development Site covers a wide area located within the administrative boundaries of Redcar and Cleveland Borough Council (RCBC) to the south of the River Tees (South Bank and Dormanstown wards) and in both Stockton-on-Tees Borough Council (STBC) and Hartlepool Borough Council (HBC) to the north of the River Tees (Billingham South ward and Fens & Greatham and Seaton wards, respectively). A portion of the Proposed Development Site south of the River Tees lies within the area covered by the South Tees Development Corporation (STDC) masterplan site within the Teesworks industrial zone.

1.1.7 The final Proposed Development Site boundary for the purposes of the DCO Application (including land for the connection corridors and temporary land required during construction), will be refined through ongoing studies and taking into account responses to the statutory consultation.

1.1.8 The location of the Proposed Development Site is shown in Plate 1.

Plate 1: Proposed Development Site Location

1.1.9 Further information on the Proposed Development can be found in Chapter 4: Proposed Development (PEI Report, Volume I) and on the project website[1].

1.1.10 The PEI Report has been prepared to comply with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (referred to as 'the EIA Regulations'). Environmental Impact Assessment (EIA) is a systematic process used to predict the negative (adverse) or positive (beneficial) effects of a proposed development.

1.1.11 The PEI Report presents:

- a description of the Proposed Development, including information on the Proposed Development Site and its design, size and other relevant features;

[1] https://www.bp.com/en_gb/united-kingdom/home/where-we-operate/reimagining-teesside/h2teesside/about-h2teesside.html

- information on the reasonable alternative sites, technologies and layouts that have been considered and the main reasons for the options chosen;
- an assessment of the likely impacts and significant environmental effects of the construction, operation (including maintenance) and decommissioning of the Proposed Development based on the preliminary environmental information available at the time of writing; and
- measures that are proposed to avoid, prevent, or reduce, or if possible, offset, such likely significant adverse effects.

1.1.12 The purpose of this NTS is to describe the Proposed Development and provide a summary in non-technical language of the key findings of the PEI Report.

1.1.13 The PEI Report is to provide suitable information to statutory consultees at an appropriate stage of the design, to allow for feedback or concerns to be addressed and the Proposed Development design amended as necessary.

1.1.14 An Environmental Statement (ES) would be submitted with the DCO Application for the Proposed Development. The ES would present full details of the environmental effects associated with the Proposed Development. The PEI informs and is structured similarly to the ES but is not intended to be a draft ES or equivalent.

1.2 The Applicant

1.2.1 H2 Teesside Ltd, a bp company, is 'the Applicant' for the Proposed Development.

1.2.2 H2 Teesside Ltd is to be the lead developer and operator for the Hydrogen Production Facility and hydrogen pipelines which would support the decarbonisation of natural gas used for industrial applications in Teesside.

1.2.3 The Proposed Development will export carbon (as CO_2) via the CO_2 Export Corridor NEP facilities on the adjacent NZT site. The captured CO_2 would be compressed to high pressure by NEP to "dense phase" for transportation by a new pipeline to the NEP Endurance store beneath the North Sea. The onshore infrastructure required for compression and export (the high-pressure compression plant and CO_2 export pipeline) is subject to a separate consent, through the NZT DCO Project (for which a decision on whether a DCO has been granted is expected in the second half of 2023). The conditioned and compressed CO_2 would be transported offshore by NEP for storage at the Endurance underground store beneath the North Sea located approximately 145 km to the east/south-east of the Proposed Development Site. Geological storage and offshore CO_2 transportation would be managed and operated by NEP and would also be subject to separate consents.

1.3 The Development Consent Order

1.3.1 The Applicant intends to submit an application to the Secretary of State (SoS) for Energy Security and Net Zero under Section 37 of the Planning Act 2008 (the Planning Act), seeking a DCO for the Proposed Development. A DCO is required for the Proposed Development as the SoS has made a direction under Section 35 of the

Planning Act to designate it as a project which must be consented via a DCO. It is currently anticipated that the DCO Application will be submitted in 2024.

1.3.2 Subject to it being granted by the SoS, the DCO will provide the necessary authorisations and consents for the construction, operation (including maintenance) and decommissioning of the Proposed Development. If granted the DCO would contain a number of 'Requirements' to secure mitigation measures and govern how the construction and operation of the Proposed Development can proceed - 'Requirements' are referred to at various points in this NTS.

2.0 ASSESSMENT METHODOLOGY

2.1 EIA Methodology

2.1.1 The assessment presented in the PEI Report follows a standard EIA methodology, which is summarised below.

2.1.2 The objective of the EIA process is to determine the changes (referred to as 'impacts') that may occur to the environment as a result of the Proposed Development. Example impacts include increases in traffic, increased noise, or a change in the composition of the air around the Proposed Development. The changes are compared to 'baseline' environmental conditions. This baseline is defined as conditions which are either current without the Proposed Development (the existing baseline) or would be expected, based on suitable estimates, to occur in future without the Proposed Development taking place (the future baseline). The EIA process identifies potentially sensitive 'receptors' (and resources) that may be affected by these changes, such as local residents, protected sites, local flora and fauna, water, land and defines the extent to which these receptors may be affected by the predicated changes. Where the extent of these effects exceeds a certain threshold, defined by the amount of change and the sensitivity of a given receptor to change, the receptor is predicted to experience a 'significant effect'.

2.1.3 Where possible, the EIA uses standard methodologies, based on legislation, defined standards, and accepted industry criteria. These are set out in detail in each technical chapter of the PEI Report (Volume I).

2.1.4 Effects on receptors can be adverse, neutral (neither positive nor negative), or beneficial. They can also be temporary (not expected to last beyond construction e.g. noise from construction plant) or permanent (expected to last following completion of construction e.g. the views of the finished Proposed Development). Effects can also have different durations including short-term (those associated site site-preparation and construction), medium-term (those that extend into the operational phase for a few months or years), or long-term (those that last for the duration of the operational phase).

2.1.5 For the purpose of the PEI Report, adverse and beneficial effects are described as being potentially 'significant' or 'not significant'. Where the EIA predicts a significant adverse effect on one or more receptors, mitigation measures are identified where possible to avoid or minimise the effect, or to reduce the likelihood of it happening. The use of such mitigation would be secured through requirements included within the draft DCO or through other legislation and consenting regimes (e.g., protected species licences).

2.1.6 Details of the EIA process and assessment methodology are provided in Chapter 2: Assessment Methodology (PEI Report, Volume I).

2.2 EIA Scoping (Selection of Environmental Topics to be Assessed)

2.2.1 EIA scoping is a process that is designed to identify relevant topics that should be included in the EIA and reported in the PEI Report and the subsequent ES. An EIA

Scoping Report and a request for an EIA Scoping Opinion under Regulation 10 of the EIA Regulations was submitted to the Planning Inspectorate (the Inspectorate) and relevant consultees to allow them to comment on the extent and approach to the environmental assessments to be undertaken.

2.2.2 A Scoping Opinion was received from the Inspectorate on 17th May 2023 and is presented within Appendix 1B: Scoping Opinion in PEI Report, Volume III. In compliance with the Scoping Opinion, the PEI Report and the subsequent ES would include assessments of the following environmental topics:

- Air Quality;
- Surface Water, Flood Risk and Water Resources;
- Geology, Hydrogeology and Contaminated Land;
- Noise and Vibration;
- Ecology and Nature Conservation (including Aquatic Ecology);
- Ornithology;
- Marine Ecology;
- Traffic and Transport;
- Landscape and Visual Amenity;
- Cultural Heritage;
- Socioeconomics and Land-Use;
- Climate Change;
- Major Accidents and Natural Disasters;
- Materials and Waste;
- Human Health; and
- Cumulative and Combined Effects.

2.2.3 Following the completion of the EIA Scoping Report and the publication of the Inspectorate's Scoping Opinion, the environmental information for a DCO is reported as follows:

- the PEI Report is prepared to inform consultation with the public and other stakeholders about the Proposed Development, based on the preliminary environmental information available at the time of the consultation; and
- the ES is then prepared to accompany the DCO Application and includes the EIA of the Proposed Development, taking account of any design evolution that has taken place as well as feedback received during consultation.

2.3 Consultation

2.3.1 The Planning Act requires the Applicant to carry out pre-application consultation on their DCO proposals. This includes consultation on the PEI Report to enable consultees to develop an informed view of the potential likely significant effects of the Proposed Development, based on preliminary findings of the environmental assessments undertaken at this time. With this, consultees can provide informed comment on the Proposed Development, the assessment process, and preliminary findings prior to the preparation of the ES.

2.3.2 Consultation with key stakeholders has been ongoing and will continue following the publication of the PEI Report, during the EIA and in preparation of the ES to support the DCO Application. The design of the Proposed Development and the EIA will take into consideration comments received through consultation on the PEI Report.

2.3.3 The PEI Report has been prepared to meet the requirements of Regulation 12(2) of the EIA Regulations. In accordance with Regulation 12(2)(b), the PEI Report presents:

> *"the information referred to in Regulation 14(2) which [...] is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development (and of any associated development)".*

2.4 The PEI Report Structure

2.4.1 The format of the PEI Report is outlined below and largely reflects the proposed format of the final ES:

- Chapters 1 – 2: an introduction to the PEI Report and the Environmental Impact Assessment methodology;
- Chapters 3 – 6: a description of the surrounding area, the Proposed Development and construction methodology and timescales and a description of need for the Proposed Development and the potential alternatives considered;
- Chapter 7: a summary of relevant legislation and planning policy;
- Chapters 8 – 22: preliminary assessments of the likely significant effects of the Proposed Development in relation to the environmental topics scoped into the EIA;

2.4.2 Chapter 23: preliminary assessment of the potential for cumulative and combined effects to occur as a result of the Proposed Development. Volumes II and III of the PEI Report comprise the figures and technical appendices respectively, that accompany each chapter of the PEI Report Volume I.

2.4.3 This NTS forms Volume IV of the PEI Report.

3.0 PROPOSED DEVELOPMENT

3.1.1 The Proposed Development is described in Chapter 4: Proposed Development of the PEI Report (Volume I) and comprises the construction, operation (including maintenance) and decommissioning of an approximately 1.2 GWth (Phase 1 - 600 MWth and Phase 2 - 600 MWth) Carbon Capture and Storage (CCS) enabled Hydrogen Production Facility (the Production Facility). The Proposed Development also comprises the following elements:

- The Hydrogen (H_2) Production Facility itself (including on-site H_2 storage);
- hydrogen export pipelines to allow for export of hydrogen fuel to offtakers in Teesside (Hydrogen Pipeline Corridor);
- an Air Separation Unit (ASU) located on the Main Site, to supply oxygen (O_2) and nitrogen (N_2) for hydrogen production (or alternatively O_2 and N_2 supply pipelines for the H_2 production process if required;
- carbon dioxide (CO_2) capture and compression facilities and CO_2 export pipeline to the adjacent NEP facilities (CO_2 Export Corridor), natural gas pipeline to supply fuel for the supply of gas to the Production Facility (Natural Gas Connection Corridor), and an electricity grid connection to provide power to the Proposed Development (Electrical Connection Corridor);
- water supply and treatment infrastructure and wastewater treatment and disposal infrastructure (Water Connections Corridor);
- other utilities connections, telecommunications, and other associated and ancillary infrastructure, and temporary construction and laydown areas.

3.1.2 The Production Facility, carbon capture and compression facilities and associated infrastructure would be located on the 'Main Site', as referred to in the PEI Report.

3.1.3 Captured CO_2 would be compressed for export via a short CO_2 export connection pipeline to the NEP CO_2 gathering system on the adjacent NZT site. The Proposed Development Site only includes the CO_2 export connection so far as it is required to join the NEP carbon export pipeline. Any further infrastructure required for CO_2 export is subject to a separate consent associated with the NZT Project.

3.1.4 The Proposed Development Site boundary and the Main Site are shown in Annex A (Figure 4-2: Parts of the Proposed Development Site, PEI Report, Volume II) as are the locations of the indicative Connection Corridors within the Proposed Development Site boundary.

3.1.5 Access to the Main Site is expected to be via the existing Teesworks access road from the A1085 Trunk Road, via the former Redcar Steelworks entrance or alternatively via the Lackenby Steelworks entrance. Travelling south-west from the Main Site access, the A1085 Trunk Road provides a link to the A1053 Tees Dock Road, which in turn connects to the A174 to the south and the A66 to the north.

3.1.6 At the end of its design life, decommissioning of the Proposed Development would see the removal of all above ground equipment down to ground level and the ground remediated, to enable future re-use. It is assumed that all underground infrastructure would remain in place; however, all connection and access points would be sealed or grouted to ensure disconnection.

3.1.7 A Decommissioning Environmental Management Plan (DEMP) would be produced and agreed pursuant to a DCO Requirement. The DEMP would consider in detail all potential environmental risks and contain guidance on how risks can be removed, mitigated or managed.

4.0 DESCRIPTION OF THE EXISTING ENVIRONMENT

4.1 Proposed Development Site Details

4.1.1 The Proposed Development Site encompasses approximately 1,350 hectares (ha). This would be refined as the DCO Application progresses with the final layout being determined through studies of constraints and discussions with relevant stakeholders.

4.1.2 Details of the Proposed Development Site are presented in Chapter 3: Description of the Existing Environment (PEI Report, Volume I.)

4.1.3 The Main Site has an area of approximately 91 ha. However, the layout of the Proposed Development has not yet been confirmed and it is not anticipated that all this land would be required.

4.1.4 The Main Site comprises former industrial land that was used for steel production as part of the Redcar Steelworks. Previous industrial buildings and infrastructure that remained on the site have either been demolished or in the process of being dismantled. Therefore, demolition of the existing infrastructure has not been assessed as part of the EIA as it does not form part of the Proposed Development.

4.2 Potential Sensitive Receptors

4.2.1 Environmental receptors (and resources) have been identified within and outside the Proposed Development Site boundary and are described in more detail in Chapter 3: Description of the Existing Environment (PEI Report, Volume I). Distances are provided as the shortest distance between the receptor and the closest point of the boundary of the Proposed Development Site (or Main Site, if specified).

4.2.2 Key receptors for each topic have been identified as part of the assessment process and details are included in the relevant technical chapters (Chapters 8 – 23, PEI Report, Volume I). The key receptors for the Proposed Development are described below.

<u>Residential</u>

4.2.3 There are no residential receptors within the Proposed Development Site.

4.2.4 The nearest residential receptor to the Main Site is Marsh House Farm/Marsh Farmhouse which is located approximately 1.3 km to the east.

4.2.5 The nearest residential settlements to the Main Site are the town of Redcar (approximately 2.6 km to the east), including the borough of Dormanstown (approximately 1.3 km to the south-east). The main residential areas in the vicinity of the Proposed Development are shown on Figure 3-1: Environmental Constraints within 1 km of the Proposed Development Site Boundary (PEI Report, Volume II).

<u>Air Quality</u>

4.2.6 There are no Air Quality Management Areas (AQMAs) within the Proposed Development Site, the nearest being over 20 km away.

Hydrology and Flood Risk

4.2.7 The River Tees (a Main River) discharges to the North Sea via the Tees Estuary at Tees Mouth and is located approximately 0.9 km to the west of the Main Site. The Proposed Development Site includes proposed crossings under the River Tees for the Hydrogen Pipeline Corridor.

4.2.8 Other watercourses within 1 km of the Main Site include:

- Greatham Creek (a Main River), a tributary of the River Tees located 4 km west of the Main Site;
- Dabholm Gut which is a man-made tidal inlet located approximately 0.7 km south of the Main Site;
- The Fleet located approximately 0.8 km east of the Main Site; and
- The Mill Race located approximately 0.9 km south-east of the Main Site.

4.2.9 There are numerous other waterbodies within the Proposed Development Site, including ordinary watercourses, localised drains, pools/surface waterbodies, and areas of marshy ground.

4.2.10 Designated bathing waters ‘Redcar Coatham’ are located immediately north of the Proposed Development Site and ‘Seaton Carew North Gare’ Bathing Water is situated immediately north of the Study Area.

4.2.11 The Main Site is considered to be at low risk of flooding from both tidal and fluvial sources due to being located in Flood Zone 1. There are areas within the Proposed Development Site boundary, including the Hydrogen Pipeline, Water and Electrical Connections Corridors that are within Flood Zone 2 (medium risk) and Flood Zone 3 (high risk) parts of which are protected by flood defences in parts of North Tees.

4.2.12 Tidal flood risk is considered the greatest risk to the north of the Tees Estuary. However, there are Ordinary Watercourses that could pose a fluvial flood risk to small sections of the Hydrogen Pipeline Corridor, predominantly where the connection corridor crosses a watercourse or drain.

4.2.13 There are several tidal defences in proximity to the Proposed Development Site including floodwalls and flood banks. These defences are routinely inspected for potential defects by the Environment Agency.

Geology/Hydrogeology

4.2.14 The site is generally underlain by Made Ground which overlies superficial deposits (Tidal Flat Deposits, Glacio-lacustrine deposits and Glacial Till) and underlain by bedrock (which may comprise Mercia Mudstone Group, Penarth Group (mudstone), Redcar Mudstone or Sherwood Sandstone).

4.2.15 The Superficial Tidal Flat Deposits underlying the Proposed Development Site are classified by the Environment Agency as Secondary Aquifers, the Redcar Mudstone Formation is classified as Secondary undifferentiated Aquifer, and the Mercia Mudstone bedrock is classified as Secondary B aquifer.

4.2.16 A small section of the Proposed Development Site (within the Hydrogen Pipeline Corridor) is located within a Nitrate Vulnerable Zone (NVZ). The Main Site is located over 5 km south-east of the nearest aquifer Source Protection Zone (SPZ). There are no Drinking Water Protected Areas, Drinking Water Safeguard Zones (Surface Water and Groundwater) or groundwater, potable water or surface water abstraction licences located within 1 km of the Proposed Development Site.

Noise and Vibration

4.2.17 The Marsh House Farm at Warrenby is the closest Noise Sensitive Receptor o the Proposed Development Site and is a single residential dwelling within an industrial setting. Areas of public/private amenity close to the Proposed Development Site are mainly located to the north around Coatham. In addition, birds within the Teesmouth and Cleveland Coast SSSI, SPA and Ramsar site may also be sensitive to noise and vibration.

Ecology and Nature Conservation

4.2.18 Within 15 km of the Proposed Development Site there are a number of statutory designated ecological sites including:

- three Special Protection Areas (SPAs);
- three Special Areas of Conservation (SAC);
- two Ramsar sites;
- twenty Sites of Special Scientific Interest (SSSI); and
- three National Nature Reserves (NNRs).

4.2.19 There are areas of the Proposed Development Site that pass within the boundaries of four of these designated ecological sites including:

- Teesmouth and Cleveland Coast SPA;
- Teesmouth and Cleveland Coast Ramsar site;
- Teesmouth and Cleveland Coast SSSI; and
- Teesmouth NNR.

4.2.20 There are thirteen Local Nature Reserves (LNRs) within 5 km of the Proposed Development Site, one of which, Cowpen Bewley Woodland Country Park LNR, is partially located within the Proposed Development Site boundary.

Traffic and Transport

4.2.21 Access to the Main Site is expected to be via the existing Teesworks access road from the A1085 Trunk Road, via the former Redcar Steelworks entrance or alternatively via the Lackenby Steelworks entrance. Travelling south-west from the Main Site access, the A1085 Trunk Road provides a link to the A1053 Tees Dock Road, which in turn connects to the A174 to the south and the A66 to the north.

4.2.22 The Tees Valley Railway Line runs approximately 0.9 km south-east of the Main Site. This line passes through the Proposed Development Site and is operated by Northern

Rail. The Redcar British Steel railway station on the Tees Valley line is located to the south of the Main site and is currently mothballed.

4.2.23 There are no Public Rights of Way (PRoW) within the Main Site. The England Coast Path, a National Trail, runs approximately 1.3 km east of the Main Site. The Teesdale Way Long Distance Route runs adjacent to the Main Site along its northern boundary.

Landscape and Visual Amenity

4.2.24 The Proposed Development Site is located within the Tees Lowlands National Character Area (NCA). This forms a broad, open plain dominated by the meandering lower reaches of the River Tees and its tributaries, with wide views to distant hills. The large conurbation around the Lower Tees and Teesmouth contrasts with the rural area to the south and west, which is largely agricultural in character.

4.2.25 There are no Landscape Character Designations covering the industrial complexes along the banks of the River Tees, including the Proposed Development Site. However, the RCBC's 'Landscape Character Supplementary Planning Document' (March 2010) notes that this industry has a strong influence on neighbouring landscape character areas.

Cultural Heritage

4.2.26 There are no designated heritage assets within the Main Site.

4.2.27 There are 59 listed buildings within 5 km of the Main Site. The closest being three Grade II listed buildings (Marsh Farmhouse and Farm Cottage, 'Garden Wall South of Marsh Farmhouse', and 'Barn and Stable Circa 10 Metres North West of Marsh Farmhouse') located approximately 1.3 km to the east of the Main Site at Warrenby.

4.2.28 There are four conservation areas within 5 km of the Main Site as follows:

- Coatham Conservation Area, Redcar, located approximately 2.5 km to the east;
- Kirkleatham Conservation Area, located approximately 3.8 km to the south-east;
- Seaton Conservation Area, located approximately 4.6 km to the north-west; and
- Wilton Conservation Area located approximately 5 km to the south-east.

4.2.29 There are no Scheduled Monuments, World Heritage Sites, Registered Parks and Gardens, Registered Battlefields or Heritage Coasts within 5 km of the Main Site.

5.0 CONSTRUCTION PROGRAMME AND MANAGEMENT

Construction Programme

5.1.1 The Proposed Development construction programme is currently anticipated to commence shortly after the DCO is granted in 2025. Construction is expected to last for approximately 6 years, taking place in two phases, with overall construction expected to be completed by the end of 2030.

5.1.2 Construction of Phase 1 of the Proposed Development is expected to last for 32 – 36 months years from 2025 to 2028.

5.1.3 Phase 2 of the Proposed Development would include the infrastructure required for a second hydrogen production unit; on-site storage; supporting utilities; and the remaining Hydrogen Pipeline Connections. Early enabling works for Phase 2 may overlap with commissioning for Phase 1 (Q1 2028). However, there is not expected to be an overlap of the main construction phases with the main civils works for Phase 2 beginning after Phase 1 construction is completed (Q2 2028). Phase 2 construction is expected to be completed by the end of 2030.

5.1.4 Each environmental assessment topic within the PEI Report identifies and assesses the reasonable 'worst case' construction scenario for that topic, where relevant.

Construction Activities

5.1.5 Proposed Development construction activities would include:

- establishment of temporary construction laydown areas (including storage, site offices, welfare facilities, secure fencing and gates, and car parking);
- earthworks to prepare the site;
- construction of foundations which may require piling for key structures;
- erection of buildings and structures (including the Hydrogen Production Facility and ancillary units);
- installation of utilities and utility connections (electrical, natural gas, and water connections);
- construction of the CO_2 Export Corridor and Hydrogen Pipeline Corridor; and
- commissioning (testing) of the installation prior to operation.

5.1.6 The Applicant will appoint contractors to undertake the construction phase of the Proposed Development.

5.1.7 A Framework Construction Environmental Management Plan (CEMP) will be prepared as part of the ES to support the DCO Application. It will set out the key measures to be employed during construction to control and minimise the impacts on the environment. A final CEMP will be prepared by the contractor prior to the start of construction. The submission, approval, and implementation of this final CEMP would be secured by a Requirement of the draft DCO.

6.0 NEED, ALTERNATIVES AND DESIGN EVOLUTION

6.1.1 The EIA Regulations state that an ES should include a description of reasonable alternatives studied by an applicant and the main reasons for selecting the chosen development, accounting for environmental effects.

6.1.2 Chapter 6: Need, Alternatives and Design Evolution in the PEI Report (Volume I) provides this information in respect of the Proposed Development, at this preliminary stage. In summary, alternatives have been considered during the evolution of the Proposed Development, including:

- alternative technologies;
- alternative sites;
- alternative layouts and design options within the Proposed Development Site; and
- connection corridor construction methodologies.

6.1.3 Different technologies have been evaluated to identify the preferred option for delivering a CCS enabled blue hydrogen production facility. Two potential technologies, one which involves ATR based reforming and another which utilises a proprietary Low Carbon Hydrogen technology, are now being considered. It is expected that one of these technologies would be selected as the EIA progresses based on factors including capacity, scalability, cost, technology readiness level, energy efficiency, associated emissions, safety, and capture rate. Justification for this selection would be outlined in the ES.

6.1.4 Two Main Site options, Main Site A (the Foundry) and Main Site B (Redcar Bulk Terminal) were considered for site location. The sites are in proximity to each other, and both provide proximity to both existing and potential future users of low carbon hydrogen and to NEP infrastructure for CO_2 export and offshore storage. Both Main Site options can be connected to required infrastructure (including natural gas, water and electrical) and both are considered sufficiently remote from any safety sensitive receptors.

6.1.5 Main Site A is deemed the most appropriate location for the Main Site given its location directly adjacent to the NEP onshore facilities thereby simplifying the CO_2 Export pipeline corridor routing. This site also presents an opportunity for locating other proposed bp projects adjacent to the Proposed Development Site.

6.1.6 Alternative layouts within the Main Site are being evaluated in terms of the configuration of structures and buildings, and the design of the Proposed Development. Alternative options for routing of the Hydrogen Pipeline, Natural Gas, 'other gases' (O_2 and N_2), Electrical and Water and Wastewater Connection Corridors are also still being evaluated and refined. Options in respect of water and wastewater management are also still under consideration. The Proposed Development includes an appropriate degree of flexibility to allow for the future selection of these options.

6.1.7 Alternative construction methodologies for connection corridors that are being considered include trenchless crossings, below ground open trench, the installation of new or existing above ground support structures, and the repurposing and reuse of existing pipelines (where possible). This is subject to ongoing design work, discussions with landowners and statutory consultees, and is being informed by environmental sensitive receptors and constraints and surveys.

6.1.8 To ensure a robust assessment, a maximum built ‘envelope’ (also referred to as the ‘Rochdale envelope’) has been defined to accommodate this necessary flexibility and to enable the EIA to consider the ‘worst case’ of potential design elements.

6.1.9 The overall design and construction methodology of the Proposed Development has been identified and developed following the above approach, taking into account environmental effects alongside other factors such technical and commercial availability. The design of the Main Site elements and the connection routings within the Connection Corridors will continue to evolve following consultation. The final Rochdale Envelope design will be reported in the ES that will be submitted as part of the DCO Application.

7.0 SUMMARY OF ENVIRONMENTAL EFFECTS

7.1 Introduction

7.1.1 The likely significant environmental effects of the Proposed Development are described within the PEI Report (Volume I). This section provides a summary of the overall findings of the PEI Report.

7.1.2 An assessment of the environmental impacts and effects of the Proposed Development during its construction, operation (including maintenance) and decommissioning has been completed for each of the topics that have been scoped for inclusion within the EIA.

7.1.3 It is envisaged that the impacts and effects of the eventual decommissioning of the Proposed Developments are likely to be comparable to, or less than, those for construction activities and may be similarly controlled. As such, the commentary below as related to construction phase effects is also considered to be applicable to the decommissioning phase.

7.2 Air Quality

Introduction

7.2.1 Chapter 8: Air Quality (PEI Report, Volume I) presents the findings of a preliminary assessment of potential air quality effects on human health and ecological receptors as associated with the Proposed Development.

7.2.2 There are no AQMAs identified in the area with the potential to be affected by the Proposed Development.

7.2.3 Baseline air quality conditions have been evaluated through a review of local authority air quality management reports, Defra published data and other sources. Monitoring has also been conducted in the air quality study area to supplement available data.

7.2.4 The air quality assessment uses screening tools and computer models to predict the dispersion of air emissions from the Proposed Development and its associated traffic movements. These predict concentrations of pollutants in ambient air which are compared to national air quality standards where available, or other appropriate levels as agreed with regulators. Further air quality modelling will be undertaken during the EIA and reported in the ES.

Effects During Construction

7.2.5 During construction, air quality effects could arise due to:

- construction dust emissions on human and ecological receptors; and
- construction traffic emissions.

7.2.6 An evaluation of construction dust arisings concluded that there could be a low to medium impact on human health and a high impact on ecological receptors resulting in potentially adverse (significant) effects. However, it is considered that through the implementation of mitigation measures included within the CEMP, effects of dust on sensitive receptors would not be significant.

7.2.7 Despite there being some sensitive human receptors along roads where construction traffic would be present, effects of construction traffic on air quality are predicted to be not significant.

Effects During Operation

7.2.8 A preliminary operational assessment for the Production Facility has predicted that air quality effects on human health receptors are not significant. As the design progresses and when additional information becomes available, further air quality modelling would be undertaken during the EIA.

7.2.9 Subject to further air quality modelling, it is predicted that air quality effects on nearby ecological receptors during the operation of the Proposed Development are likely to be significant. This would need to be further evaluated during the EIA and will be considered in further detail in Chapter 12: Ecology and Nature Conservation and the Habitat Regulations Assessment.

7.2.10 Operational phase traffic flows are below applicable screening criteria. Therefore, significant air quality effects from traffic emissions are not anticipated.

7.3 Surface Water, Flood Risk and Water Resources

Introduction

7.3.1 Chapter 9: Surface Water, Flood Risk and Water Resources (PEI Report, Volume I) presents the findings of a preliminary assessment of likely significant effects of the Proposed Development on the surface water environment (including inland, transitional, and coastal surface waters), flood risk and water resources. The scope of the assessment includes water quality, water resources, hydro-morphology, flood risk and drainage.

7.3.2 A summary of surface water bodies within the water environment study area, and flood risk for the Proposed Development Site is outlined in Section 4 of this NTS.

Effects During Construction

7.3.3 During construction, water environment effects could include:

- temporary impacts on surface water quality;
- temporary impacts on the hydromorphology of watercourses;
- potential impacts on groundwater resources and local water supplies and potentially the baseflow to watercourses;
- potential increase in surface water runoff leading to an impact on flood risk;
- increased risk of groundwater flooding or recharge as a result of below ground installations; and
- alteration in fluvial and overland flow paths.

7.3.4 As a worst case, it is assumed that there would be open cut installation across several watercourses for the connection corridors. The proposed open cut methodology has been assessed as having a localised and potential temporary Moderate adverse (significant) effect on the hydromorphological status of Belasis Beck, which is a watercourse of high importance for morphology. This effect would be temporary with the watercourse morphology expected to recover. This will be reassessed during the EIA once further details on watercourse crossing construction methodologies (e.g., using trenchless technologies) are known.

7.3.5 With the implementation of mitigation measures through the CEMP and associated Water Management Plan (WMP), no other significant effects during Proposed Development construction have been identified. The WMP will include an outline of responsibilities with regard to water management, required water quality monitoring, pollution prevention measures, training requirements for construction workers with regard to the water environment, an outline of likely relevant permissions and consents required, and a Pollution Incident and Response Plan.

<u>Effects During Operation</u>

7.3.6 During operation, water environment effects could arise due to:

- impacts on receiving water features from pollutants;
- changes in water quality from operational discharges;
- potential nutrient enrichment of ponds located adjacent to the Main Site;
- potential increase in volume and rate of surface water runoff leading to an impact on flood risk;
- increased local demand for potable water supply; and
- water quality impacts on receiving water features from an increase in foul drainage.

7.3.7 Changes in water quality within the Tees Coastal waterbodies from operational discharges have been predicted to have a potential moderate adverse (significant) effect due to the very high importance of these receptors for water quality. This will be re-evaluated during the EIA when more details regarding effluent quality and water treatments are available. If required, mitigation measures would then be identified.

7.3.8 With the implementation of a Surface Water Drainage Strategy, a Pollution Prevention Plan, Emergency Response Plan, a Surface Water Maintenance and Management Plan and measures outlined in the Preliminary Flood Risk Assessment, no other significant effects are predicted for surface water, flood risk or water resources during Proposed Development operation.

7.4 Geology, Hydrogeology and Contaminated Land

Introduction

7.4.1 Chapter 10: Geology, Hydrogeology and Contaminated Land (PEI Report, Volume I) presents the findings of a preliminary assessment of significant effects from the Proposed Development on geology, hydrogeology and contaminated land. Consideration has been given to geology (superficial soils and bedrock), geological and hydrogeological designations, soils and agricultural land classification, land contamination and minerals.

7.4.2 A desk-based assessment of available information and relevant interpretive reports of previous ground investigation (GI) works have been used to define the baseline conditions and thereafter the potential effects associated with the Proposed Development on ground conditions. Further confirmatory intrusive GIs will be undertaken to determine the need for further risk-based assessment and to inform the Proposed Development detailed design.

Effects During Construction

7.4.3 Potential impacts on ground conditions during the construction phase include:

- creation of new contaminant linkages;
- mobilisation of existing contaminants;
- changes to hydrogeological regimes (e.g. during dewatering activities); and
- changes to surface water quantity and quality.

7.4.4 With appropriate design of the Proposed Development Site construction activities and with the implementation of appropriate construction mitigation measures to be detailed in the CEMP, no significant adverse effects are anticipated.

Effects During Operation

7.4.5 During operation, potential impacts on ground conditions could arise due to impacts to soil quality, groundwater and watercourses as a result of accidental spills from the handling or leakage of fuels, lubricants, stored chemicals and process liquids.

7.4.6 With appropriate operational management of the Proposed Development in accordance with the Environmental Permit and the DCO, no significant adverse effects are anticipated.

7.5 Noise and Vibration

Introduction

7.5.1 Chapter 11: Noise and Vibration (PEI Report, Volume I) presents the findings of a preliminary assessment of the potential noise and vibration effects from the Proposed Development.

7.5.2 Potential noise sensitive receptors (NSRs) have been identified around the boundary of the Proposed Development Site. Ambient sound measurements have been undertaken and noise levels during construction and operation of the Proposed

Development have been predicted. As construction activities are currently unknown, predicted construction noise levels have been based on construction methods used for similar energy and pipeline projects. National standards have been applied to determine whether there is the potential for significant effects without further mitigation measures being applied.

7.5.3 The assessment has also considered the potential for vibration effects. No significant vibration is expected from construction activities at the Main Site; however construction impacts are likely to be higher as a result of works within the Connection Corridors due to their proximity to receptors.

Effects During Construction

7.5.4 During construction, effects could arise due to:

- noise and vibration from construction works; and
- potential changes in road traffic noise.

7.5.5 Unmitigated effects from construction on noise levels at nearby NSRs have been estimated and effects classified which has identified the following:

- potential major and moderate adverse (significant) effects have been predicted at NSRs H1 (Manor House Farm, Cowpen Bewley) and H4 (Seal Sands Office) respectively as a result of trenchless crossing for the Hydrogen Pipeline during the daytime;
- during evenings and weekends, potential major adverse (significant) effects have been predicted due to open cut trenches at H1 during construction of the Hydrogen Pipeline Corridor and at H6 (58 Broadway West, Redcar) during construction of the Electrical Connection Corridor;
- during evenings and weekends, potential major or moderate adverse (significant) effects have been predicted at NSRs H1, H5 (Marsh House Farm, Warrenby) and H6 as a result of trenchless workings for the Hydrogen Pipeline and/or Water Connections Corridors;
- at night-time, construction activities at the Main Site are predicted to have potential moderate adverse (significant) effects on NSRs H5 and H6;
- at night-time, potential major and/or moderate adverse (significant) effects have been identified at NSRs H1, H2 (Cresswell Road, Grangetown), H5 and H6 as a result of open cut trench workings for the Hydrogen Pipeline, Water Connections, and Electrical Connection Corridors;
- at night-time, potential Major adverse (significant) effects have been identified at NSRs H1, H5 and H6 as a result of trenchless crossing for the Hydrogen Pipeline and Water Connections Corridors.

7.5.6 However, the potential significant noise effects as detailed above are unmitigated. Noise control measures would be implemented through the Final CEMP and best practice construction methods would be used to reduce noise effects. Where significant construction effects are predicted, additional noise-control equipment such as jackets on pneumatic drills, acoustic covers on compressors, shrouds on piling rigs and cranes would be implemented. The use of temporary barriers or screens can also provide additional mitigation. With these measures and further measures to be identified through further assessment during the EIA, noise effects during construction are anticipated to be reduced to levels that are not significant.

7.5.7 No significant noise effects have been predicted as a result of construction traffic.

7.5.8 There is potential for some vibration effects to cause annoyance to occupants of residential receptors during construction of connection corridors resulting in a Moderate adverse (significant) effect at NSRs H1 and H4. Measures to control vibration such as avoiding the use of vibratory equipment within proximity to NSRs, will be detailed in the CEMP, such that significant effects are not anticipated. Further consideration will be given to potential vibration effects and an assessment reported in the ES.

<u>Effects During Operation</u>

7.5.9 Potential moderate adverse (significant) effects during the daytime and major/moderate adverse (significant) effects during the night-time have been predicted at H5 during the operation of the Proposed Development.

7.5.10 With the placement of limits on noise emissions from plant and equipment at source, in addition to screening or orientating plant within the Site away from sensitive receptors, operational noise levels are anticipated to be reduced such that significant effects would be avoided. Sound reductions required to mitigate operational sound will be considered further as the Production Facility design progresses and will be presented in the ES.

7.6 Ecology and Nature Conservation (including Aquatic Ecology)

<u>Introduction</u>

7.6.1 Chapter 12: Ecology and Nature Conservation (including Aquatic Ecology) (PEI Report, Volume I) presents the findings of a preliminary assessment of the potential significant effects from the Proposed Development on terrestrial and aquatic ecological features (habitats and protected species, including bats).

7.6.2 The assessment of likely significant effects has taken a precautionary approach and presents a worst-case scenario as surveys to inform the assessment are currently ongoing, and the Proposed Development design is still being developed. Effects will be re-evaluated during the EIA following the definition of site-specific mitigation measures.

<u>Effects During Construction</u>

7.6.3 During construction, ecological effects could be generated due to the following:

- direct or indirect habitat loss/modification;
- loss of functionally linked land to statutory designated sites;
- direct harm from noise and visual disturbance of species;

- physical or chemical pollution resulting in degradation of habitats;
- changes in air quality from construction dust;
- changes in hydrology;
- changes in water quality (chemical or physical) of watercourses resulting from their crossings (open-cut or otherwise) or a pollution event or mobilisation of sediment;
- crossing or culverting of watercourses; and
- encroachment of machinery, compaction of soil, or a pollution event resulting in damage.

7.6.4 The Proposed Development construction works will be undertaken in a manner that aims to avoid impacts to ecological receptors – this includes the use of trenchless technologies where possible, using existing infrastructure, implementation of the CEMP, and the presence of an Environmental or Ecological Clerk of Works during the construction works.

7.6.5 Nevertheless, at present, the preliminary assessment indicates that the Proposed Development construction activities have the potential to generate a range of potentially significant adverse effects on a range of ecological habitats, including designated and non-designated sites, as well as protected species. This is a precautionary assessment before taking into consideration site-specific mitigation and habitat management measures. Such measures are being developed in consultation with Natural England and other stakeholders and would be reported in the ES. As such, it is anticipated that predicted ecological effects to be reported in the ES will be less than those presented in Chapter 12: Ecology and Nature Conservation (PEI Report, Volume I).

Effects During Operation

7.6.6 During operation, potentially significant adverse effects could be generated due to:

- loss of functionally linked land to statutory designated sites;
- noise and visual disturbance of species within statutory designated sites; and
- changes in air quality at statutory and non-statutory designated sites.

7.6.7 The Proposed Development includes measures that aim to minimise impacts upon ecological receptors. This includes avoidance of sensitive ecological habitats, appropriate lighting design, and optimisation of the Proposed Development's stack height. Detailed dispersion modelling of emissions to air will be undertaken during EIA to determine potential impacts on ecological features and design mitigation measures (such as stack height considerations whilst balancing other impacts). Further mitigation would be provided within the ES following completion of surveys and Proposed Development design.

7.6.8 The creation of new habitats as associated with the Proposed Development design has the potential to deliver some potentially significant beneficial effects – this includes effects on open mosaic habitat on previously developed land, ponds and other habitats of local or above importance.

7.6.9 Biodiversity Net Gain (BNG) consists of a new obligation on all planning permissions and DCOs to improve the environment by at least 10% as a compulsory planning condition; details are set out in the Environment Act 2021, sections 98 and 99, therefore the Applicant will aim to achieve BNG as part of the habitat creation associated with the Proposed Development.

7.7 Ornithology

Introduction

7.7.1 Chapter 13: Ornithology (PEI Report, Volume I) presents the findings of a preliminary assessment of the potential significant effects associated with the Proposed Development on ornithological features (breeding and wintering birds).

7.7.2 The Proposed Development Site is located within the Teesmouth and Cleveland Coast SPA/Ramsar site and the Teesmouth and Cleveland Coast SSSI.

Effects During Construction

7.7.3 During construction, ornithological effects could be generated due to the following:

- temporary habitat losses and functionally linked land resulting in losses of breeding, roosting and/ or feeding habitats;
- noise and visual disturbance of non-breeding and breeding birds and their dependent young;
- degradation of habitats used by feeding and breeding birds from physical or chemical pollution from emissions of dust and/or particulates and chemical spills to groundwater and/or water;
- increased surface water runoff and flood risk resulting in degradation of nesting and feeding habitats of breeding birds and/or loss of nests;
- morphological and hydrological effects on surface waters resulting in dewatering of wetland habitats used by birds;
- destruction of breeding bird nests, eggs and young; and
- changes in air quality resulting in changes to habitat structure, with resulting effects on nesting and feeding habitats.

7.7.4 The Proposed Development construction works will be undertaken in a manner that aims to avoid impacts to birds. This includes implementation of the CEMP, and the presence of an Environmental or Ecological Clerk of Works during construction.

7.7.5 The preliminary assessment indicates that without the specification of further site-specific mitigation measures, Proposed Development construction activities have the potential to generate a range of potentially significant adverse effects on ornithological features, including birds using designated and non-designated sites. This is a precautionary assessment before taking into consideration site-specific mitigation and habitat management measures. Such measures will be developed in consultation with Natural England and other stakeholders and reported in the ES. As such, it is anticipated that predicted ornithological effects to be reported in the ES would ill be less than those presented in Chapter 13: Ornithology (PEI Report, Volume I).

Effects During Operation

- During operation, without mitigation, effects on ornithological features could arise due to permanent habitat losses including within statutory and non-statutory designated sites, adversely affecting breeding, roosting and feeding species;
- permanent losses of functionally linked land to statutory and non-statutory designated sites adversely affecting breeding, roosting and feeding species;
- noise and visual disturbance causing displacement of birds and brood failures;
- changes in air quality as a result of process emissions and vehicular traffic causing degradation of habitats;
- increased surface water runoff and flood risk resulting in degradation of nesting and feeding habitats and/or loss of nests;
- chemical contamination of Tees Bay marine waters resulting from process wastewater discharges and effects on fish and other prey stocks used as a foraging resource by birds; and
- morphological and hydrological effects on surface waters resulting in dewatering of wetland habitats used by birds.

7.7.6 The Proposed Development includes measures that aim to minimise impacts on birds and their habitats. This includes avoidance of sensitive ecological habitats, appropriate lighting design, and optimisation of the Proposed Development's stack height. Detailed dispersion modelling of emissions to air will be undertaken during the EIA to determine potential impacts on ornithological features and design mitigation measures (such as stack height considerations whilst balancing other impacts).

7.7.7 At present the preliminary assessment indicates that without the specification of further site-specific mitigation measures, Proposed Development operation has the potential to generate a range of potentially significant adverse effects upon ornithological receptors, including birds using designated and non-designated sites. This is a precautionary assessment before taking into consideration site-specific mitigation and habitat management measures. Such measures would be developed in consultation with Natural England and other stakeholders and reported in the ES. As such, it is anticipated that predicted ornithological effects to be reported in the ES will be less than those presented in Chapter 13: Ornithology of this PEI Report.

7.8 Marine Ecology

Introduction

7.8.1 Chapter 14: Marine Ecology (PEI Report, Volume I) presents the findings of a preliminary assessment of the potential significant effects associated with the Proposed Development on marine ecology.

7.8.2 The Proposed Development is situated within the Teesmouth and Cleveland Coast SPA/Ramsar/SSSI and the Teesmouth NNR which are in place, in part, for the protection of seals, providing refuge at important haul-out sites.

7.8.3 A number of protected or notable marine animal species have been identified as present, or potentially present, within the marine ecology study area. These include harbour porpoise, minke whale, bottlenose dolphin and white-beaked dolphin, grey seal and harbour (or common) seal. In addition, several protected or notable migratory and commercial fish species have been identified.

Effects During Construction

7.8.4 During construction, potential impacts to marine ecological receptors include:

- indirect impacts upon marine ecology from changes in water quality as a result of polluted surface water runoff;
- impacts on hauled-out or surfaced seals from changes in airborne soundscape and visual cues.

7.8.5 The Proposed Development construction works will be undertaken in a manner that aims to avoid and minimise effects upon marine ecology. This includes the selective use of trenchless technologies for watercourse crossings, specified construction hours, controlled use of construction lighting and other measures to be detailed in the CEMP. With the implementation of such measures, and due to the temporary and short-term nature of potential construction impacts, both direct and indirect effects upon marine ecology predicted to be not significant.

Effects During Operation

7.8.6 No potential impacts to marine ecology receptors have been identified during the Proposed Development operational phase and as such there is no potential for any potentially significant effects.

7.9 Traffic and Transport

Introduction

7.9.1 Chapter 15: Traffic and Transport (PEI Report, Volume I) identifies the potential effects of the Proposed Development on traffic and transport in the surrounding area. The assessment considers the predicted number of vehicle movements generated during the construction and operation of the Proposed Development, and the sensitivity (including pedestrian and cyclist safety) and capacity of the local road network.

Effects During Construction

7.9.2 The additional traffic due to the Proposed Development construction activities would result in small, temporary increases in traffic flows, including Heavy Goods Vehicles (HGVs), on the roads leading to the Main Site and Connection Corridor areas north and south of the River Tees. However, due to the low sensitivity of the road links used, and the volume of associated traffic, no significant effects are expected.

7.9.3 Notwithstanding this, traffic management measures would be implemented during the construction of the Proposed Development to minimise traffic impacts on the local road network. These measures include:

- implementation of a Construction Worker Travel Plan (CWTP);
- the appointed construction contractor to assess the potential for implementing construction worker minibuses and car sharing options (to be included in the CWTP);
- implementation of a Construction Traffic Management Plan (CTMP) to control the impact of HGVs on the local road network during construction; and
- working with suppliers to ensure that materials classified as hazardous that are being brought to the Proposed Development Site are transported in compliance with applicable regulations.

7.9.4 The construction contractor would also review options for the use of rail and water transport when sourcing construction materials. The contractor would review the use of rail travel for construction staff accessing the Proposed Development Site using the existing Redcar British Steel railway station (currently mothballed).

Effects During Operation

7.9.5 Once operational, the Proposed Development would employ up to 130 full-time staff who would work shifts at the Main Site. During infrequent periods of periodic maintenance this could increase. Due to the very low traffic flows to be generated during operation, Proposed Development operation would not generate any significant transportation effects. A Travel Plan for the operational Production Facility would be prepared and agreed with the Local Planning Authority (LPA) prior to operations commencing.

7.10 Landscape and Visual Amenity

Introduction

7.10.1 Chapter 16: Landscape and Visual Amenity (PEI Report, Volume I) presents the findings of a preliminary assessment of the potential effects of the Proposed Development on landscape character and visual amenity.

7.10.2 The study area for landscape and visual effects includes areas where it is considered that there is potential for significant direct or indirect effects on landscape character or sensitive views due to the construction/decommissioning or operation of the Proposed Development.

7.10.3 The assessment is based on the largest possible dimensions for the Proposed Development and on a worst-case flare stack height of up to 100 m above ground level. There is anticipated to be either a single flare stack or two stacks (one per phase) in the Proposed Development.

Effects During Construction

7.10.4 Although construction activities associated with the Proposed Development would impact several landscape receptors, impacts would be temporary and experienced in the context of other large-scale industrial developments. Therefore, no significant effects are predicted to landscape character during Proposed Development construction.

7.10.5 The assessment indicates that construction activities have the potential to generate temporary moderate adverse (significant) effects at two selected viewpoints, one of which is recreational (viewpoint 7 - England Coast Path, Warrenby) and one which is recreational and residential (viewpoint 8 - Redcar seafront). This is due to their proximity to the Main Site and limiting intervening vegetation. It is considered that such effects are difficult to mitigate due to the proximity of these viewpoints to the Proposed Development and the scale of the associated structures.

7.10.6 Although construction activities would be visible from other visual receptors, they would be viewed in the context of an area containing a high number of large-scale industrial structures. For some viewpoints, such as Viewpoint 3 – Teesmouth National Nature Reserve, England Coastal Path and Viewpoint 5 – South Gare Breakwater, low level construction activities would be screened by intervening landform and vegetation.

Effects During Operation

7.10.7 Although the Proposed Development will introduce additional built development and infrastructure to a number of landscape receptors, this would occur within the context of previous and existing similar development. Therefore, no significant effects are predicted to landscape character during the operation of the Proposed Development.

7.10.8 The assessment indicates that moderate adverse (significant) effects are expected at one recreational viewpoint (Viewpoint 7 – England Coast Path, Warrenby) during operation. This is due to the proximity of the viewpoint to the Main Site and the prominence of structures associated with the Proposed Development. No significant visual effects are expected at residential receptors during Proposed Development operation.

7.10.9 For some visual receptors, such as Viewpoint 3 – Teesmouth National Nature Reserve, England Coastal Path and Viewpoint 14 – Viewpoint at Saltholme Wildlife Reserve and Discovery Park (RSPB), the majority of low-level structures on the Main Site would be screened by intervening landform and vegetation. Although larger structures, stacks and plumes associated with the flare would be visible, this would be in the context of existing large-scale industrial structures within the wider view.

7.11 Cultural Heritage

Introduction

7.11.1 Chapter 17: Cultural Heritage (PEI Report, Volume I) presents the findings of a preliminary assessment of the potential effects to cultural heritage assets which comprise archaeology, built heritage and historic landscape as associated with the Proposed Development. A summary of cultural heritage receptors is outlined in Section 4 of this NTS.

7.11.2 A number of mitigation measures have been incorporated into the design and construction methodologies of the Proposed Development, to avoid impacts to known or unrecorded heritage assets. During the construction period these include:

- refining connection corridor routes where practicable;
- use of existing pipeline infrastructure and established corridors where practicable;
- siting much of the Hydrogen Pipeline Connection in an existing above ground pipeline racking network;
- use of trenchless technologies, including horizontal directional drilling (HDD) or a micro-bored tunnel (MBT) for the Hydrogen Pipeline and other connection corridors;
- use of brownfield sites or existing hard standing areas, where practicable within the Proposed Development Site for construction laydown areas.

Effects During Construction

7.11.3 Features relating to a Romano-British settlement have been recorded within the Hydrogen Pipeline Corridor and there is potential for additional features relating to this settlement to extend into the Hydrogen Pipeline Corridor. These previously unrecorded remains have the potential to be of low to medium heritage value. Due to being underground within the vicinity of the settlement, construction of the Hydrogen Pipeline Corridor has the potential to result in the permanent loss of such remains – this would result in a major adverse (significant) effect if left unmitigated. No other potentially significant cultural heritage effects have been identified.

7.11.4 Given the above, a programme of archaeological evaluation and mitigation will be undertaken, consisting of excavation and recording which will be carried out prior to the start of construction. The archaeological investigation will be carried out in accordance with a Written Scheme of Investigation agreed (WSI) with relevant archaeology officers and local authorities. A protocol will also be included in the CEMP that will include procedures for the reporting, protection and management of unexpected archaeological discoveries. With the implementation of the proposed mitigation, no significant residual effects upon heritage assets are expected.

Effects During Operation

7.11.5 Operation of the Proposed Development would not have any impacts upon buried archaeological remains. The Proposed Development will represent a new component into an existing industrial landscape. However, its inclusion within the visual setting of existing heritage assets would not result in significant changes to these asset's setting or value. As such, no potentially significant cultural heritage effects have been identified during the operation of the Proposed Development.

7.12 Socioeconomics and Land-Use

Introduction

7.12.1 Chapter 18: Socioeconomics and Land-Use (PEI Report, Volume I) presents the findings of a preliminary assessment of the potential effects of the Proposed Development on employment, local businesses and the local population. The assessment takes into account the demographics of the area surrounding the Proposed Development Site.

7.12.2 The design of the Proposed Development aims to minimise potential socioeconomic impacts by:

- minimising impacts on any PRoW that cross the Proposed Development Site;
- use of construction methods that minimise local disruption, including methods for the hydrogen pipeline crossing under the River Tees.

Effects During Construction

7.12.3 A total of 675 net construction jobs are expected to be generated during the Proposed Development construction phase, of which 506 are expected to be within the Middlesbrough and Stockton area. Construction employment created by the Proposed Development construction phase is predicted to have a moderate beneficial (significant) short-term effect on local employment.

7.12.4 No potentially significant effects are predicted associated with wider socioeconomic impacts to agricultural and industrial land, PRoW, private assets, education and community facilities, development land, temporary workers accommodation, or demographic effects and community disruption.

Effects During Operation

7.12.5 A total of 61 net operational jobs are expected to be generated during the Proposed Development operation, with 46 of these estimated to be filled by residents of the Middlesbrough and Stockton area. This would result in a minor beneficial effect (not significant).

7.12.6 No significant socioeconomic effects are expected during Proposed Development operation.

7.13 Climate Change

Introduction

7.13.1 Chapter 19: Climate Change (PEI Report, Volume I) presents the findings of a preliminary assessment which considers the potential effects of the Proposed Development on the climate and the effect of future climate change on the Proposed Development and the surrounding environment.

7.13.2 The assessment includes:

- Lifecycle greenhouse gas (GHG) impact assessment (the potential effect the Proposed Development may have on GHG emissions and therefore climate change); and
- Climate change resilience assessment (the resilience of the Proposed Development to future projections for climate change).

7.13.3 Due to the preliminary nature of this assessment, it is not currently possible to undertake a full in-combination climate change impacts assessment (the combined effect of the Proposed Development and climate change on surrounding receptors). However, during the EIA, the assessment will identify the likely in combination impacts and effects. The results will be presented in the ES.

GHG Assessment

7.13.4 The receptor for GHG emissions associated with the Proposed Development is the global climate.

7.13.5 GHG emissions associated with the Proposed Development have been examined for their significance against the UK Carbon Budgets. The preliminary assessment indicates that the GHG emissions from hydrogen production and distribution are Minor to Moderate adverse. However, when looking at the ability of the hydrogen produced to enable a transition to a lower carbon economy, the Proposed Development has a net benefit due to the reduced carbon emissions when compared to use of natural gas or diesel.

Climate Change Resilience

7.13.6 The potential impacts and effects of projections for climate change on the Proposed Development have been assessed, taking into account resilience measures that have been incorporated into the Proposed Development design.

7.13.7 With mitigation measures embedded in the Proposed Development design, no significant resilience risks have been identified as these are deemed sufficient to reduce the likelihood or consequence of an impact occurring from projected climate hazards.

7.14 Major Accidents and Disasters

Introduction

7.14.1 Chapter 20: Major Accidents and Disasters (MA&Ds) (PEI Report, Volume I) presents the findings of a preliminary assessment which considers the MA&Ds that have the potential to arise during the construction, operation (including maintenance) and decommissioning of the Proposed Development.

7.14.2 Major accidents are incidents such as fires and explosions that could result in serious harm to people. They also have the potential to cause widespread damage to property and the environment. Disasters can be naturally occurring events, such as earthquakes, landslides and flooding. The impact of MA&Ds can be very significant, but the likelihood of their occurrence is generally low.

7.14.3 There are a number of sites regulated by the Control of Major Accidents Hazard (COMAH) Regulations 2015 within 5 km of the Proposed Development Site. Together these sites form a 'domino group' where the risks or consequences of a major accident may be increased due to the proximity of the sites to each other. There are also a number of sensitive receptors which could be vulnerable to MA&D risks. These include private residences, community and local economic receptors, the historical and cultural environment, the water environment, designated ecological sites, and infrastructure and the built environment.

7.14.4 The Proposed Development is anticipated to be an Upper Tier COMAH (defined as facilities that store, handle, or process significant quantities of hazardous substances) installation due to the substances that would be present on-site. This status will be reviewed as the design develops. Appropriate COMAH notifications, with supporting risk assessments and a Major Accident Prevention Plan, would be submitted to the relevant authorities for approval prior to construction.

Effects During Construction

7.14.5 Credible scenarios for construction phase risk events include:

- ground instability;
- structural collapse/accidental impact;
- utility (pipeline or electrical cable) strike/unexploded ordnance (UXO) impact; and
- release of ground contamination existing within the Main Site given the legacy of its historical industrial use.

7.14.6 Best practice industry codes, standards and methods will be used during the Proposed Development construction phase. Construction methods and site clearance works would be informed by ground investigation work, while a CEMP would be in place to control the potential environmental impacts related to the construction works. Consultation would also be carried out with appropriate stakeholders such as National Grid Gas Transmission and the Environment Agency in relation to working close to live pipelines.

7.14.7 With these mitigation measures in place, all assessed credible scenarios during the construction phase have been assessed as having a tolerable level of risk, and thus residual effects are considered not significant.

Effects During Operation

7.14.8 During operation, effects could arise due to:

- fire caused by loss of containment of flammable gas;
- explosion;
- toxic gas release;
- asphyxiant gas release;
- domino effect (to and from neighbouring facilities); and

- flooding.

7.14.9 The design of the Proposed Development take into account industry standards and potential MA&Ds risks during operation to ensure these risks are minimised to an acceptable level. This includes for example fire detection and protection measures, gas detection and pressure monitoring, and locating electrical equipment above predicted flood levels. Hazardous Substances Consent would be obtained from the local planning authority (RCBC) who would consult with the HSE.

7.14.10 With regards to a potential ‘domino effect’, it is a requirement of the COMAH Regulations that neighbouring upper tier sites should review and update their off-site emergency plans and safety reports to consider the potential impact of domino sites. As such, the existing safety precautions at neighbouring industrial sites would mitigate the risk of domino effects occurring. The Cleveland Emergency Planning Unit (CEPU) provides an emergency planning service to ensure local authorities are prepared to respond to emergencies and to support emergency services and the community.

7.14.11 It is considered that all MA&D risk events (following the implementation of defined mitigation measures) identified during the operation of the Proposed Development would be tolerable as they have been reduced to a level that is As Low As Reasonably Practicable (‘the ALARP principle’). As the Proposed Development design is still in development, further mitigation measures would be defined and reported in the ES.

7.15 Materials and Waste

Introduction

7.15.1 Chapter 21: Materials and Waste (PEI Report, Volume I) presents the findings of a preliminary assessment of the potential effects associated with the use of materials and waste production. The materials and waste assessment considers the consumption of key construction materials and the generation and management of waste during the construction, operation (including maintenance) and decommissioning of the Proposed Development.

7.15.2 The baseline has been determined taking into account the following:

- national (UK or GB) and regional consumption/sales for key construction materials (steel, aggregates, asphalt and concrete);
- Mineral Safeguarding Areas (MSAs) and allocated/safeguarded mineral and waste sites;
- landfill void capacity in Yorkshire and the Humber and the North East (non-hazardous and inert landfill void capacity), and England (hazardous landfill void capacity); and
- waste received at relevant hazardous waste management facilities nationally.

7.15.3 Construction and operational waste arisings have been estimated and as a reasonable worst-case it has been assumed that all waste would be sent to landfill.

Effects During Construction

7.15.4 During construction, effects could arise due to:

- changes in demand for materials; and
- changes in available landfill void capacity.

7.15.5 Potential effects arising from changes in demand for materials are not considered to be significant.

7.15.6 During construction, waste is expected to arise due to excavations and construction of the Proposed Development. Some waste materials arising from excavation works have the potential to be contaminated such that the material would be classed as hazardous. If such material was disposed to hazardous waste landfill, this has the potential to have a moderate adverse (significant) effect. In practice, a proportion of contaminated material from the Proposed Development could be non-hazardous and/or likely to be sent to a waste management facility rather than being disposed to landfill, reducing the overall quantities of waste for disposal and associated effects.

7.15.7 No other significant adverse residual waste effects resulting from the construction of the Proposed Development have been identified.

7.15.8 A further assessment of potential material and waste effects would be undertaken and reported in the ES when further details of construction material requirements and potential waste arisings are available.

Effects During Operation

7.15.9 During operation, effects could arise due to:

- changes in available landfill void capacity; and
- changes in available hazardous waste management facility capacity.

7.15.10 Operational waste from the Proposed Development would comprise waste from site offices and waste from the Production Facility (including thermal reclamation waste) processes which may be hazardous waste. Amine storage would be appropriately bunded and accidental spills would be cleaned and go to a separate closed drainage system. From here, it would be recovered and recycled for use within the process, or otherwise taken off-site by tanker to a specialist treatment plant.

7.15.11 The main waste types and quantities of operational waste are not yet confirmed. However, based on worst case assumptions, no significant adverse material and waste effects resulting from the operation of the Proposed Development have been identified.

7.16 Human Health

Introduction

7.16.1 Chapter 22: Human Health (PEI Report, Volume I) identifies the potential effects of the Proposed Development upon human health, taking into account information from other technical assessments that are relevant to human health.

7.16.2 The assessment considers potential effects on the health and wellbeing of those communities likely to be impacted by the Proposed Development in the Hartlepool, Redcar and Cleveland, and Stockton-on-Tees districts and Teesside.

7.16.3 The Proposed Development incorporates embedded mitigation measures that aim to avoid any significant human health effects, including (but not limited to):

- mitigation measures as detailed in Chapter 8: Air Quality, Chapter 11: Noise and Vibration, Chapter 15: Traffic and Transportation, Chapter 18: Socioeconomics and Land Use and Chapter 19: Climate Change (PEI Report, Volume I);
- construction works to be undertaken in accordance with the CEMP;
- the Production Facility would require an Environmental Permit and would comply with this under the Environmental Permitting (England and Wales) Regulations 2016.
- a DEMP would be prepared which would consider in detail all potential environmental risks during Proposed Development decommissioning.

7.16.4 Electromagnetic Field (EMF) effects must be controlled in accordance with the Control of Electromagnetic Fields at Work Regulations 2016, which sets out how employers must make and implement action plans to ensure compliance with the defined exposure limits. It is likely that all electrical and control system cables would be installed below ground or at ground level with no new overhead transmission lines proposed. Therefore, it is considered that with appropriate Proposed Development design, significant effects on human health associated with EMFs would be avoided. This would be further assessed during the EIA and reported in the ES.

Effects During Construction

7.16.5 The mitigation measures as detailed above reduce environmental effects during the construction of the Proposed Development which in turn mitigate the effects on the local community and existing facilities from a human health perspective. As such, no significant effects on human health have been identified during construction.

Effects During Operation

7.16.6 The mitigation measures proposed in other technical assessments to reduce effects from the operation of the Proposed Development on the environment would in turn mitigate the effects on the local community and existing facilities from a human health perspective. As such, no significant effects on human health have been identified during the operation of the Proposed Development.

7.17 Cumulative and Combined Effects

7.17.1 Chapter 23: Cumulative and Combined Effects (PEI Report, Volume I) describes the approach for the assessment of cumulative and combined effects as a result of the Proposed Development.

7.17.2 The assessment of Cumulative and Combined Effects will include:

- cumulative effects: these occur when the environmental impacts of the Proposed Development interact with those associated with other planned projects and developments located within a realistic geographical scope where environmental impacts could act together to result in a greater significance of effect on environmental resources and/or receptors; and
- combined effects: these are effects resulting from a single development (i.e., the effects of the Proposed Development) on any one receptor that may collectively cause an effect or effects of greater significance on environmental resources and/or receptors.

7.17.3 There are several developments in the vicinity of the Proposed Development that have the potential to generate cumulative impacts in association with the Proposed Development. Chapter 23: Cumulative and Combined Effects (PEI Report, Volume I) has established a long list of potential developments which will be further updated during the EIA.

7.17.4 A detailed assessment of the cumulative and combined effects will take place during the EIA and reported in the ES.

8.0 SUMMARY AND CONCLUSIONS

8.1.1 This NTS and the associated PEI Report present a preliminary assessment of the potential environmental effects of the Proposed Development based on the design and information at the time of writing (August 2023). Following statutory consultation, further assessments will be undertaken during the EIA to inform the ES for the DCO Application, and which would also take account of responses to this consultation.

8.1.2 Potential environmental impact avoidance, design and mitigation measures have been identified to mitigate and control environmental effects during construction, operation (including maintenance) and decommissioning of the Proposed Development. These will be reviewed and refined, and additional mitigation provided where necessary, and presented in the ES.

ANNEX A – FIGURE 4-2: PARTS OF THE PROPOSED DEVELOPMENT SITE

Revision: 0   Drawn: MAB   Checked: AD   Approved: KS   Date: 2023-08-04

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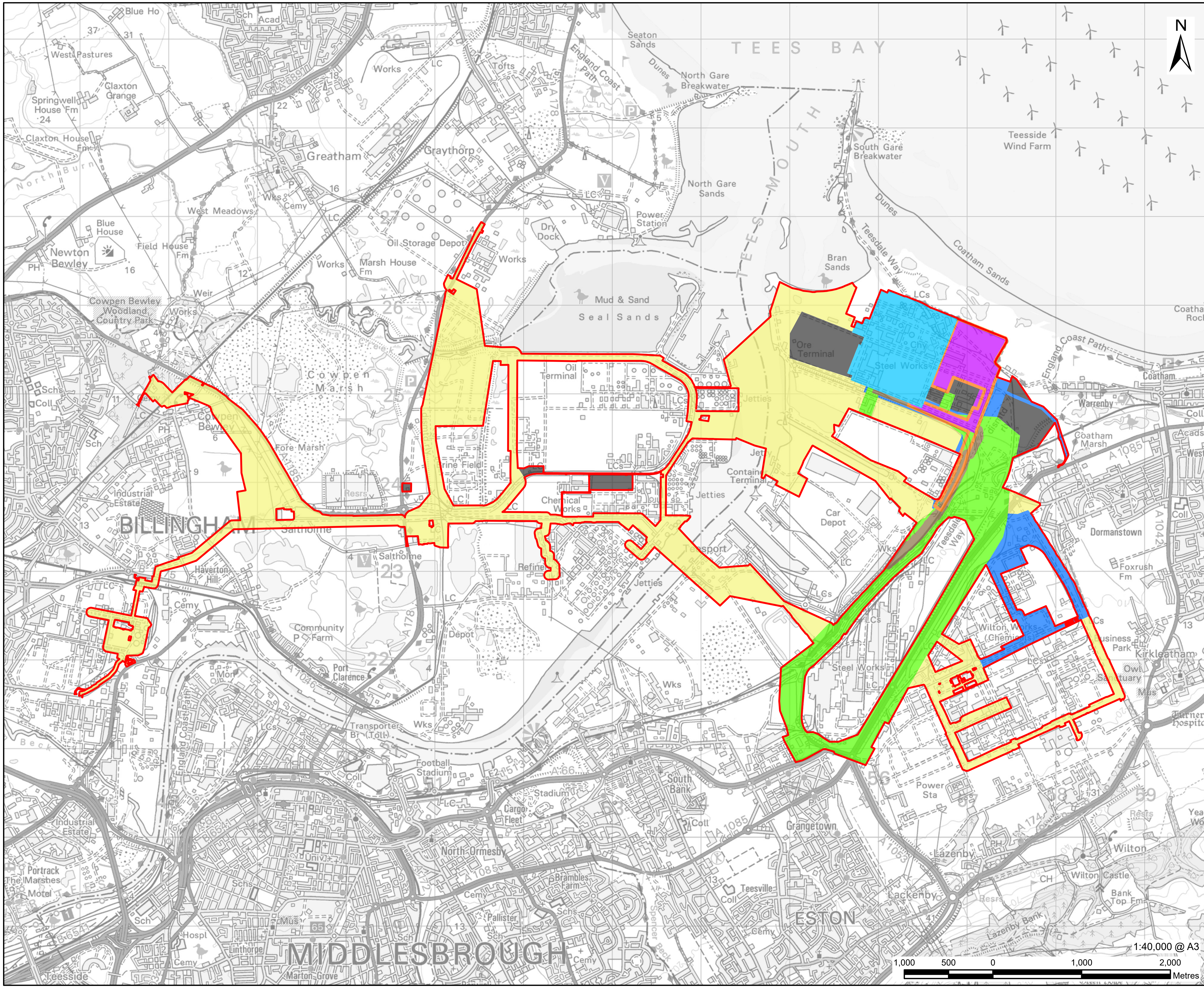

AECOM

PROJECT

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LEGEND

- Proposed Development Site Boundary
- Main Site
- CO_2 Export Corridor
- Electrical Connection Corridor
- Hydrogen Pipeline Corridor
- Indicative Temporary Construction Laydown Areas
- Natural Gas Connection Corridor
- Other Gases Connection Corridor (O_2 and N_2)
- Water Connection Corridor

NOTES

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ISSUE PURPOSE

PEI Report

PROJECT NUMBER

60689030

FIGURE TITLE

Parts of the Proposed Development Site

FIGURE NUMBER

Figure 4-2