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1. Introduction and EIA Methodology

1.1 Background

- 1.1.1 This Environmental Statement (ES) has been prepared by AECOM Limited (AECOM) on behalf of VPI Immingham LLP (VPI) and Phillips 66 Limited (Phillips 66) ('The Applicants') in relation to planning applications ('the Applications') for the construction, operation and maintenance of two proposed Post-Combustion Carbon Capture (PCC) developments and associated facilities located at VPI Immingham Combined Heat and Power (CHP) Plant and Phillips 66's Humber Refinery ('the Proposed Developments'). The Proposed Developments comprise the first phase of the Humber Zero project.
- 1.1.2 This ES presents the findings of the Environmental Impact Assessment (EIA) undertaken in connection with the Proposed Developments.
- 1.1.3 The Proposed Developments will be separately consented under the Town and Country Planning Act 1990. Two planning applications will be submitted – one for the Proposed VPI Development and one for the Proposed Phillips 66 Development. In recognition of the inter-related nature of the Proposed Developments, the EIA for both applications is integrated and reported in this ES.
- 1.1.4 This chapter is supported by Figure 1.1 (ES Volume III), which illustrates the locations of the Proposed Developments, and Figures 1.2 and 1.3 (ES Volume III) which illustrate the boundaries of the two planning application sites ('the Phillips 66 Site' and 'the VPI Site' respectively).

1.2 The Applicants

- 1.2.1 VPI Immingham LLP own and operate the gas-fired CHP Plant located on Rosper Road in Immingham. The plant operates 24/7 to provide the electricity and steam that is critical to the operation of the neighbouring refineries and also to supply electricity to the National Grid.
- 1.2.2 Phillips 66 Limited own and operate the Humber Refinery at Eastfield Road, South Killingholme. The Humber Refinery is one of the most sophisticated in Europe; it is highly integrated, energy efficient and manufactures both fuels and specialist products. It is Europe's only supplier of synthetic graphite coke for Electric Vehicle batteries and consumer goods and is a UK leader in the production of lower carbon fuels.
- 1.2.3 The designs of the Proposed Developments demonstrate the Applicants' progress towards decarbonisation.

1.3 The Proposed Developments

- 1.3.1 The Proposed Developments will deliver up to 3.8 million tonnes (also known as megatonnes) per annum (Mtpa) of abated carbon dioxide (CO₂) emissions via:
- PCC retrofit to two gas turbines (GT1 and GT2) and two auxiliary gas boilers at the VPI Immingham CHP Plant ('the Proposed VPI Development'); and
 - PCC retrofit to the Fluid Catalytic Cracker (FCC) stack at the Humber Refinery ('the Proposed Phillips 66 Development').

Progress of the Proposed Developments is subject to the necessary consents being granted and government policy/ funding support being in place to enable final investment decisions to be made.

- 1.3.2 Further information on the Proposed Developments is provided in ES Chapter 3: Proposed Developments Description, Need and Alternatives Considered and ES Chapter 4: Construction Programme and Management.
- 1.3.3 The VPI Site and the Phillips 66 Site (collectively 'the Sites') are both located wholly within the administrative boundary of North Lincolnshire Council (NLC).
- 1.3.4 The VPI Site (see Figure 1.3 in ES Volume III) comprises an area of 28.51 hectares (ha) and includes the existing CHP Plant and the parcel of vacant land directly to the south and south-east of the CHP Plant where the PCC plant will be located.
- 1.3.5 The Phillips 66 Site (see Figure 1.2 in ES Volume III) comprises an area of 15.68 ha and includes the northern part of the Humber Refinery and areas to the north-east of the Refinery (some overlapping with the VPI Site) which are required for connections including the CO₂ pipeline connection to the CO₂ transmission network.
- 1.3.6 Further information on the Sites is provided in ES Chapter 2: Sites and Site Surroundings.
- 1.3.7 All definitions of the Proposed Development elements and parts of the Site are defined in the ES Glossary.
- 1.3.8 The CO₂ transmission network that the Proposed Developments will connect into is under development by others. There are two potential networks that the Proposed Developments could be connected to:
- the proposed Viking CCS (formerly V Net Zero) CO₂ transport and storage network (promoted by Harbour Energy) which is anticipated to commence adjacent to the Sites (to the south of the VPI CHP Plant) and will transport CO₂ in dense phase (high pressure) via a below ground pipeline to Theddlethorpe and out to the Viking fields (which have 300 CO₂ Mt storage potential) via an existing subsea pipeline; and/ or
 - the East Coast Cluster's Humber Low Carbon Pipelines (HLCP) (promoted by National Grid) which is anticipated to be located approximately 2 km to the north of the Sites and will transport captured CO₂ across the Humber estuary to Easington, and from there via an offshore pipeline to the Endurance saline aquifer.
- 1.3.9 The decision as to which network will be connected to by each of the Proposed Developments will be made following Government funding announcements and commercial discussions.

1.4 Consenting Regime and Requirement for EIA

- 1.4.1 As noted above, planning consents for the Proposed Developments are to be sought via two planning applications under the Town and Country Planning Act 1990.
- 1.4.2 With regards to EIA, the relevant regulations are the Town and Country Planning (EIA) Regulations 2017 (as amended) (hereafter referred to as the 'EIA Regulations').
- 1.4.3 The Proposed Developments are of a type which falls within Schedule 1 Part 23 of the EIA Regulations ("*Installations for the capture of carbon dioxide streams for the purposes of geological storage pursuant to Directive 2009/31/EC from installations referred to in this Schedule, or where the total yearly capture of carbon dioxide is 1.5 megatonnes or more*"). As such the Proposed Developments comprise 'EIA development' and an EIA is required to accompany the Applications.
- 1.4.4 Although not mandatory, an EIA Scoping Report was submitted to NLC to commence the EIA process and represented the first notification to NLC, as the Local Planning Authority (LPA), that the Applicants will undertake an EIA in respect of the Proposed Developments and produce an ES to report the findings of the EIA.
- 1.4.5 EIA is an iterative process that feeds into the engineering design process to mitigate significant environmental effects where they are predicted to occur. The final design iteration, along with the findings of the EIA are reported in this ES, in accordance with EIA Regulations.

- 1.4.6 The ES covers both the Proposed VPI Development and the Proposed Phillips 66 Development (including assessment of each in isolation as well as the whole Proposed Development) and is submitted with each of the Applications.
- 1.4.7 The Applicant has formally notified NLC in writing under Regulation 8(1)(b) of the EIA Regulations that an ES would be prepared in respect of the Proposed Development. The Proposed Development is therefore 'EIA development' for the purposes of the EIA Regulations and this ES summarises the results of the EIA work undertaken.

1.5 EIA Scoping

- 1.5.1 The issues that the Applicant considered the EIA should address were identified in the EIA Scoping Report (Appendix 1A in ES Volume II) submitted to NLC pursuant to Regulation 15 of the EIA Regulations on 25 January 2022. The EIA Scoping Report was developed with reference to standard guidance and best practice following initial consultation with a number of statutory consultees and was informed by the EIA team's experience of working on a number of similar projects.
- 1.5.2 NLC's Scoping Opinion was received on 11 March 2022, including the formal responses received from consultees, and is presented within Appendix 1B (ES Volume II). Key issues raised in the Scoping Opinion are summarised at the start of each technical chapter of the ES, with all matters having been considered during the EIA process.
- 1.5.3 The EIA scoping process concluded that the following environmental topics required assessment and would be reported in the ES:
- Air Quality;
 - Noise and Vibration;
 - Traffic and Transport;
 - Water Resources and Flood Risk;
 - Landscape and Visual Amenity;
 - Cultural Heritage;
 - Ecology and Nature Conservation;
 - Geology, Hydrogeology and Land Contamination;
 - Waste Management;
 - Climate Change and Carbon;
 - Major Accidents and Disasters; and
 - Socio-economics and Human Health.

1.6 EIA Methodology and Reporting

- 1.6.1 The EIA has been carried out in accordance with the requirements defined by the EIA Regulations. The information presented in the ES describes the findings of the EIA.
- 1.6.2 The ES sets out the process followed during the EIA including the methods used for the collection of data and for the identification and assessment of impacts and effects, and the findings of the EIA. Any assumptions made or limitations on the assessments are clearly identified.
- 1.6.3 The EIA process is designed to be capable of considering, and sensitive to, changes that occur as a result of changes to the design, including any mitigation measures that are incorporated during the EIA.
- 1.6.4 The EIA is based on a number of related activities, as follows:

- establishing existing baseline conditions;
 - consultation with statutory and non-statutory consultees throughout the pre-planning application process;
 - consideration of relevant local, regional and national planning policies, guidelines and legislation relevant to EIA;
 - consideration of technical standards for the development of significance criteria;
 - review of secondary information, previous environmental studies and publicly-available information and databases;
 - physical surveys and monitoring;
 - desk-top studies;
 - computer modelling;
 - reference to current legislation and guidance; and
 - expert opinion.
- 1.6.5 Impacts are considered on the basis of their magnitude, duration and reversibility. Cumulative and combined effects are also to be considered where appropriate. Significance is evaluated on the basis of the scale of the impact and the importance or sensitivity of the receptors, in accordance with standard assessment methodologies (major, moderate, minor and not significant).
- 1.6.6 Where likely significant environmental effects are identified in the assessment process, measures to mitigate these effects are put forward.
- 1.6.7 The EIA adopts a worst-case assessment basis, based on the Proposed Developments' design and adopting the principles of the Rochdale Envelope, wherever specific parameters cannot yet be fixed for the Proposed Development. This is detailed further in Chapter 3: Project Description, Need and Alternatives (ES Volume I).

Structure of the ES

- 1.6.8 The structure of the ES reflects the assessment topics agreed through the EIA Scoping process.
- 1.6.9 The ES comprises the following documents:
- **Non-Technical Summary (NTS):** this document provides a summary of the key issues and findings of the EIA in non-technical language.
 - **Volume I: Environmental Statement Main Text.** This contains the full text of the EIA with the chapter headings as follows:
 1. Introduction and EIA Methodology;
 2. Site and Site Surroundings
 3. Proposed Developments Description, Need and Alternatives;
 4. Construction Programme and Management;
 5. Policy Context;
 6. Air Quality;
 7. Noise and Vibration;
 8. Traffic and Transport;
 9. Water Environment and Flood Risk;
 10. Landscape and Visual Amenity;
 11. Cultural Heritage;

12. Ecology and Nature Conservation;
13. Geology, Hydrogeology and Land Contamination;
14. Climate Change;
15. Materials and Waste;
16. Major Accidents and Disasters;
17. Socio-economics and Human Health;
18. Cumulative and Combined Effects; and
19. Summary of Significant Environmental Effects.

- **Volume II:** Figures
- **Volume III:** Technical Appendices: These provide supplementary details of the environmental studies conducted during the EIA including relevant data tables, figures and photographs.

Structure of the Technical Chapters

- 1.6.10 Technical Chapters 6 to 17 of the ES are structured based on standard subheadings, as described below.

Section 1 Introduction

- 1.6.11 The Introduction briefly summarises the scope of the assessment presented within the chapter.

Section 2 Legislation and Planning Policy Context

- 1.6.12 The Legislation and Planning Policy Context section provides a brief overview of the relevant legislation, planning policy and technical guidance relevant to the assessment.

Section 3 Assessment Methodology and Significance Criteria

- 1.6.13 The assessment method incorporates feedback from consultation that has been undertaken throughout all stages of the project, highlighting any key issues that have arisen from the EIA scoping exercise that have been specifically addressed within the EIA.
- 1.6.14 The methods used in undertaking the technical study are outlined in this section with reference to published standards, guidelines and relevant significance criteria.
- 1.6.15 The method for evaluating the significance of effects before and after mitigation is described with reference to definitive standards, accepted criteria and legislation where available. Where it is not possible to quantify impacts, qualitative assessments are carried out, based on available knowledge and professional judgment. Where uncertainty exists, this is noted.
- 1.6.16 Specific criteria for each technical assessment are set out, giving due regard to:
- extent and magnitude of the impact;
 - impact duration (whether short, medium or long term);
 - impact nature (whether direct or indirect, reversible or irreversible);
 - whether the impact occurs in isolation, is cumulative or interactive;
 - performance against environmental quality standards where relevant;
 - sensitivity of the receptor; and
 - compatibility with environmental policies and standards.
- 1.6.17 For issues where definitive quality standards do not exist, significance may be based on the:
- local, district, regional or national scale or value of the resource affected;
 - number of receptors affected;

- sensitivity of these receptors; and
- duration of the impact.

1.6.18 In order to provide a consistent approach to expressing the outcomes of the various studies undertaken as part of the EIA, and thereby enable comparison between effects upon different environmental components, the following matrix is applied throughout the ES to define effects, unless otherwise specified and explained.

Table 1.1: Significance of effects matrix

Magnitude of Impact	Sensitivity of Receptor				
	Negligible	Low	Medium	High	Very High
High	Minor	Moderate	Moderate	Major	Major
Medium	Negligible	Minor	Moderate	Moderate	Major
Low	Negligible	Negligible	Minor	Moderate	Moderate
Negligible	Negligible	Negligible	Negligible	Minor	Minor

1.6.19 For the purpose of this EIA, moderate and major effects (shaded orange in the matrix above) are deemed 'significant', and where possible mitigation measures have been identified to reduce the residual effects to 'not significant' (minor or negligible).

1.6.20 Each of the technical chapters provide the criteria, including sources and justifications, for quantifying the different levels of residual effect. Where possible, this has been based upon quantitative and accepted criteria (for example, the National Air Quality Strategy objectives or noise assessment guidelines), together with the use of value judgment and expert interpretation to establish to the scale of an effect.

Section 4 Baseline Conditions (including Future Baseline)

1.6.21 In order to assess the potential impacts and effects of the Proposed Developments, it is necessary to determine the environmental conditions that currently exist on the Phillips 66 Site and VPI Site and in the surrounding area, for comparison. These are known as the existing baseline conditions. Baseline conditions are determined using the results of site surveys and investigations or desk-based data searches, or a combination of these, as appropriate.

1.6.22 The EIA also considers future baseline conditions taking account of any planned or likely changes to the existing baseline, for comparison to future 'with development' scenarios – for example, future baseline flood risk with climate change.

Section 5 Development Design and Impact Avoidance

1.6.23 Measures that have been integrated into the Proposed Developments in order to avoid or reduce adverse environmental effects will be described. Such measures may include refinement of the design and layout of the Proposed Developments to avoid impacts on sensitive receptors, implementation of Environmental Management Plans, and adherence of relevant legislation, guidance and best practice. The assessment of impacts and effects in the next section takes account of these measures already being in place.

Section 6 Likely Impacts and Effects of the Proposed Developments

1.6.24 This section identifies the likely impacts and effects resulting from the Proposed Developments. The likely impacts and effects associated with the Proposed Phillips 66 Development and the Proposed VPI Development are assessed separately as well as together (project-wide) to provide transparency and clarity to the planning process.

1.6.25 The magnitude of impacts is defined with reference to the relevant baseline conditions (existing or future, as appropriate), and effects are determined in accordance with the identified methodology.

- 1.6.26 The technical assessments identify the environmental impacts of the Proposed Developments at key stages in their construction, operation (including maintenance) and eventual decommissioning.
- 1.6.27 The assessment scenarios that are considered for the purposes of the EIA (and considered in the ES) are as follows:
- Existing Baseline without the Proposed Developments – the year that the baseline data has been collected;
 - Future Baseline without the Proposed Developments – for comparison respectively with the construction and operation scenarios described below;
 - Construction of the Proposed Developments;
 - Opening and/ or Operation (including maintenance) of the Proposed Developments – where opening represents the start of operation; and
 - Decommissioning of the Proposed Developments.

Section 7 Mitigation and Enhancement Measures

- 1.6.28 The Mitigation and Enhancement Measures section will describe the measures that will be implemented by the Applicants to reduce any significant adverse effects identified by the assessment and enhance beneficial effects during construction and operation of the Proposed Developments.

Section 8 Residual Effects and Conclusions

- 1.6.29 Effects of the Proposed Developments remaining following the implementation of available mitigation measures are known as ‘residual effects’. These are discussed for each of the potential effects, and their significance level identified.
- 1.6.30 As for the ‘before mitigation’ effects, residual effects associated with the Proposed Phillips 66 Development and the Proposed VPI Development will be assessed separately as well as together (project-wide) to provide transparency and clarity to the planning process.

1.7 Statement of Competence

- 1.7.1 As required under Regulation 18(5)(b) of the EIA Regulations, an ES must be accompanied by a statement outlining the relevant expertise or qualifications of those involved in its preparation. A statement of competence of the EIA coordinators and the technical specialists that have provided expert input to the ES is included as Appendix 1C (ES Volume II).

1.8 Consultation

- 1.8.1 Consultation is integral to developing the proposals and related assessments that underpin a planning application and the EIA process. The views of consultation bodies and information provided by the local community serve to focus the environmental studies and to identify specific issues that require further investigation, as well as to inform aspects of the design of the Proposed Development. Consultation is an ongoing process as part of the design development.
- 1.8.2 Consultation with statutory consultees regarding the technical scope and approach to the EIA has been ongoing throughout the EIA process, and is described in the technical chapters of this ES.
- 1.8.3 Public consultation has also been undertaken in accordance with a consultation strategy agreed with NLC. This has included a project website, newsletters, social media, meetings with local councillors, communications with the Humber Refinery Community Advisory Committee, in-person events at local venues and interactive virtual events. Feedback has been collected via the events, feedback forms (postal and online), the project website, email and freepost.

- 1.8.4 Feedback has been analysed and given regard during the finalisation of the planning applications and this ES.
- 1.8.5 A summary of the public consultation that has been undertaken, the feedback received and the responses made, is provided in the Consultation Report that accompanies the planning applications.

1.9 References

Department for Business, Energy and Industrial Strategy (2021) *Industrial Decarbonisation Strategy*. [Available at] [Industrial Decarbonisation Strategy \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/94411/industrial-decarbonisation-strategy.pdf)