VikingCCS

Viking CCS Pipeline

Environmental Statement Volume II - Chapter 5: EIA Methodology

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5.1 Introduction

5.1.1 This chapter of the Environmental Statement (ES) sets out the methodology and approach taken to reporting the likely significant environmental effects of the Viking Carbon Capture Storage (CCS) Pipeline (hereafter 'the Proposed Development').

5.1.2 Environmental Impact Assessment (EIA) is the process of identifying, evaluating and mitigating the likely significant environmental effects of a project. It promotes the early identification and evaluation of the likely significant environmental effects and enables appropriate mitigation (that is, measures to avoid, reduce or offset significant adverse effects) to be identified and incorporated into the design of the development, or commitments to be made to environmentally sensitive construction methods and practices.

5.1.3 The EIA has been undertaken in accordance with the requirements of the Planning Act 2008 (Ref 5-1) and the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('*the EIA Regulations*') (Ref 5-2).

5.1.4 A more detailed overview of the methodology adopted for each environmental topic is provided within each respective topic chapter of this Environmental Statement (ES) (Technical Chapters 6-19). Where any deviation from the standard approach outlined in this chapter occurs, a clear explanation and justification for any deviation is provided.

5.1.5 This ES contains the information specified in Regulation 14(2)(a) - (f) and Schedule 4 of the EIA Regulations set out in Table 1-2 of *Chapter 1: Introduction* of this *ES Volume II.* This chapter has been informed by current best practice guidance, as set out within the Planning Inspectorate's Advice Note Seven (Ref 5-1).

5.1.6 In preparing this ES, reference has been made to the following documents and guidance:

- *Overarching National Policy Statement for Energy (EN-1)* (Ref 5-4) *and Draft EN-1* (Ref 5-5) - identifies the generic issues which should be taken into account in assessing applications for development consent for major energy infrastructure. As the Proposed Development is a Nationally Significant Infrastructure Project (NSIP), the general principles and methods of assessment contained within the National Policy Statement EN-1 were referenced and adopted, where appropriate;
- *National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)* (Ref 5-6) *and Draft EN-4* (Ref 5-7) - applies to nationally significant infrastructure pipelines which transport natural gas or oil and, therefore, is not fully applicable to the Proposed Development. However, NPS EN-4 notes in section 1.6.2 that the information provided within may also be useful in identifying impacts to be considered in applications for pipelines intended to transport other substances. EN-4 contains principles to be applied in the assessment and mitigation design specific to oil and gas pipeline;
- *The National Planning Policy Framework (NPPF) (*Ref 5-8*)* – the general principles and methods of assessment contained within the National Planning Policy Framework were referenced and adopted, where appropriate, though noting the primacy of the National Policy Statements;
- *Planning Inspectorate Advice Note Three: EIA Notification and Consultation Republished August 2017 (version 7)* (Ref 5-9);

- *Planning Inspectorate Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping Republished June 2020 (version 7)* (Ref 5-3);
- *Planning Inspectorate Advice Note Nine: Rochdale Envelope Republished July 2018 (version 3)* (Ref 5-10);
- *Planning Inspectorate Advice Note Seventeen: Cumulative Effects Assessment Published August 2019 (version 2)* (Ref 5-12);
- Guidelines for Environmental Impact Assessment (Ref 5-13) published by the Institute of Environmental Management and Assessment (IEMA) – this provides best practice guidance for undertaking EIA; and
- Environmental Impact Assessment: Guide to Shaping Quality Development (Ref 5-17) published by IEMA – this sets out principles and a framework for maximising the interaction between environmental thinking and project design.

5.1.7 In addition to the above guidance, each technical chapter of this ES also includes topic specific technical guidance which has been used to help inform the assessment.

5.2 Competent expertise

5.2.1 Regulation 14(4)(a) of the EIA Regulations (Ref 5-2) requires that the ES is prepared by 'competent experts'. Regulation 14(4)(b) requires that the ES must be accompanied by a statement from the applicant outlining the relevant expertise or qualifications of such experts.

5.2.2 This ES, and the EIA carried out to identify the likely significant environmental effects of the Proposed Development, has been undertaken by AECOM on behalf of Chrysaor Production (U.K.) Limited, a Harbour Energy company (the 'Applicant'). AECOM is one of the founding members of the EIA Quality Mark, a voluntary scheme operated by the Institute of Environmental Management and Assessment (IEMA) through which AECOM's EIA activity is independently reviewed to ensure it delivers excellence in EIA practice.

5.2.3 This ES has been prepared by competent experts within AECOM, the content of which has been subjected to detailed checking, technical review and verification in accordance with its quality assurance procedures.

5.2.4 Information summarising the competency of the environmental specialists responsible for the technical assessments is included within *ES Volume IV: Appendix 1.1 (Document 6.4).*

5.2.5 The overall EIA lead and competent expert responsible for this ES is Michael Williams, a Technical Director within AECOM. Michael has over 21 years of experience in the co-ordination, management, delivery and technical review of EIAs and ESs. Michael was supported by the overall consenting lead Nigel Pilkington. Nigel has over 25 years of experience in delivering EIA's and securing consents for a variety of different projects within the UK. Further information on both individuals is included within *ES Volume IV: Appendix 1.1 (Application Document 6.4.1.1).*

5.3 Scope of the EIA

Scoping Report

5.3.1 Scoping forms a key stage of the EIA process; providing a framework for identifying likely significant environmental effects arising from the Proposed Development and defining the environmental topics to be addressed within the ES.

5.3.2 On 29 March 2022, an EIA Scoping Report was submitted to the Planning Inspectorate, accompanied by a formal request for a Scoping Opinion. The Scoping Report clearly outlined the intended scope of each environmental topic and the overall structure of the ES.

5.3.3 The scoping exercise identified that the following environmental topics should be considered in the EIA as the Proposed Development could potentially result in significant effects on the environment:

a. Ecology and Biodiversity;
b. Landscape and Visual;
c. Historic Environment;
d. Geology and Hydrogeology;
e. Agriculture and Soils;
f. Water Environment;
g. Air Quality;
h. Noise and Vibration;
i. Traffic and Transport;
j. Socio-economics;
k. Health and Wellbeing;
l. Materials and Waste;
m. Climate Change;
n. Cumulative Effects; and
o. Major Accidents and Disasters.

5.3.4 A number of other studies were also identified as being required to be undertaken. These included:

- Habitats Regulations Assessment (HRA);
- Flood Risk Assessment (FRA);
- Water Framework Directive Assessment; and
- Transport Assessment.

Scoping Opinion

5.3.5 An EIA Scoping Opinion was received from the Planning Inspectorate (on behalf of the Secretary of State (SoS)) in May 2022 and is presented in *ES Volume IV: Appendix 5.2 (Application Document 6.4.5.2).* The advice contained within the Scoping Opinion has been taken into account for the EIA assessment methodology, topics, and presentation of the ES. In accordance with Regulation 14 of the EIA Regulations, this ES has been prepared in accordance with the Scoping Opinion. Where additional matters have been scoped out during the assessment process, the ES explains the reasoning for scoping them out and justifies the approach taken. Specific responses to each of the items within the Scoping Opinion are summarised within each of the technical topics and provided in one place within *ES Volume IV: Appendix 5.3 (Application Document 6.4.5.3).*

5.3.6 In examining the proposed scope of the EIA, the Planning Inspectorate engaged a range of prescribed consultees (comprising statutory and non-statutory bodies, agencies and groups) for their views on the content of the assessments.

5.3.7 The Scoping Opinion concluded that some environmental topics and sub-topics did not need to be considered, including an assessment of transboundary effects, heat or radiation. A summary of topics that have been scoped out (or in) of the EIA is provided in each technical chapter of this *ES Volume II - Chapters 6 to 19*.

5.4 Defining the Study Area

5.4.1 A Study Area is defined in each individual technical assessment in Chapters 6 to 19. A rationale is also provided to support the selection of the Study Areas selected for each technical discipline.

5.5 Consideration of Alternatives

5.5.1 Regulation 14(2)(d) of the EIA Regulations states that "*an ES should include… a description of the reasonable alternatives studied by the applicant, which are relevant to the DCO Proposed Development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment*". *ES Volume II Chapter 2: Design Evolution and Alternatives* (Application Document 6.2.2) provides more information relating to how the Proposed Development has evolved and a consideration of the alternatives which have been considered and an explanation for the design changes which have been made.

5.6 Characterisation of the Baseline Environment

Existing baseline

5.6.1 To assess the potential impacts resulting from the Proposed Development it is necessary to first establish the environmental conditions that currently exist along and within the vicinity of the Proposed Development.

5.6.2 The understanding of the baseline for each environmental receptor has been collated through some or all of the following:

- Review of secondary sources (desk-based, i.e., review of existing documentation and literature; data searches and available data sets within the purchased GroundSure report);
- Collection of baseline data through undertaking on-site baseline field; and
- Stakeholder Consultation.

5.6.3 The existing baseline conditions accordingly reflect the environmental conditions which prevail at the time of undertaking surveys and reporting the EIA. Baseline environmental data sources are outlined in Chapters 6 - 19 of ES Volume II (Application Document 6.2), with additional information provided within ES Volume IV (Application Document 6.4).

Future baseline

5.6.4 The ES includes an outline of the likely changes to the existing baseline that can be anticipated without the development of the Proposed Development taking place, based on available information and knowledge.

5.6.5 In establishing the likely future baseline conditions, a combination of predictive forecasting, review of information and professional judgement was used to identify and take account of the following variables that could occur:

- Changes from natural events, trends and evolution (including human activities) – for example where ecological species move from their current location over time and

populate different areas, or where environmental conditions are expected to alter as a consequence of future climate change;

- Changes in environmental and societal values – for example where the status of the environment alters due to protection through planning designations being introduced or changed; and/or
- Changes relating to future development – for example where construction of a new housing development is programmed to be completed around the time of Proposed Development construction commencing, which may alter existing land use relationships. Where necessary, these have alternatively been considered within the cumulative impact assessment.

5.6.6 The future baseline scenario is described within each technical chapter within *ES Volume II - Chapters 6 to 20 (Application Document 6.2)*.

5.7 Environmental Statement

5.7.1 This ES presents a description of the Proposed Development and its likely significant environmental effects on the environment during construction and operation (including maintenance where relevant) and decommissioning. It also details measures to avoid or reduce such effects and the alternatives considered.

5.7.2 The ES summarises the outcomes of the following EIA related activities which have been undertaken:

- establishing the baseline conditions via undertaking and reporting on primary physical surveys;
- review of secondary information, previous environmental studies, publicly available information and databases;
- consultation with statutory and non-statutory consultees;
- consideration of relevant local, regional and national planning policies, and guidelines;
- adherence to legislation relevant to EIA or technical topics;
- consideration of technical standards for the development of significance criteria;
- application of specialist assessment methodologies;
- design review and analysis;
- provision of expert opinion;
- desk-top studies;
- modelling and calculations; and
- reference to current guidance.

5.7.3 To help with consistency, the following common format has generally been adopted in the reporting of the individual technical assessments presented in Chapters 6 - 19 of this *ES Volume II*:

- Introduction;
- Legislation, Policy and Guidance;
- Scope of Assessment and Consultation;
- Assessment Methodology;
- Baseline Conditions and Study Area;

- Development Design and Embedded Mitigation;
- Potential Impacts and Assessment of Effects;
- Additional Mitigation and Enhancement Measures;
- Residual Effects;
- Monitoring (where relevant);
- Cumulative Effects;
- Summary; and
- References.

5.8 Overview of Environmental Impact Assessment Methodology

General Overview

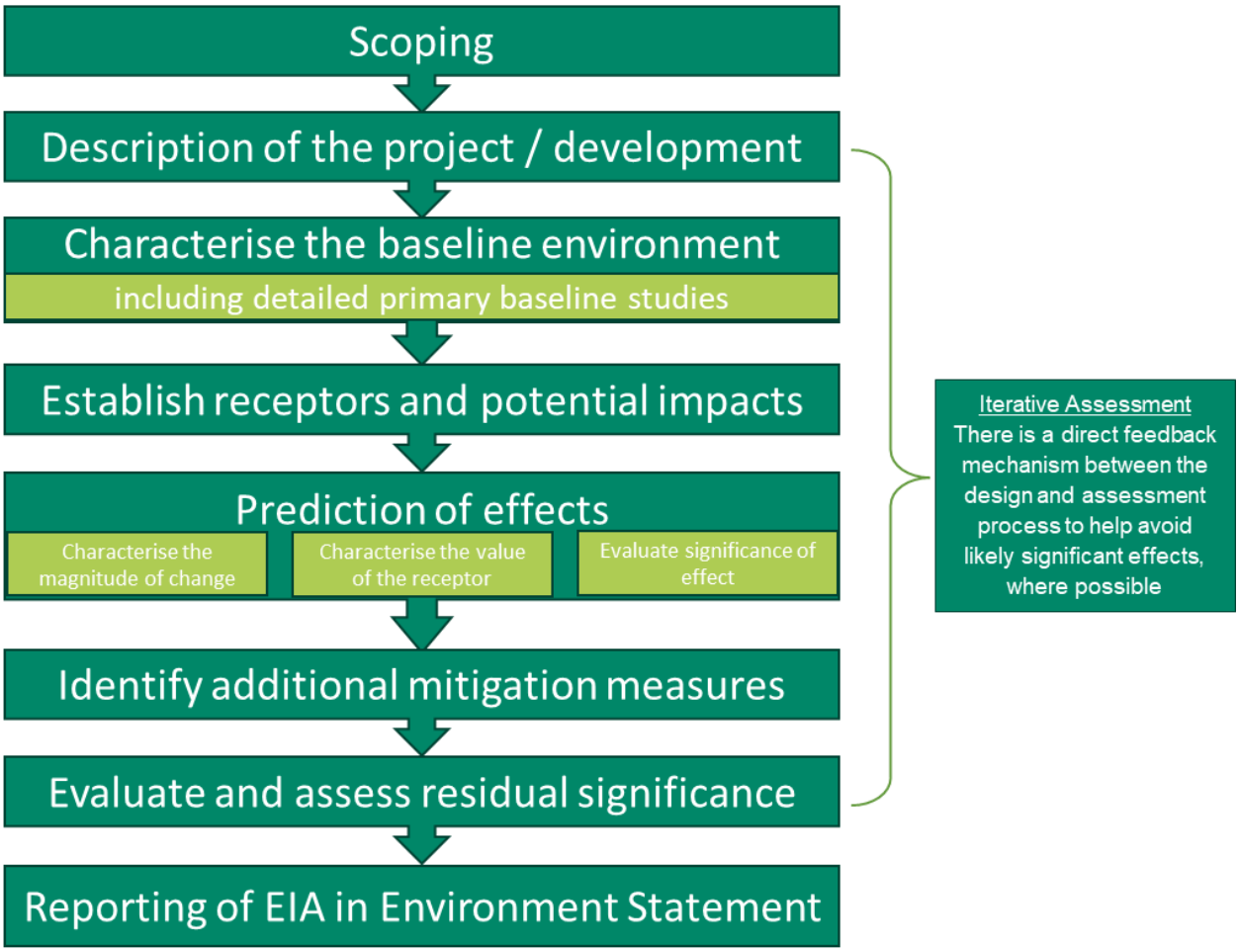
5.8.1 The assessment methodology for the ES follows a systematic approach in order to identify the significant effects of the Proposed Development on human health, the natural and physical environments and material assets.

5.8.2 The design of the Proposed Development represents a preliminary design that will be progressed and refined during the Front-End Engineering Design (FEED) stage, requiring a certain level of flexibility to be maintained. However, in line with Advice Note Nine (Using the Rochdale Envelope) (Ref 5-10) the parameters of the assessment have been developed so as to assess the reasonable worst case including for example assuming that the pipeline route could be located anywhere within the Limits of Deviation within the DCO Site Boundary as presented in *ES Volume II Chapter 3: Description of the Proposed Development (Application Document 6.2.3)*.

5.8.3 As such, the actual final design of the development would be within the set design parameters and the effects would not be worse than those reported in this ES. The final installed design and construction methodology for the Detailed Design will be developed within these parameters without the need for further assessment of environmental impacts (though design approvals will be required to confirm compliance with the assessed parameters).

5.8.4 The assessment methodology followed in this ES followed the staged approach outlined below in **Figure 5-1**. This has enabled the systematic identification of any potential significant effects which occur as a result of the Proposed Development to be identified. These steps are discussed in more detail within each subsequent sub section below.

Figure 5-1: Staged Approach for ES Assessment Methodology



Identification and Sensitivity of Receptors

5.8.5 Within the ES relevant receptors have been identified based on the baseline data gathering exercise undertaken to date from both secondary and primary sources. This comprises all receptors the Proposed Development could impact, which are relevant to the technical disciplines in the scope of the EIA.

5.8.6 All receptors will present a greater or lesser degree of sensitivity to the changes brought about by the Proposed Development. The sensitivity of a receptor relates to its capacity to accommodate change and its ability to recover if it is affected and is defined by the following factors:

- *Vulnerability:* The vulnerability of the receptor relates to its capacity to accommodate change i.e., the tolerance/intolerance of the receptor to change;
- *Recoverability:* The ability of a receptor to return to the baseline state before the Proposed Development impact caused the change; and
- *Importance:* The importance of the receptor or feature is a measure of the value assigned to that receptor based on biodiversity and ecosystem services, social value and economic value. Importance of the receptor is also defined within a geographical context, whether it is important internationally, nationally or locally.

5.8.7 Examples of receptors include biological and ecological receptors, such as designated sites or protected species, human receptors, such as residential housing or schools, and physical receptors such as waterbodies. **Table 5-1** defines the sensitivity criteria used in the ES.

Table 5-1: Sensitivity Criteria

Sensitivity	Description
High	Receptor has little or no ability to absorb change without fundamentally altering its character. For example: • Receptor has low/no capacity to return to baseline conditions within the Proposed Development's life, e.g., low tolerance to change and low recoverability such as a physical feature formed over a geological time scale, or loss of access with no alternatives; • The receptor is a designated feature of a protected site (of national or international importance), or is rare or unique; and • Receptor is highly economically valuable.
Medium	Receptor has moderate capacity to absorb change without significantly altering its character, however some damage to the receptor will occur. For example: • Receptor has intermediate tolerance to change; • Medium capacity to return to baseline condition, e.g., >5 years up to 10 years; and • The receptor is a designated feature of a site of regional importance; and or the receptor is valued but not protected.
Low	The receptor is tolerant to change without significant detriment to its character. Some minor damage to the receptor may occur. For example: • Receptor has a high tolerance to change; • High capacity to return to its baseline condition, e.g., within 1 year or up to 5 years; • May affect socio-economics behaviour but is not a nuisance to user; and • The receptor is relatively common.
Very Low	The receptor is common and/or widespread. The receptor is tolerant to change with no effect on its character. The Proposed Development's activity does not have a detectable effect on survival or viability.

Characterisation of Impacts

5.8.8 The Institute of Environmental Management and Assessment (IEMA) guidelines (Ref 5-13) state that: "*The assessment stage of the EIA should follow a clear progression; from the characterisation of 'impact' to the assessment of the significance of the effects taking into account the evaluation of the sensitivity and value of the receptors*."

5.8.9 Within the ES, the characterisation of potential impacts has been undertaken to determine what could happen to each environmental receptor because of the Proposed Development and its associated activities. Within each technical chapter, a description has been provided for each potential impact/source of effect associated with different activities undertaken on the Proposed Development – split between the three key phases:

- Construction;
- Operation (including maintenance); and
- Decommissioning.

5.8.10 This is a standard approach to identifying a list of potential impacts which may occur as a result of different Proposed Development activities. The term 'impact' refers to changes

arising from the Proposed Development, whereas the term 'effect' is used to describe the result of the impact on a receptor.

5.8.11 The general definitions used to describe impacts are noted in **Table 5-2**.

Table 5-2: Impact Definition

Terms	Definition
Direct impact	Impacts that result from a direct interaction between the Proposed Development activities and the receiving environment.
Indirect impact	Impacts on the environment, which are not a direct result of the Proposed Development activities, often produced away from the activity or as a result of a complex pathway.
Cumulative impact (inter-project impact)	Impacts that result from incremental changes caused by other present or reasonably foreseeable actions together with the Proposed Development (Ref 5-14). Generally considered to be the same impact but from different projects e.g. noise generated from two separate projects combining to affect residential amenity.
Cumulative impact (intra-project impact)	Impacts that occur where a single receptor is affected by more than one source of effect arising from different aspects of the Proposed development. An example of an intra-project impact would be where a local resident is affected by dust, noise and traffic disruption during the construction of a scheme, with the result being a greater nuisance than each individual effect alone.
Beneficial impact	An impact that is considered to represent an improvement on the baseline condition or introduces a new desirable factor (Ref 5-15).
Adverse impact	An impact that is considered to represent an adverse change from the baseline condition or introduces a new undesirable factor (Ref 5-15).

5.8.12 An estimate for the duration of the impact and resulting effect would be assigned, after the impact is characterised, using a simple scale of short term, medium term or long term, as per the below:

- *Short term:* The Proposed Development's activities that are predicted to last only for a limited period (e.g., from minutes, to hours, and no more than 3 months in total); and whose associated effect will cease on completion of the activity;
- *Medium term:* Impacts from the Proposed Development's activities that will last more than 3 months, and whose effects may continue after the completion of the activity, but will in total be less than 2 years; and
- *Long term:* Impacts from the Proposed Development's activities whose effects will last longer than 2 years.

5.8.13 General criteria for defining the magnitude of an impact are set out in **Table 5-3**. Key factors that influence this include:

- *Scale of change* – The scale of change refers to the degree of change to or from the baseline environment caused by the impact being described;

- *Spatial extent* – The extent of an impact is the full area over which the impact occurs; and
- *Duration and frequency* – The duration is the period within which the impact is expected to last prior to recovery or replacement of the feature. Frequency refers to how often the impact will occur.

Table 5-3: Impact Magnitude Criteria

Magnitude	Criteria
High	Long term and/or regional level loss; or major alteration to key elements/features of the baseline condition such that post development character/composition of the baseline will be fundamentally changed.
Medium	Medium term loss and/or local level change (greater than the Project footprint) or alteration to one or more key elements/features of the baseline conditions such that post development character/composition of the baseline condition will be materially changed.
Low	Short term, site specific and/or a minor shift away from baseline conditions. Changes arising from the alteration will be detectable but not material; the underlying character/composition of the baseline condition will be similar to the pre-development situation.
Very Low	Very little change from baseline conditions. Change is barely distinguishable, approximating to a “no change” situation.

5.8.14 Following on from the identification and characterisation of the potential impacts, an assessment of the significance of effects is able to be undertaken, as discussed below.

Evaluating the Significance of Effects

5.8.15 Having established the magnitude of change and the sensitivity of the receptor the significance of an effect can be assessed. The identification of significance typically requires the application of professional judgement, however a significance matrix (**Table 5-4**) may also be used as a guide to help identify the likely significance of effects.

5.8.16 The significance of effects will be evaluated with reference to available definitive standards, accepted criteria and legislation. For issues where definitive quality standards do not exist, significance will 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 effect.

5.8.17 Each of the specialist disciplines undertaking EIA may have a variation of the table below that aligns with magnitude and sensitivity criteria that best suits their topic area, which may also be defined within industry specific guidelines. Where the assessment criteria for determination of significance for a specific topic differs from the criteria outlined below, this is outlined within the specialist chapters (Chapters 6-19) of this *ES Volume II (Application Document 6.2)*.

Table 5-4: Significance Matrix

		Magnitude of Change			
		Very Low	**Low**	**Medium**	**High**
Sensitivity of Receptor	**High**	Negligible/ Minor	Moderate	Major	Major
	Medium	Negligible	Minor	Moderate	Major
	Low	Negligible	Negligible	Minor	Moderate
	Very Low	Negligible	Negligible	Negligible	Negligible/ Minor

5.8.18 The result of the interpretation of this matrix in line with the approach defined by each discipline is the assignment of the level of significance of the effect for all potential Proposed Development related impacts. This is done firstly with due consideration of any 'mitigation by design' measures being in place (i.e., potential effects), and then re-evaluated following the incorporation of any additional 'Project specific' mitigation (i.e., residual effects). Further information on mitigation measures is provided below. **Table 5-5** provides typical descriptions for each of the four significant effect definitions.

Table 5-5: Generic Significance Effect Descriptions

Significance Category	Indicative Description	Significant Effect?
Major	A large and detrimental change to a sensitive receptor: likely or apparent exceeding of accepted threshold. A large and beneficial change, leading to improvements to the baseline resulting in previously poor conditions being replaced by new legal compliance or major contribution being made to national targets. These effects may represent key factors in the decision-making process. Potentially associated with site and features of national importance or likely to be important considerations at a regional or district scale. Major effects may relate to resources or features which are unique and which, if lost, cannot be replaced or relocated.	Yes
Moderate	A medium scale change which, although not beyond an acceptable threshold, is still considered to be generally unacceptable, unless balanced out by other significant positive benefits of a project. In some circumstances, may be in breach of planning policy. These effects, if adverse, are likely to be important at a local scale and on their own could have a material influence on decision making. A positive moderate effect is a medium scale change that is significant in that the baseline conditions are improved to the extent that guideline targets are contributed to.	Yes, typically – but subject to application of professional judgement.
Minor	A small change that, whilst adverse, does not exceed legal or guideline standards. Would not breach planning policy. A small positive change, but not one that is likely to be a key factor in the overall balance of issues.	No

Significance Category	Indicative Description	Significant Effect?
	These effects may be raised as local issues and may be of relevance in the detailed design of a project but are unlikely to be critical in the decision-making process.	
Negligible	A very small-scale change that is so small and unimportant that it is considered acceptable to disregard. Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error, these effects are unlikely to influence decision making irrespective of other effects.	No

5.8.19 Moderate and Major levels of significance are usually considered to be significant in EIA terms, whilst Negligible or Minor impacts are not considered to be significant.

Consideration of Mitigation

5.8.20 A standard hierarchical approach to identifying mitigation requirements has been used:

- *Avoid or Prevent:* In the first instance, mitigation should seek to avoid or prevent the adverse effect at source, for example by routeing the pipelines away from a sensitive receptor. Mitigation by design has played an important role in avoiding impacts as the design of the Proposed Development has evolved;
- *Minimise or Reduce:* If the effect is unavoidable, mitigation measures should be implemented which seek to reduce the significance of the effect, for example the use of a noise bund to reduce noise levels at nearby noise sensitive receptors; and
- *Offset:* If the effect can neither be avoided nor reduced, mitigation should seek to offset the effect through the implementation of compensatory mitigation, for example offsite habitat creation to replace habitat losses.

5.8.21 The mitigation measures described in the ES fall into two categories, as follows:

- *Embedded Design Mitigation:* This is where the design of the Project is developed through an iterative process which involves seeking to avoid or reduce potential environmental effects through appropriate routeing, siting and design specifications. This is also often referred to as mitigation by design; and
- *Additional Mitigation and Enhancement Measures:* This refers to additional measures which have been identified as being necessary following an initial assessment, to help ensure any potential effects are minimised further where possible.

5.8.22 A Draft Construction Environmental Management Plan (CEMP) has been prepared and is presented in *ES Volume IV: Appendix 3.1 (Application Document 6.4.3.1)*. This document contains information relevant to the construction phase such as best practice and pollution prevention measures, specific environmental management plans, incident reporting, method statements and environmental risk assessments. A Mitigation Register is included in the Draft CEMP which tabulates all the environmental mitigation proposed as part of the ES and includes detailed descriptions of the actions required by the main contractor(s) and the Applicant during the construction and operational phases of the Proposed Development.

5.8.23 The Draft CEMP will subsequently be further developed once the Contractor(s) is appointed. The draft DCO includes a requirement that ensures that those measures included in the Draft CEMP are legally secured and have to be actioned pre / during / post construction. An appendix to the CEMP also includes a list of relevant measures which will be adopted during the operational phase.

Evaluate and Assess Residual Significance

5.8.24 As discussed in section 5.8.18, following the identification of additional mitigation measures, the assessment of significance is re-evaluated to determine whether there is likely to be a residual effect and whether it remains significant.

5.8.25 Residual effects assessed as Moderate or Major after consideration of additional mitigation measures will normally require additional analysis and consultation in order to discuss and possibly further mitigate where possible. Where further mitigation is not possible a residual effect may remain and solutions for offsetting would need to be explored.

Construction Phase Effects

5.8.26 Construction phase effects are taken to be those effects which arise as a result of construction related activities. This covers sources of effects such as construction traffic, atmospheric emissions, construction noise and vibration, dust generation, site runoff, mud on roads, risk of fuel/oil spillage, and the visual intrusion of plant and machinery on-site.

5.8.27 Construction related activities can result in both temporary and permanent effects and these are identified within the assessments presented within Chapters 6-19 of ES Volume II (*Application Document 6.2*). The identification of construction effects will be made on the basis of existing knowledge, techniques and equipment. A 'reasonable worst-case' scenario will be used with respect to the envisaged construction methods, location (proximity to sensitive receptors), phasing and timing of construction and decommissioning activities.

5.8.28 The construction phase for the Proposed Development is expected to last approximately 12 months in total, with any one location subject to open cut activities expected to have on-site work for approximately 7 months. The Applicant is committed to minimising the time during which specific locations are affected as much as is practicable.

5.8.29 In order to allow for unexpected delays to the construction programme (e.g., unsuitable weather leading to delays), *ES Volume II Chapter 3: Description of the Proposed Development* (Application Document 6.2.3) has included a section relating to the need for winterisation of the construction spread. If this was to occur, the overall construction programme would be expanded to allow for any lost time. Each technical topic has reviewed the impact of this alternative construction programme and where it would potentially alter the results of the impact assessment and the identified significance of effects, this is stated in the chapter and an explanation is provided.

Operational Phase Effects

5.8.30 Operational phase effects are taken to be the effects that occur as a result of the operational phase activities. These effects could be relatively short term, endure for a substantial period, or be permanent. This includes the effects of the physical presence of the Proposed Development infrastructure, and its operation, use and maintenance.

5.8.31 The overall operational life of the Proposed Development is expected to be for a minimum 25-year period but would have the potential to be extended significantly by implementation of appropriate inspection and maintenance regimes.

Decommissioning Phase Effects

5.8.32 Decommissioning phase effects are those which arise as a result of activities undertaken during the decommissioning phase of the Proposed Development. This covers sources of effects such as traffic, noise and vibration, dust generation and site run-off from decommissioning activities, for example. As with construction phase effects, some aspects of decommissioning will endure for longer than others.

5.8.33 As is discussed for the construction phase effects in section 5.8.27, the identification of decommissioning effects will be made on the basis of existing knowledge, techniques and

equipment. A 'reasonable worst-case' scenario will be used with respect to the envisaged decommissioning methods, location (proximity to sensitive receptors), phasing and timing of construction and decommissioning activities.

5.9 Cumulative Effects

5.9.1 In accordance with the EIA Regulations (Ref 5-2), Advice Note Seventeen (Ref 5-12), and other best practice guidance, consideration is given to the potential for cumulative and combined effects to arise as a result of the Proposed Development.

5.9.2 IEMA's report (Ref 5-16) recognises two major sources of cumulative effects:

- *Intra-project effects:* These combined effects occur where a single receptor is affected by more than one source of effect arising from different aspects of the project. An example of an intra-project effect would be where a local resident is affected by dust, noise and traffic disruption during the construction of a scheme, with the resulting cumulative effect on amenity being greater than each individual effect alone; and
- *Inter-project effects:* These cumulative effects occur as a result of a number of developments, which individually might not be significant, but when considered together could create a significant cumulative effect on a shared receptor and will include developments separate from and related to the project. An example of such an effect may be where construction traffic relating to two different developments impact on users of a single road link.

5.9.3 The EIA has identified that cumulative effects will result from a combination of different activities within the Proposed Development, and from activities associated with other development projects in the surrounding area. Full details of the cumulative impact assessment scope and methodology, the other development projects identified, and the assessment conclusions are presented in *ES Volume II Chapter 20: Cumulative Effects Assessment (Application Document 6.2.20*).

5.10 Monitoring of Significant Adverse Effects

5.10.1 Where adverse effects on the environment are predicted, proportionate monitoring measures have been identified in accordance with the requirements of Schedule 4 of the EIA Regulations (Ref 5-2).

5.10.2 The purpose of these monitoring measures is to:

- Ensure the embedded mitigation measures required to avoid, prevent, reduce and offset significant adverse effects on the environment are delivered;
- Collate data on the effectiveness of mitigation measures;
- Satisfy licence and/or permit requirements where applicable; and
- Identify remedial action(s) as a consequence of the underperformance or failure of defined mitigation measures.

5.10.3 Details of the mitigation and monitoring procedures to be implemented during and post-construction of the Proposed Development to monitor significant adverse effects – both individual and cumulative –are presented within each technical chapter of the ES and summarised within *ES Volume IV Appendix 3.1: (Application Document 6.4.3.1)* and *ES Volume IV: Appendix 3.6 (Application Document 6.4.3.6*).

5.11 General Assumptions and Limitations

5.11.1 In addition to the use of the Rochdale Envelope principles to manage design uncertainty, a number of general limitations have been encountered when undertaking the EIA, noting that these do not necessarily apply universally to each technical ES chapter. These have influenced how data collection, modelling and assessments have been progressed and reported in the ES, and have principally related to:

- The availability and accuracy of third-party data, information and records to inform the establishment of baseline conditions;
- The availability of information relating to the construction and delivery of the Proposed Development, including that relating to existing utilities and statutory undertakers' apparatus required as part of the Proposed Development;
- The availability of land access to undertake environmental surveys and monitoring in the field to supplement and verify desk-based and third-party information;
- The availability and reliability of information regarding other development projects, for inclusion in the cumulative effects assessment (see *ES Volume II Chapter 20: Cumulative Effects Assessment, Application Document 6.2.20)*.

5.11.2 To address these limitations, a number of assumptions have been made where information and/or survey access has been lacking or incomplete. These include:

- Adopting a precautionary approach in the assessment of impacts and effects where necessary;
- Applying reasonable worst-case assumptions regarding construction, operation (including maintenance) and decommissioning of the Proposed Development;
- Using a combination of modelling and professional judgement to predict the baseline conditions that could occur in the future, in the absence of the Proposed Development;
- Extrapolating from data, information and records gathered during the early stages of Proposed Development optioneering and design-development.

5.11.3 Details regarding the assumptions and limitations adopted within the topic-specific assessments are presented in more detail in Chapters 6 - 19 of *ES Volume II*, and those adopted within the cumulative effects assessment are presented in *ES Volume II Chapter 20 (Application Document 6.2.20*).

5.12 References

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Ref 5-2 *HM Government, 2017.* The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Available at: https://www.legislation.gov.uk/uksi/2017/572/contents/made Accessed July 2023.

Ref 5-3 *The Planning Inspectorate, 2000*. Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements. Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/ Accessed July 2023.

Ref 5-4 *Department of Energy and Climate Change, 2011*. Overarching National Policy Statement for Energy (EN-1)**.** Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37046/1938-overarching-nps-for-energy-en1.pdf Accessed July 2023.

Ref 5-5 *Department for Business, Energy & Industrial Strategy (BEIS), 2021*. Draft Overarching National Policy Statement for Energy (EN-1). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf Accessed July 2023.

Ref 5-6 *Department of Energy and Climate Change, 2011*. National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37049/1941-nps-gas-supply-oil-en4.pdf Accessed July 2023.

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Ref 5-8 *Ministry of Housing, Communities & Local Government, 2023.* National Planning Policy Framework (NPPF). Available at: National Planning Policy Framework (publishing.service.gov.uk) Accessed July 2023.

Ref 5-9 *The Planning Inspectorate, 2017*. Advice Note Three: EIA Notification and Consultation. Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-three-eia-notification-and-consultation-2/ Accessed July 2023.

Ref 5-10 *The Planning Inspectorate, 2018*. Advice Note Nine: Rochdale Envelope. Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-nine-rochdale-envelope/ Accessed July 2023.

Ref 5-11 *HM Government, 2008*. Planning Act 2008. Available at: https://www.legislation.gov.uk/ukpga/2008/29/contents Accessed July 2023.

Ref 5-12 *The Planning Inspectorate, 2019*. Advice Note Seventeen: Cumulative effects assessment. Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/ Accessed July 2023.

Ref 5-13 *Institute of Environmental Management and Assessment (IEMA) (2004)*. Guidelines for Environmental Impact Assessment

Ref 5-14 *European Commission (1999). Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions. Available at: https://ec.europa.eu/environment/archives/eia/eia-studies-and-reports/pdf/guidel.pdf* Accessed July 2023.

Ref 5-15 *Institute of Ecology and Environmental Management (IEEM) (2010).* Guidelines for Ecological Impact Assessment in Britain and Ireland (Marine and Coastal).

Ref 5-16 *IEMA (2011).* State of Environmental Impact Assessment Practice in the UK.

Ref 5-17 *IEMA (2015)*. Environmental Impact Assessment: Guide to Shaping Quality Development.

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