The Great Grid Upgrade

Sea Link

Preliminary Environmental Information Report

Volume: 1

Part 1 Introduction

Chapter 5 PEIR Approach and Methodology

Version A

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1.5 PEIR Approach and Methodology

1.5.1 Introduction

1.5.1.1 This chapter sets out the approach and general methodology that has been used in developing the preliminary environmental information (PEI) about Sea Link hereafter referred to as the 'Proposed Project', which is presented in this Preliminary Environmental Information Report (PEIR). As the PEIR is based upon the current findings of the as yet incomplete Environmental Impact Assessment (EIA), procedural information about the EIA process is also provided. The chapter summarises the key stages that have been followed up to the publication of this PEIR, in line with statutory requirements and formal advice provided by the Secretary of State (SoS) via the Scoping Opinion issued by the Planning Inspectorate.

1.5.1.2 Regulation 12(2) of the EIA Regulations defines the PEIR as information that has been compiled by the applicant and

"*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)*".

1.5.1.3 In relation to PEI, Planning Inspectorate Advice Note Seven (Ref 1.5.1) states that:

"*There is no prescribed format as to what PEI should comprise and it is not expected to replicate or be a draft of the ES. However, if the Applicant considers this to be appropriate (and more cost-effective) it can be presented in this way. A good PEI document is one that enables consultees (both specialist and non-specialist) to understand the likely environmental effects of the Proposed Development and helps to inform their consultation responses on the Proposed Development during the pre-application stage*".

1.5.1.4 This PEIR has not been presented as a draft ES. It does, however, provide details of the information gathered to date and the assessment work undertaken at this stage, in sufficient detail to help inform the statutory consultation responses.

1.5.1.5 This chapter should be read in conjunction with:

- **Volume 1, Part 1, Chapter 1: Introduction**; and
- **Volume 1, Part 1, Chapter 4: Description of the Proposed Project**.

1.5.1.6 This chapter is supported by the following appendices:

- **Volume 2, Part 1, Appendix 1.5.A: Cumulative Effects Assessment Methodologies**; and
- **Volume 2, Part 1, Appendix 1.5.B: Inter-project Cumulative Effects Initial Long List**.

1.5.2 PEI and EIA

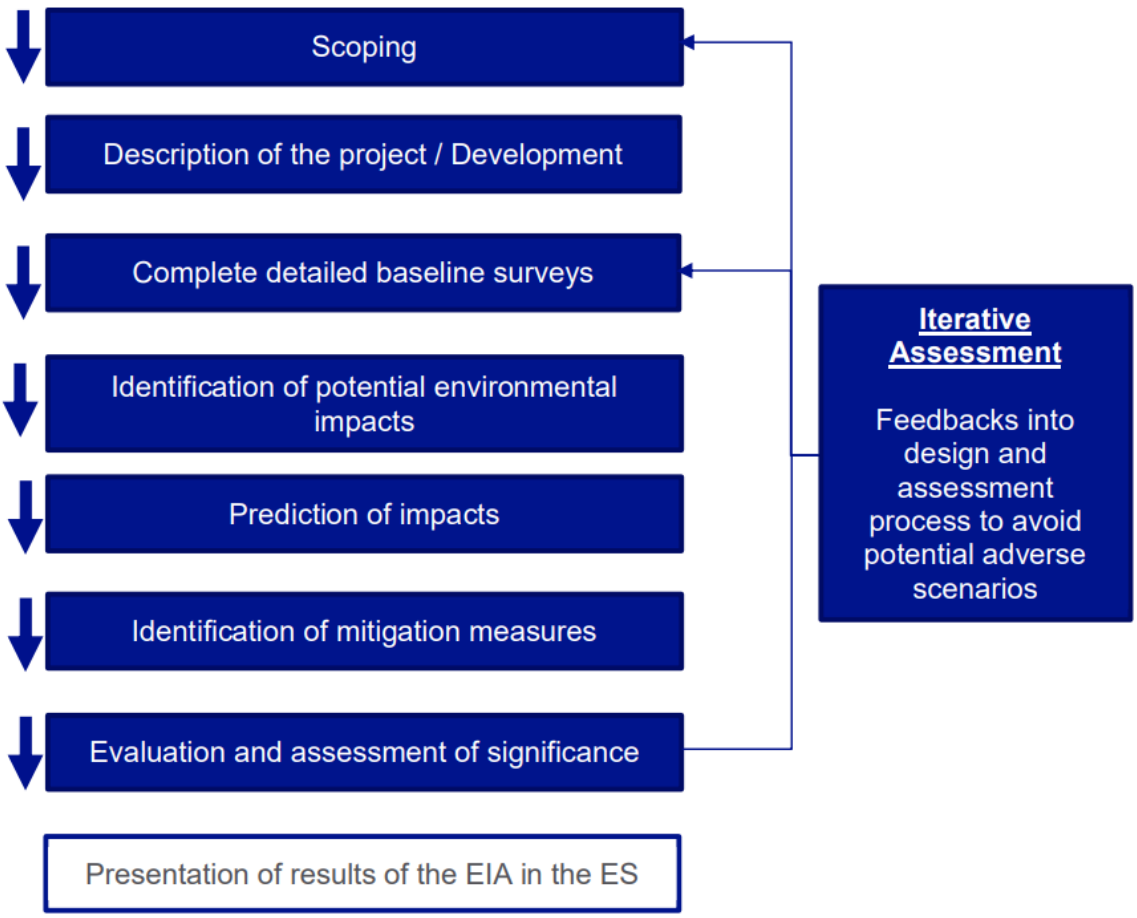
1.5.2.1 This section explains what the objectives of the PEI and EIA are and gives an overview of a typical approach to EIA. It also provides information about how those aspects of the Proposed Project where some flexibility is required post-consent, have been assessed at this PEI stage, and how they will be assessed through to the end of the EIA process.

What is EIA?

1.5.2.2 EIA is the process of compiling, evaluating, and presenting information about the likely significant environmental effects, both adverse and beneficial, of a project. The assessment is designed to help produce an environmentally sympathetic project and to provide decision makers and statutory consultees with the environmental information they require during determination of an application for consent. The early detection of likely significant adverse environmental effects enables appropriate mitigation (i.e. measures to avoid, reduce or offset likely significant adverse effects) to be identified and incorporated into the design of a project, or commitments to be made, for example to environmentally sensitive construction methods and practices. The approach is iterative and involves close working between National Grid Electricity Transmission plc (National Grid), the EIA team and the designers.

1.5.2.3 Image 1.5.1 illustrates the main stages in the EIA process, and the iterative nature of assessment and project design.

Image 1.5.1: EIA Process



1.5.2.4 Three main EIA documents are produced as part of the Development Consent Order (DCO) pre-application process:

- **EIA Scoping Report:** The Scoping Report sets out the likely significant effects from a project (scope). It also presents the data collected and the proposed assessment methodology and approach that would be used during the EIA. The Scoping Report is issued by Planning Inspectorate to consultees for comments on the scope and methodology proposed informing the Scoping Opinion.
- **Preliminary Environmental Information Report (PEIR):** The PEIR as set out in Regulation 12(2)(b) of the EIA Regulations 2017 provides information that '*is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development*'. The PEIR is used by consultees to inform their consultation responses during the Statutory Consultation[1] and it is issued at the same time the Statutory Consultation launches; and
- **Environmental Statement (ES):** The ES presents the results of the EIA undertaken for a project. It identifies the likely significant effects that would result if a project was delivered, and any mitigation proposed to reduce those significant effects. The ES is submitted as part of the application for development consent and is considered during the decision-making process.

1.5.3 Overview of the EIA Scoping Stage

1.5.3.1 The process of scoping and the preparation of a 'Scoping Report' is the main mechanism for determining the 'scope' of the EIA i.e., what environmental aspects will be considered, what methods of assessment will be used, and how conclusions will be reached regarding the significance of environmental effects.

1.5.3.2 A Scoping Report (Ref 1.5.2) for the Proposed Project was issued to Planning Inspectorate on 24 October 2022 and a Scoping Opinion (Ref 1.5.3) was received from the SoS on 1 December 2022. In each of the technical chapters presented within this PEIR, a table is provided that includes extracts from the Scoping Opinion that relate specifically to the technical chapter, and information is provided to explain how and where the issue is addressed in the PEIR or will be addressed within the ES. The Scoping Opinion takes account of responses from prescribed consultation bodies[2], relevant statutory undertakers[3], Local Authorities[4], and non-prescribed consultation bodies as appropriate.

[1] 'Statutory consultation under Section 42 to of the Planning Act 2008 (as amended) ("the Act")

[2] Schedule 1 of The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (the 'APFP Regulations')

[3] 'Statutory Undertaker' is defined in the APFP Regulations as having the same meaning as in Section 127 of the Act (PA2008)

[4] As defined in Section 43(3) of the PA2008

1.5.3.3 The Scoping Report and Scoping Opinion reflect the information available at the time they were prepared. The results of further baseline investigations may dictate the need for changes to be made to the scope, such as additional surveys or assessment that are beyond the scope of work identified in the Scoping Report or the Scoping Opinion. Likewise, any changes to the Proposed Project resulting from further technical or environmental investigations, or through changes brought about in response to consultation, may affect the scope of the EIA prior to submission. Any incidences where the proposed scope has increased or decreased since the Scoping Opinion was provided are identified in each of the technical chapters.

1.5.4 Overview of the post-Scoping EIA Process

1.5.4.1 This section describes the methodology which will be used to assess the potential effects on the natural, human and built environment as a result of the Proposed Project. In accordance with the EIA Regulations, the assessments undertaken will evaluate and identify the likely significant environmental effects arising from the proposed construction, operation and decommissioning phases of the Proposed Project.

1.5.4.2 The primary objective of the EIA is to identify likely 'significant' effects, since it is these effects that must be reported in the ES. This is undertaken by first predicting impacts and then evaluating their severity against agreed significance criteria.

1.5.4.3 The prediction, quantification and evaluation of an impact and the significance of resulting effects, is typically undertaken by considering the relationship between two factors:

- The magnitude of an effect (that is, the actual change taking place to the environment); and
- The value of the affected baseline resource or receptor and its sensitivity to the impact.

1.5.4.4 The scope of the assessment is based on that presented within the Scoping Report (Ref 1.5.2). It has also been updated based on the responses given in the Scoping Opinion (Ref 1.5.3). Where the Planning Inspectorate has requested that aspects should be scoped back into the assessment, these have been included within the assessment presented in this PEIR and will be included within the ES, unless further information (also documented in the ES) is provided to justify scoping out.

Technical Scope

1.5.4.5 The technical scope of assessment for each environmental aspect is detailed in the technical chapters of Parts 2-5. The technical scope also details the approach to baseline data collection and assessment methodologies.

Spatial Scope

1.5.4.6 The spatial scope for each environmental aspect is the area over which changes to the environment are predicted to occur because of the Proposed Project. This will depend on the nature of the potential effects and the location of receptors that could be affected. It takes account of:

- The physical area of the Proposed Project (draft Order Limits);
- The nature of the baseline environment; and

- The area, over which environmental effects may occur.

1.5.4.7 Each of the technical chapters in Parts 2-5 describes the study area to be considered, providing a clear explanation as to why that particular study area has been adopted. The spatial scope of each assessment may be refined at the ES stage in response to comments from consultees, refinement of the Proposed Project or further assessment work.

Temporal Scope

1.5.4.8 The temporal scope considers the time period over which changes to the environment and the resultant effects are predicted to occur, and are typically defined as being either temporary or permanent:

- Permanent - these are effects that will remain even when the Proposed Project is complete, although these effects may be caused by environmental changes that are permanent or temporary.
- Temporary – these are effects that are related to environmental changes associated with a particular activity and that will cease following completion of the activity.

1.5.4.9 The assessment will have regard to the programme for the Proposed Project and will evaluate the environmental effects of the Proposed Project during construction, operation, maintenance and decommissioning. These effects will be compared to the situation prevailing before the Proposed Project is commenced (the current baseline), and to the situation that would prevail in the future without the Proposed Project (the projected future baseline).

1.5.4.10 The future baseline is the theoretical situation that would exist in the absence of the Proposed Project. This is based upon extrapolating the current baseline using technical knowledge of likely changes to predict this (e.g., predictable changes such as climate change, changes that can be predicted based on reasonable assumptions and modelling calculations, information about other relevant developments etc.).

1.5.4.11 Each technical chapter in Parts 2-5 defines the baseline (current or future or both) against which the environmental effects of the Proposed Project have been assessed. The baseline conditions to be assessed for each environmental topic are outlined in the technical chapters of Parts 2-4 of this Scoping Report.

Assessment of Effects and Determination of Significance

1.5.4.12 The Institute of Environmental Management and Assessment (IEMA) guidelines (2004, p11/2) (Ref 1.5.4) 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*."

1.5.4.13 The prediction of potential impacts has been undertaken to determine what could happen to each environmental receptor because of the Proposed Project and its associated activities. There is a diverse range of potential impacts that have been considered within the assessment process therefore a range of prediction methods including quantitative, semi-qualitative and qualitative have been used as appropriate.

Identification of Potential Effects

1.5.4.14 The likely significant effects (beneficial and adverse) of the Proposed Project have been predicted and evaluated using appropriate evaluative techniques, many of which follow specific best practice guidelines for a particular topic. Potential effects have been identified first, in summary, as an indication of what effects could theoretically occur in the absence of mitigation (other than mitigation inherent in the design of the Proposed Project).

Approach to Mitigation

1.5.4.15 After the identification of the potential effects, consideration has been given to how those potential effects could be avoided, reduced or offset. This is referred to as mitigation. Each topic chapter of the PEIR has identified proposed mitigation measures that are required to avoid or reduce the potential significant adverse effects of the Proposed Project. Mitigation has been categorised as follows:

- **Embedded Measures**: are those that are intrinsic to and built into the design. They include the avoidance of designated sites through sensitive routeing, siting and design.
- **Control and Management Measures**: These are good practice measures that are included within the Code of Construction Practice (CoCP) and other control and management plans such as the use of road sweepers and the implementation of measures to control silt-laden runoff during construction.
- **Mitigation Measures**: These are measures over and above embedded measures, for example anything that has been added to the design purely to mitigate an effect such as landscape planting.

1.5.4.16 As consent for the Proposed Project will be sought through a DCO, all three categories of mitigation as described above will be the subject of a DCO requirement and will therefore be secured and therefore there will be a legal requirement to implement them. As such no assessment of likely significant effects has been undertaken prior to the application of mitigation as all mitigation will be a legal requirement. In addition as most potential effects will be mitigated through a combination of embedded measures and control and management measures no assessment of likely significant effects has been undertaken prior to the application of the third category ‘mitigation measures’ as this would result in significant repetition within the document.

Assessing Effects and Determining Residual Significance

1.5.4.17 There is no statutory definition of what constitutes a ‘significant’ effect within the EIA Regulations and whilst the determination of the significance of effects is important to informing the decision-making process, defining what is significant is not a simple task. The process typically involves consideration of two aspects of a potential effect, namely the sensitivity and/or value of the receptor or resource, and the magnitude of the impact on the receptor/resource.

1.5.4.18 The significance of the residual effects will be determined by reference to criteria for each assessment topic. Specific significance criteria for each technical discipline, include giving due regard to the following:

- scale of the impact;
- impact duration, and whether effects are temporary, revisable, or permanent;

- effect nature (whether direct or indirect, reversible or irreversible, beneficial or adverse);
- where the effect occurs in isolation, is cumulative, or will interact with other effects;
- performance against any relevant environmental quality standards;
- sensitivity of the receptor; and
- compatibility with environmental policies.

1.5.4.19 Each technical chapter of this PEIR includes a description of the proposed approach to determining the significance of effects, including how professional judgement may be applied.

Magnitude of impact

1.5.4.20 General criteria for defining the magnitude of an impact, or change, are set out in Table 1.5.1. 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 a measure of how long the impact is expected to last. Frequency refers to how often the impact would occur; it may be continuous or periodic.

Table 1.5.1: Impact magnitude criteria

Magnitude	General criteria
Large	Adverse: Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements Beneficial: Large scale or major improvement of resource = quality; extensive restoration; major improvement of attribute quality
Medium	Adverse; Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements Beneficial: benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality
Small	Adverse: Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements Beneficial: Minor benefit to, or in addition of, one (maybe more) key characteristics, features or

Magnitude	General criteria
	elements; some beneficial impact on attribute or a reduced risk or negative impact occurring
Negligible	Adverse: Very minor loss of detrimental alteration to one or more characteristics, features or elements. Beneficial: Very minor benefit to or positive addition of one or more characteristics, features or elements

Sensitivity and value of the receptor

1.5.4.21 The sensitivity of a receptor or feature is characterised by its vulnerability to change and its ability to recover. The value of a receptor or feature reflects its overall importance and the value placed on it by society; this may be reflected by its level of statutory or policy protection or else a value may be attributed through consultation and the application of professional judgement. Criteria for defining the sensitivity and/or value of a receptor are set out in Table 1.5.2. Characterisation of the receptor is achieved by balancing out of these three considerations to determine the receptor's sensitivity.

- 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 the receptor to return to the baseline state; 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.

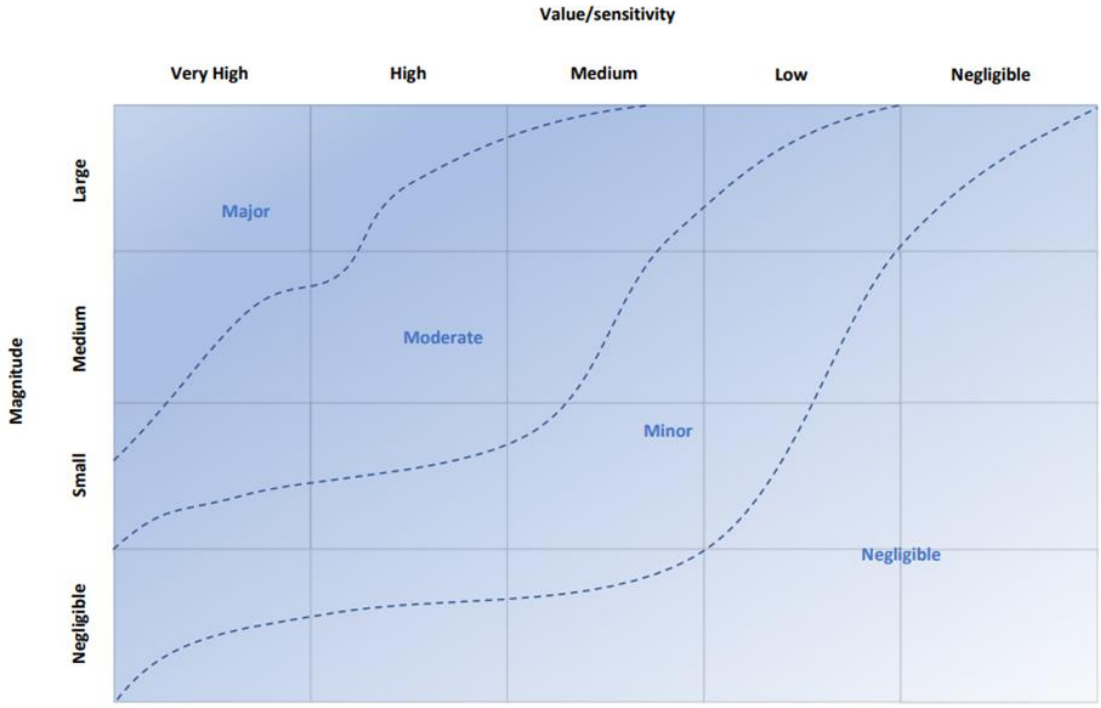
Table 1.5.2: Sensitivity criteria

Value/Sensitivity	General Criteria
Very High	Very high importance and rarity, valued at an international level and limited potential for recovery or substitution
High	High importance and rarity, valued at a national level and limited potential for recovery or substitution
Medium	Medium importance and rarity, valued at a regional level, some potential for recovery or substitution
Low	Low or medium importance and rarity, valued at a local level, good potential for recovery or substitution
Negligible	Very low importance and rarity, valued at a local level, easy to replace.

Evaluating the significance of effects

1.5.4.22 Having established the magnitude of change and sensitivity of the receptor, the significance of an effect can be assessed. To aid transparency in the assessment process, the matrix shown in Image 1.5.2 will be used as the basis for assigning significance to an effect; however, the identification of significance typically requires the application of professional judgement. As an illustration, a high sensitivity receptor subject to a large magnitude of change would experience a major significance effect, and a low sensitivity receptor subject to a small magnitude of change would experience a minor or negligible significance effect.

Image 1.5.2: Basis of assigning significance



1.5.4.23 Each of the specialist disciplines will apply magnitude and sensitivity criteria that best suit the topic area, and for some topics these may be defined in industry guidelines.

1.5.4.24 Following the classification of an effect using this methodology, a clear statement will then be made in the ES as to whether that effect is significant or not significant. Major and moderate effects are typically considered to be significant, whilst minor and negligible effects are considered not to be significant. However, professional judgement will also be applied in reaching conclusions as to the significance of effects. Typical definitions for the classification of effects are shown in Table 1.5.3.

Table 1.5.3: Generic significance description

Significance	General criteria	Significant effect
Major	A large and detrimental change to a valuable/sensitive receptor; likely exceeding an accepted (often legal) threshold. A large and beneficial change, resulting in improvements to the baseline result in previously poor conditions being replaced by new legal compliance or a major contribution being made to national targets. These effects may represent key factors in the decision-making process. Potentially associated with sites 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 that are unique and which, if lost, cannot be replaced or relocated.	**Yes**
Moderate	A medium scale change that, although not beyond an accepted threshold, is still considered to be generally unacceptable, unless balanced out by other significant positive benefits of a project. Likely to be in breach of planning policy, rather than legal statute. These effects, if adverse, are likely to be important at a regional or 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 (e.g. UK Biodiversity Action Plan (BAP) targets) are contributed to.	**Yes (typically)**
Minor	A small change that, whilst adverse, does not exceed legal or planning policy thresholds. A small positive change, but not one that is likely to be a key factor in the overall balance of issues. 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.	**No**
Negligible	A very small 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	**No**

Significance	General criteria	Significant effect
	margin of forecasting error, these effects are unlikely to influence decision making, irrespective of other effects.	

Defining residual significance in the PEIR

1.5.4.25 At this preliminary stage the surveys and assessment work have progressed to differing degrees for different technical assessments, and mitigation measures have not all been defined or designed.

1.5.4.26 However, for all technical topics enough information has been gathered and assessed in order to be able to identify whether significant effects are likely or unlikely to occur. The information is not always sufficient to allow a more precise or quantitative prediction of the level of significance to be made; typical levels of significance being negligible, minor, moderate or major). The general approach taken is therefore to only state whether effects are likely or unlikely to be significant, rather than assigning significance levels.

1.5.4.27 In general a cautionary approach is taken, to ensure that where uncertainty currently lies with any assessment work, a worst case consideration has been made to the identification of a particular effect's significance. The generic significance of effect descriptions that have been applied to the preliminary assessments within this PEIR are set out in Table 1.5.4.

Table 1.5.4: Generic significance effects descriptions

Significance	Indicative description
Significant	Large adverse changes that will exceed accepted (often legal) thresholds, to a medium scale change which may exceed accepted thresholds or lead to a breach of planning policy. Large beneficial changes, 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, ranging to a medium scale change that is significant in that the baseline conditions are improved to the extent that guideline targets are contributed to. Consideration should be given to the type and sensitivity of affected receptors and the scale of the impact and its resulting effect.
Not significant	A small change that, whilst adverse, does not exceed legal or guideline standards and is unlikely to breach planning policy, ranging to a very small scope change that is so small and unimportant that it is considered acceptable to disregard. A small positive change, but not one that is likely to be a key factor in the overall balance of issues.

Significance	Indicative description
	Consideration should be given to the type and sensitivity of affected receptors and the scale of the impact and its resulting effect.

Confidence in prediction of the significance of effects

1.5.4.28 Following on from the identification of whether an effect is considered to be significant or non-significant, the confidence in the prediction of the significance of effects is given a rating of high, moderate or low and a justification provided. Definitions of high, moderate and low confidence levels are provided in Table 1.5.5.

Table 1.5.5: Confidence level definitions

Confidence level	Definition
High confidence	A high level of confidence in the prediction of significance effects could be justified through: • The consideration of, and routeing and/or siting of the Proposed Project away from, designated features and high sensitivity receptors; • Complete baseline data to inform the prediction; • The application of committed mitigation; and • A thorough understanding of Proposed Project activities.
Moderate confidence	A moderate level of confidence in the prediction of significance effects could be justified through: • Particular surveys or assessments are incomplete at this stage, but it is possible to extrapolate results; • Mitigation measures will continue to be developed up to the submission of the application for consent; and • A general understanding of the Proposed Project activities being undertaken and the associated impacts based on other projects, while more detailed information will be provided later.
Low confidence	A low level of confidence in the prediction of significance effects could be justified through: • Only extremely limited baseline data is available at this stage; • Exact Proposed Project activities are unknown; and Where this is the case, a precautionary, worst-case approach is taken.

1.5.5 The Rochdale Envelope Approach

1.5.5.1 Major infrastructure projects such as linear infrastructure projects for underground cables, overhead lines and above ground installations, such as converter stations, typically need some flexibility to be maintained for detailed design and construction, if conditions are found that would otherwise prevent or delay construction. Examples can include previously unknown archaeological assets or poor ground conditions on cable routes and to allow for detailed design of the converter station by a specialist manufacturer post consent. To mitigate such issues a flexible approach to design parameters is used within the EIA process, and this is typically referred to as the 'Rochdale Envelope' (please see section 1.5.5.7 below); and it allows for a realistic worst-case assessment to be undertaken.

1.5.5.2 By developing a realistic worst-case scenario in response to critical technical and engineering parameters, as well as the emerging findings of the EIA and feedback from stakeholders, it is possible to strike a balance between the level of design information needed for the purpose of EIA and the application for consent and while still retaining the level of design flexibility needed as the Proposed Project moves into detailed design and construction.

1.5.5.3 The EIA process will aid and inform the design process and support the identification of a design freeze that is flexible enough to accommodate change in future stages but not so flexible that it could over-state or unnecessarily amplify the potential environmental impacts of the Proposed Project.

Limits of Deviation and Design Parameters

1.5.5.4 To accommodate unexpected issues in the routeing and siting of infrastructure when more detailed ground investigation information is available, or even during construction, a spatial tolerance will be applied for to allow small changes to the location of linear elements of the infrastructure be made; the extent of this tolerance is known as the 'limits of deviation' or LoD, and the Order Limits that will eventually be applied for will need to encompass the LoD.

1.5.5.5 In addition, some flexibility is likely to be required for non-linear aspects of the Proposed Project, for example the layout of converter stations. Design parameters are therefore applied to state the maximum dimensions and potential locations within the compound.

1.5.5.6 At this stage only preliminary environmental information is being provided, as the design of the Proposed Project, and the order limits to be applied for, have not been finalised. However, the principles and assumptions that are currently envisaged to be applied in respect of the LoD, in ensuring that the assessment is robust and considers a realistic worst case for the final built project, are set out below.

1.5.5.7 PlNS Advice Note Nine (Ref 1.5.5) provides guidance on how to deal with flexibility of this type as follows:

"*The Rochdale Envelope assessment approach is an acknowledged way of assessing a Proposed Development comprising EIA development where uncertainty exists and necessary flexibility is sought.*"

"If, in the course of preparing an ES, it becomes clear that it will not be possible to specify all the details of the Proposed Development, the ES must explain why and how this has been addressed. The ES will need to establish the relevant parameters for the purposes of the assessment. Where this approach is adopted the assessments in the ES should be undertaken on the basis of the relevant design parameters applicable to the characteristics of the Proposed Development included within the DCO. The assessment should establish those parameters likely to result in the maximum adverse effect (the worst case scenario) and be undertaken accordingly to determine significance".

1.5.5.8 This approach uses what is referred to as the 'Rochdale Envelope', after the legal cases which established its precedent (R. v Rochdale MBC ex parte Milne (No. 1) and R. v Rochdale MBC ex parte Tew [1999] and R. v Rochdale MBC ex parte Milne (No. 2) [2000]). Where a Rochdale Envelope approach has been used for a particular component of the Proposed Project, this is highlighted in the following sections.

1.5.5.9 The Rochdale Envelope approach is critical to the routeing of linear energy infrastructure; to allow for changes to be made post consent, in particular in order to avoid unforeseen ground conditions or archaeology. The proposed route of the linear infrastructure is therefore to be subject to LoD which will provide a necessary and proportionate degree of flexibility as to the final alignment of the Proposed Project. It is important to note that the area within which construction activity can take place may be wider than the LoD in places but will be within the draft Order Limits (which will ultimately translate into the Order Limits and Order Land for the DCO submission).

1.5.5.10 The LoD and design parameters for each element of the Proposed Project is explained in **Volume 1, Part 1, Chapter 4 Description of the Proposed Project**.

1.5.6 Basis of Assessment

1.5.6.1 Each of the technical chapters in Parts 2 to 4 include a section, at section 5, which sets out the assumptions that have been made in respect of the design flexibility maintained within the Proposed Project.

1.5.6.2 To take account of the flexibility allowed for in the Proposed Project, consideration has been given to the potential for the preliminary effects to be of greater or different significance should any of the permanent or temporary infrastructure elements be moved within the LoD or design parameters that are explained in **Volume 1**, **Part 1, Chapter 4 Description of the Proposed Project**.

1.5.7 Assessment Scenarios and Options

1.5.7.1 A number of alternative scenarios have been considered within each of the technical assessment chapters. These are described in the following sections.

Suffolk Onshore Scheme

Assessment scenarios

1.5.7.2 There are three instances where alternative scenarios have been considered within each of the technical assessment chapters in Part 2. These are:

- Friston substation is installed either under the current consent granted to Scottish Power Renewables (SPR) or as part of the Proposed Project, as explained in **Volume 1, Part 1, Chapter 4 Description of the Proposed Project**; and
- Saxmundham Converter Station construction access is taken off the B1121 South Entrance (bellmouth BM09) or the B1121 Main Road (bellmouth BM12 via BM 11 and BM10), as explained in **Volume 1, Part 1, Chapter 4 Description of the Proposed Project**;
- Saxmundham Converter Station permanent access is taken off the B1121 South Entrance (bellmouth BM09), B1121 Main Road (bellmouth BM12 via BM 11 and BM10) or off the B1121 The Street (bellmouth BM13), as explained in **Volume 1, Part 1, Chapter 4 Description of the Proposed Project**.

1.5.7.3 Section 5 in each technical chapter in Part 2 details whether these scenarios are relevant to the technical assessment, and if so, how they have been assessed. An example is provided in relation to Cultural Heritage in Table 1.5.6 below.

Table 1.5.6: Suffolk Onshore Scheme Consideration of Scenarios

Assessment scenario	How it has been considered within the preliminary assessment
Friston Substation	The potential for both direct and indirect impacts on cultural heritage resulting from construction under the current SPR consent or as part of the Proposed Project have been considered as part of the PEIR process (see 'Preliminary Assessment of Effects' Section). The full detailed impact assessment will form part of the final ES.
Saxmundham Converter Station construction access	The potential for both direct and indirect impacts on cultural heritage resulting from the construction access options have been considered as part of the PEIR process (Preliminary Assessment of Effects' Section). The full detailed impact assessment will form part of the final ES.
Saxmundham Converter Station permanent access	The potential for both direct and indirect impacts on cultural heritage resulting from the permanent access options have been considered as part of the PEIR process (Preliminary Assessment of Effects' Section). The full detailed impact assessment will form part of the final ES.

Suffolk Onshore Scheme including Co-location

1.5.7.4 As explained in **Volume 1, Part 1, Chapter 4 Description of the Proposed Project**, National Grid and National Grid Ventures (NGV) are in discussion to explore the opportunities for coordination of their proposed projects in Suffolk, one part of which is co-location of infrastructure. The Proposed Project therefore includes an option to facilitate co-location of infrastructure with NGV's proposed Nautilus and LionLink interconnector projects to the extent currently possible under the PA2008.

1.5.7.5 Whilst the Proposed Project include an option for co-location, the Proposed Project must be independently deliverable to ensure National Grid can comply with its statutory duties and meet the need case for the Proposed Project. The preliminary assessment included within this PEIR therefore includes an assessment of the Proposed Project in isolation and a separate assessment of the Proposed Project with co-location. The following sections describe how the Proposed Project with the co-location option differs from the Proposed Project in isolation.

HVDC cables

Proposed Project

1.5.7.6 The Proposed Project requires two High Voltage Direct Current (HVDC) cables and one fibre optic cable to be installed within three ducts in a single trench. The typical working width would be 40 m wide and would include a temporary fence on either side, temporary drainage, separate stockpiles for topsoil and subsoil and typically a 7 m wide haul road. A typical HVDC construction swathe for the Proposed Project is illustrated on **Design Drawing S42_T/TDD/SS/3001**.

Co-location

1.5.7.7 Under the co-location option the Proposed Project would include for the installation of up to a total of eight additional ducts for the two NGV projects. The typical arrangement of the working width would remain as described above but extra space would be required for up to an additional two trenches and their associated stockpiles of topsoil and subsoil. As a result, the working width would typically increase from 40 m to 59 m to allow installation of the ducts required for one of the NGV projects and from 40 m to 69 m to allow installation of the ducts required for the two NGV projects. A typical working width for a co-located option is illustrated on **Design Drawing S42_S/TDD/SS/0018**.

1.5.7.8 Although this option considers the installation of additional empty ducts, works to install cables within the ducts would be subject to separate project consents obtained for the NGV projects; therefore, this element of work is not included within the co-location assessment. The installation of the cables for the NGV projects are assessed cumulatively in **Volume 1, Part 2, Chapter 14: Suffolk Onshore Scheme Inter-project Cumulative Effects**.

HVAC cables

Proposed Project

1.5.7.9 The Proposed Project requires six High Voltage Alternating Current (HVAC) cables, two fibre optic cables and two Distributed Temperature Sensing (DST) tubes installed within eight ducts split over two separate trenches. The typical working width would be 63 m wide and would include a temporary fence on either side, temporary drainage, separate stockpiles for topsoil and subsoil and typically a 7 m wide haul road. A typical example of a HVAC construction swathe for the Proposed Project is illustrated on **Design Drawing S42_S/TDD/SS/0010**.

Co-location

1.5.7.10 Under the co-location option the Proposed Project would include for the installation of up to a total of 16 additional ducts for the two NGV projects split over four additional trenches. The typical arrangement of the working width would remain as described above but extra space would be required for the additional four trenches and associated stockpiles of topsoil and subsoil. As a result, the working width, therefore, would typically increase from 63 m to 95 m to install the ducts required for one of the NGV projects and from 63 m to 112 m to install the ducts required for the two NGV projects. A typical working width for a co-located HVAC corridor is illustrated on **Design Drawing S42_S/TDD/SS/0013**.

1.5.7.11 1.4.2.241.4.2.26For the scenario where the Proposed Project's combined HVAC and HVDC corridor is co-located with a HVAC and HVDC corridor for up to two NGV projects, the typical arrangement of the working width would remain as described above but extra space would be required for the additional six trenches and associated stockpiles of topsoil and subsoil. As a result, the working width, therefore, would typically increase from 63 m to 106 m to install the ducts required for one of the NGV projects and from 63 m to 131 m to install the ducts required for the two NGV projects. A typical working width for this co-located option The inclusion of co-location with the NGV projects within this swathe is illustrated on **Design Drawing S42_S/TDD/SS/0014**.

1.5.7.12 Although this option considers the installation of additional empty ducts, works to install cables within the ducts would be subject to the separate project consents obtained for the NGV projects and is therefore not included in the co-location assessment. The installation of the cables for the NGV projects are assessed cumulatively in **Volume 1**, **Part 2, Chapter 14 Suffolk Onshore Scheme Inter-project Cumulative Effects**.

Saxmundham Converter Station

Proposed Project

1.5.7.13 The Proposed Project requires one converter station in Suffolk (Saxmundham Converter Station); a typical arrangement for Saxmundham Converter Station is illustrated on **Design Drawing S42_S/TDD/SS/0015**. This scenario assesses the Saxmundham Converter Station being located at the site shown on **Figure 1.4.2 Saxmundham Converter Station Indicative Location**, with the associated indicative landscape mitigation strategy as illustrated on **Figure 1.4.3 Saxmundham Converter Station Indicative Landscaping Strategy**.

Co-location

1.5.7.14 Under the co-location option up to three converter stations (Saxmundham Converter Station and two for the NGV projects) would be located on the Suffolk converter station site. **Figure 1.4.5 Saxmundham Converter Station Indicative Location with Co-location** illustrates an indicative arrangement of a co-located site with three converter stations. **Figure 1.4.6 Saxmundham Converter Station Indicative Landscaping Strategy with Co-location** illustrates an indicative landscaping strategy for a co-located site with up to three converter stations. These figures demonstrate one way in which co-location of the Saxmundham Converter Station, with up to two other converter stations for the NGV projects, could be brought forward within the wider lateral LoD.

1.5.7.15 The Proposed Project however would not include the delivery of the two further converter stations themselves. The assessment of the construction of either one or two NGV converter stations on the Suffolk converter station site is, therefore, assessed cumulatively in **Volume 1, Part 2, Chapter 14: Suffolk Onshore Scheme Inter-project Cumulative Effects**, as the Proposed Project would not be seeking consent for the installation of the NGV converter stations themselves; these would be subject t o separate consents.

Friston substation

Proposed Project

1.5.7.16 The Proposed Project will either connect into the proposed Friston Substation installed under the consent granted to SPR or the proposed Friston substation would be installed by National Grid as part of the Proposed Project as set out in **Volume 1, Part 1, Chapter 4: Description of the Proposed Project**.

Co-location

1.5.7.17 Under this option the Proposed Project would be no different to that described above. Works required to the proposed Friston Substation to connect the NGV projects would be subject to their own individual separate project consents for these projects and is therefore not included for under this co-location assessment. These works for the NGV projects are assessed cumulatively in **Volume 1, Part 2, Chapter 14: Suffolk Onshore Scheme Inter-project Cumulative Effects**.

Suffolk landfall

Proposed Project

1.5.7.18 The Proposed Project requires two HVDC cables and one fibre optic cable, each installed within one of three ducts. It will also require a spare duct. The typical arrangement for the Proposed Project is illustrated on **Figure 1.4.7 Suffolk Landfall Indicative Location**.

Co-location

1.5.7.19 Under the co-location option the Proposed Project would include for the installation of up to a total of six additional ducts for the two NGV projects. An arrangement for a co-located scenario is illustrated on **Figure 1.4.8 Suffolk Landfall Indicative Location with Co-location**.

1.5.7.20 Although this option considers the installation of additional empty ducts, works to install cables within the ducts would be subject to separate project consents for the NGV projects; therefore, this element of work is not included within the co-location assessment scenario. The installation of the cables for the NGV projects are assesse d cumulatively in **Volume 1, Part 2, Chapter 14: Suffolk Onshore Scheme Int er-project Cumulative Effects** and **Volume 1, Part 4, Chapter 12: Offshore Schem e Inter-project Cumulative Effects**.

1.5.7.21 Section 5 of each technical chapter in Part 2 details how the option of co-location has been assessed within the technical assessment. An example is provided in relation to Cultural Heritage in Table 1.5.7 below.

Table 1.5.7: Suffolk Onshore Scheme Consideration of Co-location

Element of co-location	How it has been considered within the preliminary assessment
HVDC ducts	The HVDC ducts have been considered as part of the Proposed Project and the Proposed Project with co-location within the preliminary assessment. The maximum working width for the HVDC corridor has been assessed for the Proposed Project at 40 m and the maximum working width for the HVDC corridor has been assessed for the Proposed Project with co-location at up to 69 m.
HVAC cables	The HVAC ducts have been considered as part of the Proposed Project and the Proposed Project with co-location within the preliminary assessment. The maximum working width for the HVAC corridor has been assessed for the Proposed Project at 63 m and the maximum working width for the HVAC corridor has been assessed for the Proposed Project with co-location at up to 131 m.
Saxmundham Converter Station	The potential for both direct and indirect impacts on cultural heritage resulting from the Converter Station as part of the Proposed Project and the Proposed Project with co-location have been considered as part of the PEIR process (Preliminary Assessment of Effects' Section). The full detailed impact assessment will form part of the final ES.
Friston substation	No option has been included for co-location as part of the Proposed Project. This is assessed cumulatively in **Volume 1, Part 2, Chapter 14: Suffolk Onshore Scheme Inter-Project Cumulative Effects**.
Suffolk landfall	The potential for direct impacts on cultural heritage at the landfall as part of the Proposed Project and the Proposed Project with co-location have been considered as part of the PEIR process (Preliminary Assessment of Effects' Section). The full detailed impact assessment will form part of the final ES.

Kent Onshore Scheme

Assessment scenarios

1.5.7.22 Two alternative scenarios have been considered within each of the technical assessment chapters in Part 3. These are:

- The use of either low height or standard height pylons for the HVAC connection. Within this scenario there are three options as explained in **Volume 1, Part 1, Chapter 4: Description of the Proposed Project**; and
- Permanent access to Minster Converter Station and Minster 400 kV substation is either taken off A256 (through bellmouth BM02) or off Jutes Lane through bellmouth BM03 but with bellmouth BM02 being retained for any abnormal indivisible load (AIL) movements required during maintenance and operation as explained **in Volume 1, Part 1, Chapter 4: Description of the Proposed Project**.

1.5.7.23 Section 5 of each technical chapter in Part 3 details whether this scenario is relevant to the technical assessment, and if so, how it has been assessed. An example is provided in relation to Cultural Heritage in Table 1.5.8 below.

Table 1.5.8: Kent Onshore Scheme Consideration of Scenarios

Assessment scenario	How it has been considered within the assessment
Pylon types	The potential impacts to cultural heritage resulting from pylons are considered to be largely on the setting of assets rather that physical due to the limited footprint of pylons. Variations in height and shape of pylons have been considered to see how the type of pylon used might increase/reduce potential impacts on setting. This has been considered as part of the preliminary assessment.
Permanent access to Minster Converter Station and Substation	The potential impacts to cultural heritage resulting from permanent access are considered to be largely physical as it is assumed the road will have a limited visual impact on the landscape and therefore have a limited impact on the setting of heritage assets. This has been considered as part of the preliminary assessment.

Coordination and Co-location

1.5.7.24 Unlike the proposals in Suffolk, there are no separate projects that require a coordinated approach with the Proposed Project in Kent.

Offshore Scheme

Assessment scenarios

1.5.7.25 There are no assessment scenarios considered as part of the Offshore Scheme.

Offshore Scheme Including Coordination and Co-location

1.5.7.26 As set out above coordination including the facilitation of co-location is being explored with the proposed NGV projects within the locality. There is one element of the Proposed Project with co-location which is relevant to the Offshore Scheme. This element is the Suffolk landfall and is as described in the section above.

1.5.7.27 Section 5 of each technical chapter in Part 4 details whether this option is relevant to the technical assessment, as if so, how it has been assessed. An example is provided relation to Benthic Ecology in Table 1.5.9 below.

Table 1.5.9: Offshore Scheme Consideration of Co-location

Element of co-location	How it has been considered within the assessment
Suffolk landfall	Proposed Project Only: Four ducts (one per cable and one spare). Proposed Project with co-location: up to ten ducts

Assessment of Scenarios and Options

1.5.7.28 Where a technical chapter identifies the need to consider an assessment scenario and option within section 5 of the technical chapters, the preliminary assessment of that scenario and option is then presented in section 9 Preliminary Assessment of Effects.

1.5.8 Sensitivity Test

1.5.8.1 It is likely that under the terms of the draft DCO, construction could commence in any year up to five years from the granting of the DCO which is assumed to be 2026. Consideration has been given to whether the preliminary effects reported would be any different if the works were to commence in any year up to year five.

1.5.9 Cumulative Effects

1.5.9.1 When undertaking an assessment of the environmental effects of a project, it is necessary to consider how various effects may interact, and also how the effects of the Proposed Project could accumulate with the effects of other developments proposed within the same zone of influence.

Intra-project effects

1.5.9.2 Intra-project cumulative effects (sometimes referred to as combined or interactive effects) occur where a single receptor is affected by more than one source of effect or aspect of a project. An example of an intra-project effect would be where a local community is affected by dust, noise, and traffic disruption during the construction of a project, with the result being a greater level of nuisance than each individual effect alone.

1.5.9.3 Schedule 4 of the EIA Regulations states that an ES should include:

Paragraph 19:

"*A description of the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter relationship between the above factors*."

Paragraph 20:

"*A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development, resulting from:*

(a) The existence of the development;

(b) The use of natural resources;

(c) The emission of pollutants, the creation of nuisances and the elimination of waste, and the description by the applicant of the forecasting methods used to assess the effects on the environment."

1.5.9.4 In line with this requirement, a description of the likely significant intra-project cumulative effects will be provided within the ES and a preliminary assessment is provided within this PEIR in:

- **Volume 1, Part 2, Chapter 13: Suffolk Onshore Scheme Intra-project Cumulative Effects**;
- **Volume 1, Part 3, Chapter 13: Kent Onshore Scheme Intra-project Cumulative Effects**; and
- **Volume 1, Part 4, Chapter 11: Offshore Scheme Intra-project Cumulative Effects**.

1.5.9.5 The methodology for how intra-project cumulative effects have been assessed within this PEIR and will be assessed within the ES is provided in **Volume 2, Part 1, Appendix 1.5.A: Cumulative Effects Assessment Methodologies**.

Inter-project effects

1.5.9.6 Inter-project cumulative effects occur where a receptor is affected by two or more projects at the same time, potentially amplifying the overall effect. Individually the effects may not be significant, but when considered together could create a significant cumulative effect.

1.5.9.7 In addition to paragraph 20 for the EIA Regulations described above, the Overarching National Policy Statement for Energy (NPS EN-1) states the following in relation to requirements for the assessment of cumulative effects:

"*When considering cumulative effects, the Environmental Statement (ES) should provide information on how the effects of the applicant's proposal would combine and interact with the effects of other developments (including projects for which consent has been sought or granted, as well as those already in existence)*".

1.5.9.8 The Planning Inspectorate Advice Note Seventeen (Ref 1.5.6) provides a methodology for assessing inter-project cumulative effects. It provides guidance about the type and scale of other developments that should be considered in the assessment of cumulative effects with other projects.

1.5.9.9 An assessment of inter-project cumulative effects will be provided within the ES and a preliminary assessment is provided within this PEIR in:

- **Volume 1, Part 2, Chapter 14: Suffolk Onshore Scheme Inter-project Cumulative Effects**;
- **Volume 1, Part 3, Chapter 14: Kent Onshore Scheme Inter-project Cumulative Effects**; and
- **Volume 1, Part 4, Chapter 12: Offshore Scheme Inter-project Cumulative Effects**.

1.5.9.10 The methodology for how inter-project cumulative effects have been assessed within this PEIR and will be assessed within the ES is provided in **Volume 2, Part 1, Appendix 1.5.A: Cumulative Effects Assessment Methodologies**.

1.5.9.11 The initial long list of projects screened for the inclusion on the long list of other projects to be considered cumulatively is presented in **Volume 2, Part 1, Appendix 1.5.B Inter-project Cumulative Effects Initial Long List**.

1.5.10 Monitoring

1.5.10.1 Schedule 4, Paragraph 7 of the EIA Regulations states that, where appropriate, the ES should include a description of any proposed monitoring arrangements where likely significant residual effects have been identified. The monitoring requirements will be detailed within the ES topic chapters to include clear and proportionate objectives for monitoring, the parameters to be monitored, the methodology for the monitoring, a timescale for implementation, identification of the party who will be responsible for the monitoring, and an outline of the remedial actions to be undertaken should results be adverse.

1.5.11 Structure of the Technical Chapters

1.5.11.1 Each of the technical chapters within Parts 1 – 4 are structured as follows:

- Introduction;
- Regulatory and Planning Context;
- Scoping Opinion and Consultation;
- Approach and Methodology;
- Basis of Assessment;
- Study Area;
- Baseline Conditions;
- Mitigation;
- Preliminary assessment of effects; and
- Summary.

1.5.12 References

Ref 1.5.1 Planning Inspectorates Advice Note Seven Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, June 2020 (version 7) [online] 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/.

Ref 1.5.2 National Grid Electricity Transmission plc, Sea Link Environmental Impact Assessment Scoping Report, October 2022 [online] Available at: https://infrastructure.planninginspectorate.gov.uk/projects/south-east/sea-link/?ipcsection=docs.

Ref 1.5.3 Sea Link Scoping Opinion Adopted by the Planning Inspectorate (on behalf of the Secretary of State) pursuant to Regulation 10 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, December 2022 [online] Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN020026/EN020026-000027-EN020026-Scoping-Opinion.pdf.

Ref 1.5.4 Institute of Environmental Management and Assessment (2004). Guidelines for Environmental Impact Assessment.

Ref 1.5.5 Planning Inspectorate Advice Note Nine: Rochdale Envelope, July 2018 (version 3) [online] Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-nine-rochdale-envelope/.

Ref 1.5.6 Planning Inspectorate Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, August 2019 (version 2) [online] Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/.

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