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## 2.0 ASSESSMENT METHODOLOGY

### 2.1 Environmental Impact Assessment Approach and Scope

2.1.1 This Preliminary Environmental Information (PEI) Report has been prepared to satisfy the requirements of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) ('the EIA Regulations') (see Chapter 1: Introduction of PEI Report Volume I).

2.1.2 In preparing this PEI Report, (in line with the EIA Regulations as it forms part of the EIA process), reference has been made to the following guidance:

- Advice Note Three: EIA Consultation and Notification (Planning Inspectorate (PINS), 2017a);
- Advice Note Seven: Environmental Impact Assessment, Preliminary Environmental Information, Screening and Scoping (PINS, 2020);
- Advice Note Nine: Rochdale Envelope (PINS, 2018a);
- Advice Note Ten: Habitats Regulations Assessment (PINS, 2017b);
- Advice Note Twelve: Transboundary Impacts (PINS, 2018b);
- Advice Note Seventeen: Cumulative Effects Assessment relevant to nationally significant infrastructure projects (PINS, 2019); and
- Advice Note Eighteen: The Water Framework Directive (PINS, 2017c).

2.1.3 Reference has also been made to the Scoping Opinion received from the Secretary of State on 25 June 2020 (**Appendix 1B**: PEI Report Volume II) and the advice contained within it regarding assessment methodology, topics and presentation of the final ES together with responses received through consultation and engagement.

2.1.4 In response to the Scoping Opinion, the EIA and this PEI Report include assessments of the following environmental topics:

- Chapter 8: Air Quality;
- Chapter 9: Noise and Vibration;
- Chapter 10: Traffic and Transport;
- Chapter 11: Biodiversity and Nature Conservation;
- Chapter 12: Water Resources and Flood Risk;
- Chapter 13: Geology, Hydrogeology and Land Contamination;
- Chapter 14: Landscape and Visual Amenity;
- Chapter 15: Cultural Heritage;
- Chapter 16: Socio-economics;
- Chapter 17: Climate Change and Sustainability
- Chapter 18: Major Accidents and Disasters; and
- Chapter 19: Cumulative and Combined Effects.

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- 2.1.5 The EIA Scoping Report (**Appendix 1A** (PEI Report Volume II)) concluded that a number of topics did not need to be considered as part of the EIA accompanying the Application for the Proposed Development and could be scoped out. These topics and, where relevant, the response in the Scoping Opinion are described in this chapter.

#### Aviation

- 2.1.6 The Civil Aviation Association (CAA) has a general interest in charting all known structures of 91.4m (300 feet) or more above ground level (AGL) and may also require lighting at the top of tall structures.
- 2.1.7 The proposed/ existing chimney stacks of Keadby 2 and Keadby 1 Power Station are 75m and 60m respectively and therefore below the height that the CAA require to be charted although the proposed Keadby 2 Power Station stack will be fitted with lighting at the top for aviation purposes.
- 2.1.8 The nearest airfield (Sandtoft Airfield), is located approximately 4.6km to the south-west of the Proposed Development Site.
- 2.1.9 Relevant details on the height of proposed structures proposed and lighting is detailed within **Chapter 4: The Proposed Development**. A single stack associated with the Proposed Development could exceed 91.4m AGL (reaching up to 101m AGL). The Applicant is consulting with the organisations listed in the Scoping Opinion as part of this consultation. Such organisations include: the CAA (the aviation regulator); NATS (responsible for managing civilian air traffic being routed through the en-route Controlled Airspace (CAS) above the UK) and the MOD Defence Infrastructure Organisation (DIO) (responsible for safeguarding the interests of the MoD).
- 2.1.10 The CAA is being formally consulted on the Proposed Development to review any requirements for aviation lighting on the stack(s) and to enable the Proposed Development to be charted in future, if required.
- 2.1.11 The likely effect on military and civil aviation radar will be addressed through the above consultation. In addition, the Meteorological Office is being consulted to ensure that the Proposed Development would not present a risk of compromising the use of Ingham Meteorological Radar, some 30km south-east of the Proposed Development Site.

#### Electronic Interference

- 2.1.12 The EIA Scoping Report noted that the proposed maximum building heights and expected temporary construction cranes would be no higher than those associated with Keadby 2 Power Station under construction. Therefore, an assessment of the Proposed Development's effect on electronic interference was not considered to be required.
- 2.1.13 The introduction of new structures of significant height and bulk into an environment can cause disruption to the reception of electromagnetic waves. Although this effect relates to both radio and TV signals, TV reception is potentially more affected and as such only TV reception has been considered.
- 2.1.14 The proposed maximum building heights will be no higher than the existing stacks at Keadby Power Station and those constructed for Keadby 2 Power Station, with the

exception of the stack currently anticipated to be circa 101m AGL but only circa 6m wide. The expected maximum heights of temporary construction cranes will be similar to the height of those used for construction of Keadby 2 Power Station.

- 2.1.15 Terrestrial television signals are transmitted in digital format. The only relevant interference mechanism affecting digital terrestrial TV signals is attenuation due to buildings physically blocking (and absorbing) them. If the TV signals are too weak then the pictures very quickly deteriorate into random 'blocks' and then disappear altogether.
- 2.1.16 Given the height and massing of the buildings, stacks and temporary structures associated with the Proposed Development, the lack of nearby residential properties in close proximity to the Site and the lack of any sight lines between transmission antenna and residential areas being obscured by the Proposed Development, it is considered that an assessment of the Proposed Development's effect on electronic interference is not required as part of the EIA.
- 2.1.17 Notwithstanding, as requested in the EIA Scoping Opinion (**Appendix 1B** (PEI Report Volume II)), further technical consideration has been given, since the publication of the EIA Scoping Report, to the potential for electronic interference. Ofcom guidance '*Tall structures and their impact on broadcast and other wireless services*' (Ofcom, 2009) states that '*Problems are more likely to occur if a building or structure is constructed which is significantly taller than those around it, or is on high ground*' and that the '*shadow*' (interference) caused by a tall structure between a transmitter and receiver disappears 1-5km away from the tall structure.
- 2.1.18 There are a number of telecommunications transmitters within 2km of the Proposed Development Site, as follows ([www.mastdata.com](http://www.mastdata.com)):
- BT transmitter in Keadby, approximately 300m south-east of the Proposed Development Site;
  - three transmitters adjacent to Althorpe Train Station, approximately 900m south-east of the Proposed Development Site;
  - Vodafone transmitter in Althorpe, approximately 2km south of the Proposed Development Site; and
  - O<sub>2</sub> transmitter approximately 2km east of the Proposed Development Site.
- 2.1.19 The tallest structures associated with the existing Keadby 1 Power Station are the stacks at 60m high, whilst those associated with Keadby 2 Power Station under construction are the stack at 75m and heat recovery steam generator (HRSG) building at 52m high. It is anticipated that the tallest structure associated with the Proposed Development may be the absorber stack at circa 101m AGL. With the exception of this stack, the Proposed Development would not introduce new buildings or structures that are significantly taller than those around it including notably the adjacent turbines associated with Keadby Windfarm which are present to the north of the Proposed Development Site and which are 80m high to the nacelle or 126m high to the blade tip.
- 2.1.20 Relevant telecommunications companies have been formally consulted and any concerns raised regarding electronic interference will be dealt with in the ES, where necessary.

2.1.21 On the basis of the above, at this stage it is concluded that there is no potential for significant electronic interference effects as a result of the Proposed Development.

#### Health and Safety

2.1.22 In the Scoping Opinion (**Appendix 1B** of PEI Report Volume II) Public Health England (PHE) expressed a wish to see the summation of relevant issues into a specific section to provide a focus which ensures that public health is given adequate consideration. As such, **Appendix 16A: Human Health** summarises key information, risk assessments, proposed mitigation measures, conclusions and residual impacts, relating to human health.

2.1.23 The Health and Safety Executive (HSE) confirmed that there are no licenced explosive sites within proximity to the Proposed Development Site, and confirmed the location of one major accident hazard pipeline within the Proposed Development Site:

- HSE ref 7034, operated by National Grid PLC; 7 Feeder Eastoft / Keadby Power Station.

2.1.24 Further advice was provided regarding relevant consents that may be required relating to the storage of hazardous substances at the Proposed Development Site.

2.1.25 The information provided is being taken into account in the ongoing design of the Proposed Development and relevant consents likely to be required will be identified in the Schedule of Other Consents and Licences, which will be provided to the Planning Inspectorate and other bodies being consulted on the draft DCO, and which will describe other consents and licences that are, or may be, required under other legislation for the Proposed Development.

2.1.26 Following receipt of the Scoping Opinion, a chapter has been included in the PEI Report and will be included in the ES to consider Major Accidents, Hazards and Disasters (see **Chapter 18**, PEI Report Volume I).

#### Waste Management

2.1.27 The EIA Scoping Report proposed that waste management should be scoped out of the EIA, but that in accordance with the EIA Regulations, the ES will provide an estimate, by type and quantity, of expected residues and emissions including quantities and types of waste produced during the construction and operation phases, where relevant. Preliminary information has been provided including:

- proposals for maintaining a materials balance of cut and fill volumes (**Chapter 4: The Proposed Development**);
- compliance with the waste hierarchy (e.g. with respect to re-use, recycling or recovery before disposal (**Chapter 17: Climate Change and Sustainability**); and
- impacts on relevant plans and policies (waste and materials) including available landfill capacity of the region (**Chapter 17: Climate Change and Sustainability**).

2.1.28 It is proposed that information on types and quantities of waste will be provided in the ES, and measures included in the Framework Construction Environmental Management Plan (CEMP) which will accompany the DCO application and which will

form the basis of the CEMP to be secured by requirement of the draft DCO to manage construction waste in accordance with the waste hierarchy.

## 2.2 Preliminary Environmental Information Report

2.2.1 This PEI Report presents a description of the Proposed Development and its likely significant environmental effects on the environment during construction, operation (including maintenance where relevant) and decommissioning, based on the preliminary environmental information available at the time. It also details measures to avoid or reduce such effects and the alternatives considered.

2.2.2 This PEI Report summarises the outcomes to date of the following ongoing EIA activities:

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

2.2.3 These activities enable the prediction of impacts in relation to the current and future baseline, and a prediction based on the information available of the likely significance of effects on environmental receptors.

2.2.4 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.

2.2.5 Each technical chapter within this PEI Report (Chapters 8 to 19) follows the same structure for ease of reference, which is:

- introduction;
- legislation, planning policy and guidance;
- assessment methodology;
- baseline conditions;
- development design and impact avoidance;

- likely impacts and effects;
- mitigation and enhancement measures;
- monitoring;
- limitations or difficulties (including where any information is still pending at this stage)
- summary of likely significant residual effects; and
- references.

## 2.3 Rochdale Envelope

- 2.3.1 As discussed in **Chapter 4: The Proposed Development**, a number of technical parameters have yet to be finalised for the Proposed Development, in order to maintain flexibility as the Proposed Development design progresses. This is important as the technology for carbon capture on gas-fired power stations is at an early stage in design development, and also to maintain commercial flexibility to meet the changing demands of the UK market and government policy on the transition to Net Zero, prior to plant construction. Therefore, the Rochdale Envelope approach has been applied within the EIA to ensure a robust assessment is presented of the likely significant environmental effects of the Proposed Development, in accordance with the Planning Inspectorate's Advice Note 9: The Rochdale Envelope (Planning Inspectorate, 2018). This involves assessing the maximum (and where relevant, minimum) parameters for the elements where flexibility needs to be retained, recognising that the worst-case parameter for one technical assessment may differ from another. Where this approach is applied, this has been confirmed within the relevant chapters of this PEI Report.
- 2.3.2 As is relevant for each technical discipline, alternative designs under the Rochdale Envelope approach have been assessed, in order to predict worst-case overall impacts. These have been used in the assessment of effects significance. Each of the **Chapters 6 – 19** describe the parameters applied in relation to the particular discipline. As the Proposed Development design evolves, key elements of the design may be fixed (e.g. maximum stack heights). However, it is likely that flexibility will need to be maintained for some aspects of the Proposed Development into the Application. Where flexibility is to be retained in the Application, any changes to design parameters will remain within the worst-case envelope assessed in this assessment. Justification for the need to retain flexibility in certain parameters will be outlined in **Chapter 4: The Proposed Development of the ES**.

## 2.4 Study Areas: Spatial Scope of Assessment

- 2.4.1 The assessment chapters of this PEI Report (**Chapters 6 to 18**) describe their spatial scope, including their rationale for determining the specific area within which the assessment is focussed. The study areas are a function of the nature of the impacts and the locations of potentially affected environmental resources or receptors. The widest spatial scope considered is 15km (as set out in the EIA Scoping Report (**Appendix 1A**, PEI Report Volume II), which relates to the appraisal of potential operational air quality effects on statutory designated ecological sites as a result of the Proposed Development. Justification for the spatial scope considered appropriate is documented in each topic chapter (**Chapters 6 to 16**).

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## 2.5 Definition of Existing and Future Baseline

- 2.5.1 Existing baseline conditions have been defined for each technical assessment topic in **Chapters 8 - 19**, based on desk-based studies and site surveys, where necessary. As described above, it is also important to consider future baseline conditions (in the absence of the Proposed Development) against which the effects of the Proposed Development can be assessed.

## 2.6 Assessment Years and Assessment Scenarios: Temporal Scope of Assessment

- 2.6.1 The approach has been to assess the environmental impacts of the Proposed Development at key stages in its construction and operation and, as far as practicable, its final decommissioning.

### Baseline Conditions (including Future Baseline)

- 2.6.2 The 'existing baseline' date is 2020 since this is the period in which the baseline studies for the EIA are being undertaken. 'Future baseline' conditions are also predicted for each assessment scenario, whereby the conditions anticipated to prevail at a certain point in the future (assuming the Proposed Development does not progress) are identified for comparison with the predicted conditions with the Proposed Development. This can include the introduction of new receptors and resources into an area, or new development schemes that have the potential to change the baseline, where these form committed developments.

- 2.6.3 The assessment scenarios that are being considered for the purposes of the EIA (and considered in this PEI Report) are as follows:

- existing Baseline (2020);
- future Baseline (No Development) (up to Q3 2022);
- construction. Construction of the Proposed Development could (subject to the necessary consents being granted and an investment decision being made) potentially start as early as Quarter 3 2022. However, for certain topics such as road traffic, a worst-case is to consider an assessment year later in the programme. Considering that the DCO may be granted allowing construction to commence within up to 7 years from the date of consent, construction activities may commence as late as 2029;
- opening and/ or operation – assuming an approximate three year construction programme followed by a period of commissioning, the Proposed Development is unlikely to commence commercial operation before Q3 2025, with timescales for commercial operation linked to the development of the Zero Carbon Humber (ZCH) Partnership proposals. The assessment years have been chosen by specialists as the worst-case for each topic; and
- decommissioning - it is envisaged that the Proposed Development would have an operational life of up to circa 25 years. If the operating life were to be extended, the Proposed Development would be upgraded in line with the legislative requirements at that time. On this basis, decommissioning activities are currently anticipated to commence after 2057.



2.6.4 In most cases these are 'self-selecting', as they simply reflect the anticipated dates on or periods within which certain activities are predicted to take place.

## 2.7 Development Design, Impact Avoidance and Mitigation

2.7.1 The design process for the Proposed Development has been heavily influenced by the findings of early environmental appraisals and the EIA process. Therefore, the Proposed Development has been sited, and has had a number of measures incorporated into the concept design, to avoid or minimise environmental impacts. The key aspects where the design has evolved are described in **Chapter 4: The Proposed Development**. These include measures needed for legal compliance, as well as measures that implement the requirements of best practice guidance documents (e.g. Environment Agency pollution prevention guidelines). The initial assessment has been undertaken on the basis of these measures being implemented (i.e. they are 'embedded mitigation').

2.7.2 The key aspects where the design has evolved are described in **Chapter 6: Consideration of Alternatives** (PEI Report Volume I).

2.7.3 Implementation of the impact avoidance and minimisation measures relied on in the assessment will be secured in the DCO, either through the setting of limits of deviation (e.g. specific maximum Above Ordnance Datum (AOD) heights and fixed grid references for emission points) or specifying mitigation measures via a Requirement.

2.7.4 Once the likely effects were identified and quantified, consideration has been given to any further mitigation (over and above anything identified within the Development Design and Impact Avoidance sections of each topic chapter) that may be required to mitigate any significant adverse effects identified. The residual effects (after the implementation of mitigation) have then been assessed and presented in each topic chapter. Significant residual effects will also be summarised in **Chapter 20: Summary of Significant Residual Effects of the ES** accompanying the application for development consent.

## 2.8 Impact Assessment Methodology and Significance Criteria

2.8.1 Impacts are defined as changes arising from the Proposed Development, and consideration of the result of these impacts on environmental receptors enables the identification of associated effects, and their classification (major, moderate, minor and negligible, and adverse, neutral or beneficial). Each effect has been classified both before and after mitigation measures have been applied. Effects after mitigation are referred to as 'residual effects.'

2.8.2 The classification of effects is undertaken with due regard to the following:

- extent (local, regional or national) and magnitude of the impact;
- duration (whether short, medium or long-term);
- nature (whether direct or indirect, reversible or irreversible);
- whether the effects occur in isolation, are cumulative or interactive;
- performance against environmental quality standards and in the context of relevant legislation, standards and accepted criteria;

- number of receptors affected;
- sensitivity of receptors;
- compatibility with environmental policies; and
- professional experience and judgement of the assessor.

2.8.3 Further details are provided in each topic chapter.

2.8.4 Where it has not been possible to quantify effects, qualitative assessments have been undertaken, based on available knowledge and professional judgment. Where any uncertainty exists, this has been noted in the relevant technical chapter in the 'Limitations or Difficulties' section.

2.8.5 To enable comparison between technical topics and aid understanding of the EIA findings, standard terms are used wherever possible to classify effects throughout this PEI Report (major, moderate, minor and negligible), and effects are also described as being adverse, neutral or beneficial. Where the quality standards for each technical discipline result in deviations in the standard assessment methodology, these are described in the relevant chapters, as applicable.

2.8.6 Definitions of the standard terms are provided below:

- negligible – imperceptible effect to an environmental resource or receptor;
- minor – slight, very short or highly localised effect;
- moderate – limited effect (by extent, duration or magnitude);
- major – considerable effect (by extent, duration or magnitude) of more than a local scale or in breach of recognised acceptability, legislation, policy or standards;
- adverse – detrimental or negative effects to an environmental resource or receptor;
- neutral – effects to an environmental resource or receptor that are neither advantageous or detrimental; and
- beneficial – advantageous or positive effect to an environmental resource or receptor.

2.8.7 Moderate and major effects are generally considered to be 'significant' for the purposes of the EIA Regulations, in accordance with standard EIA practice.

2.8.8 Each of the technical chapters provides further description and definition of the assessment criteria relevant to each topic. Where possible, this has been based upon quantitative and accepted criteria (for example British Standards), together with the use of value judgment and expert interpretation to classify effects.

2.8.9 In general, the classification of an effect is based on the magnitude of the impact and sensitivity or importance of the receptor, using the matrix shown in Table 2.1.

2.8.10 Where there are deviations away from this matrix (due to the technical guidance for a specific assessment topic), this is highlighted within the relevant technical chapter and the reason for the variation explained.

**Table 2.1: Classification of effects**

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

2.8.11 In the context of the Proposed Development, short-term effects are those associated with the site preparation and construction and/or decommissioning phases, which cease when construction works are completed. Long term effects are those associated with the completed, operational Proposed Development, which last for the duration of the operational phase. Effects may also be permanent (irreversible) or temporary (reversible) and direct or indirect.

2.8.12 Effects on areas on the scale of the Lincolnshire county, or North Lincolnshire district (or similar scale across local authority boundaries) are considered to be at a regional level, whilst effects that cover different parts of the country, or England as a whole, are considered to be of a national level. Smaller scale effects are considered to be at a local level.

## 2.9 Cumulative and Combined Effects

2.9.1 As required by the EIA Regulations, consideration is given to the potential for cumulative and combined effects to arise as a result of the Proposed Development.

2.9.2 Cumulative effects are those that accrue over time and space from a number of development activities. The impact of the Proposed Development will be considered in conjunction with the potential impacts from other projects or activities which are reasonably foreseeable in terms of delivery. This includes projects that have been submitted but have not yet been approved or have planning permission or development consent that are located within a geographical scope where environmental impacts could act together to create a more significant overall effect on a receptor and where sufficient environmental information is available.

2.9.3 Combined effects are those resulting from a single development, in this case the 'Proposed Development,' on any one receptor that may collectively cause a greater effect (such as the combined effects of noise and air quality/dust impacts during construction on local residents).

2.9.4 Cumulative and combined effects are discussed in **Chapter 19: Cumulative and Combined Effects** (PEI Report Volume I).

## 2.10 Inter-related Effects and Interdependencies

2.10.1 It is recognised that different consultees have interests in different aspects of the environment. For ease of reference, the ES will contain a table to illustrate where inter-related effects arise.

## 2.11 Transboundary Effects

- 2.11.1 Initial consideration has been given to the Planning Inspectorate Advice Note 12: Transboundary Impacts (PINS, 2018) and specifically Annexes A and B, which set out the criteria and relevant considerations taken into account by the Planning Inspectorate when screening Nationally Significant Infrastructure Projects (NSIP) for likely significant effects on the environment in another EEA state.
- 2.11.2 The nearest EEA states are the Republic of Ireland at over 350km west and the Netherlands at over 375km east of the Proposed Development Site. Taking into account the potential pollution impact pathways through air, land and water, and the effects predicted to arise from the Proposed Development, set out in **Chapter 8: Air Quality**, **Chapter 11: Biodiversity and Nature Conservation** and **Chapter 12: Water Resources and Flood Risk** within their respective spatial scopes, the likelihood of significant effects on the environment of another EEA state is considered negligible. Therefore, significant transboundary effects associated with the Proposed Development are not anticipated.

## 2.12 References

HM Government (2017) Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

Ofcom (2009) *Tall structures and their impact on broadcast and other wireless services*.

Planning Inspectorate (2017a) *Advice Note Three: Environmental Impact Assessment: Consultation and Notification, Version 7*, August 2017.

Planning Inspectorate (2020a) *Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping, Version 7*, June 2020.

Planning Inspectorate (2018a) *Advice Note Nine: Rochdale Envelope, Version 3*, July 2018.

Planning Inspectorate (2018b) *Advice Note 12: Transboundary Impacts and Process, Version 5*, March 2018.

Planning Inspectorate (2019) *Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, Version 2*, August 2019.