POWER FOR GOOD

Steeple Renewables Project

Appendix 1.1 - Steeple Renewables Project EIA Scoping Report

Environmental Statement - Volume 2

April 2025

Document Reference: EN010163/APP/6.3.1

Revision: 1

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)



Appendix 1.1 - Steeple Renewables Project EIA Scoping Report

Document Properties		
Prepared By	The Steeple Renewables Project Consultant Team	
Version History		
Version	**Date**	**Version Status**
Application Version	April 2025	Rev 1

POWER FOR GOOD

Steeple Renewables Project

Environmental Impact Assessment Scoping Report

Land at Sturton le Steeple, Nottinghamshire

Prepared by: Pegasus Group



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1. Introduction

1.1 Background

1.1.1 RES Limited (the "Applicant") has commissioned this Scoping Report relating to the Environmental Impact Assessment (EIA) of Steeple Renewables Project (hereafter referred to as the "Proposed Development"). The Proposed Development is for an electricity generating station with a capacity over 50 megawatts (MW), comprising the installation of a ground mounted solar photovoltaic (PV) electricity generation with an approximate capacity of 400 MW of energy generation and associated development comprising 200 MW of energy storage, grid connection infrastructure and all other infrastructure integral to the construction, operation and maintenance of the Scheme including access. Located on an area of agricultural land to the east and west of Sturton le Steeple and south of West Burton Power Station (the "Application Site" or "Site").

1.1.2 The area of land for the Site measures 943.4 hectares (ha) (2330.25 acres) and is located approximately 5km south of Gainsborough. The Application Site location is shown on **Figure 1.1 – Site Location Plan** and described in Chapter Two: Project Description. The EIA will also assess the cable route for the grid connection into the existing substation at West Burton Power Station adjacent to the northern boundary of the Site. **Figure 1.2 – Indicative Parameter Plan** shows the indicative areas proposed for the cable route infrastructure, solar development, battery energy storage system (BESS) and associated infrastructure and also areas marked for biodiversity mitigation.

1.1.3 It is relevant to note that at this stage, **Figure 1.1** shows the expected maximum extent of the land that would be included within the Development Consent Order (DCO) application, which includes all land being considered for the purposes of the Proposed Development and provides a 'plan sufficient to identify the land' for the purposes of this Scoping Report.

1.1.4 The Applicant has further notified the Secretary of State under Regulation 8(1)(b) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (amended) (the "EIA Regulations") that an Environmental Statement (ES) will be provided in respect of the application for consent for this Development.

1.1.5 This Scoping Report supports the Applicant's request for a Scoping Opinion under Regulation 10(1) of the EIA Regulations.

1.2 Scope of the Environmental Impact Assessment

1.2.1 Table 1.1 sets out how the various environmental parameters as detailed within paragraph 4 and 5 of Schedule 4 of the EIA Regulations will be considered within the ES. Where a topic has been scoped out of the ES the reasoning has been provided.

Table 1.1 Environmental Parameters

EIA Topic	Scoped In/Out	How / Where addressed / Reason for Scoping Out
Population	**Scoped In**	To be assessed within the Socio-Economic and Health Chapter.
Human Health	**Scoped In**	To be assessed within the relevant technical assessments such as Air Quality and Noise. There is not to be a specific chapter within the ES that considers Human Health.
Biodiversity	**Scoped In**	To be assessed within the Ecology & Biodiversity chapter(s).
Land	**Scoped In**	To be assessed within the Land Use and Agricultural Chapter.
Soil	**Scoped Out**	There is no known history of soil contamination on the site. The land grade and structure of the soils on the Site will be assessed within the Land Use and Agriculture Chapter.
Water	**Scoped In**	To be assessed within the Hydrology, Hydrogeology, Flood Risk and Drainage Chapter.
Air	**Scoped In**	To be assessed within the Air Quality Chapter.
Climatic Factors	**Scoped In**	To be assessed within the Climate Change Chapter.

Material Assets	**Scoped Out**	It is not considered that there are any further 'material assets' to those already addressed within other EIA topics.
Cultural Heritage including Architectural and Archaeological aspects	**Scoped In**	To be assessed within with the Cultural Heritage and Archaeology chapter.
Landscape	**Scoped In**	To be assessed within the Landscape and Visual Impact Assessment.
Risk of Major Accidents and Disasters	**Scoped Out**	The nature, scale and location of the Proposed Development is not considered to be vulnerable to or give rise to significant impacts in relation to the Risk of Accidents and Major Disasters[1]. A Fire Risk Statement relating to the BESS would be submitted as part of the application, and therefore the matter of fire prevention and safety would be covered appropriately outside of the ES. Potential effects relating to soil conditions, surface water flooding and climate change are all considered in other chapters of the Environmental Statement. During all phases of the development (construction, operation and

[1] No definition of 'major accidents and disasters' in provided in the EIA Regulations, however the IEMA Quality Mark Article on 'Assessing Risks of Major Accidents / Disasters in EIA' produced by WSP in 2016 provides the following definition "man-made and natural risks which are considered to be likely, and are anticipated to result in substantial harm that the normal functioning of the project is unable to cope with/rectify i.e. a significant effect."

		decommissioning) the Applicant would implement measures to be in accordance with the relevant health and safety legislation, regulations, and industry guidance to ensure that risks are suitably controlled and managed (for instance in relation to working near to overhead power lines or electrical infrastructure). A draft construction methodology will also be provided in the chapter on the 'Description of the Proposed Development', which would inform the Construction and Environmental Management Plan (CEMP). It is therefore considered that appropriate measures and controls could be achieved in line with the relevant legislation and processes to minimise risks to human and environmental receptors.
Interrelationship between above factors	**Scoped In**	To be assessed within the Cumulative and Interactive Effects chapter.

1.2.2 The Summary section (Section 19) of this report will set out more detailed conclusions with regard to the details on the scope of each environmental topic within the ES and confirms which areas are proposed to be scoped out of the EIA process.

1.3 The Applicant

1.3.1 RES is the world's largest independent renewable energy company and is active in onshore and offshore wind, solar, energy storage, green hydrogen, transmission and distribution. As an industry innovator for over 40 years, RES has delivered more than 23GW of renewable energy projects across the globe and supports an

operational asset portfolio exceeding 12GW worldwide for a large client base. Understanding the unique needs of corporate clients, RES has secured over 1.5GW of corporate power purchase agreements (PPAs) enabling access to energy at the lowest cost.

1.4 IEMA Quality Mark

1.4.1 Pegasus Planning Group is an Institute of Environmental Management and Assessment (IEMA) Registered Impact Assessor and also holds the IEMA EIA Quality Mark as recognition of the quality EIA product and continuous training of our environmental consultants. A Statement of Competence will be included within the ES, outlining the relevant expertise or qualifications of the experts who prepared the ES.

1.5 Consenting Regime

1.5.1 The Development falls within the definition of a 'nationally significant infrastructure project' (NSIP) under Section 14(1)(a) and 15(2) of the Planning Act 2008 (the "Act") as the construction of a generating station in England with a capacity of more than 50MW, with a capacity in the region of 400MW.

1.5.2 The EIA requirement for NSIP developments is transposed into law through the EIA Regulations. The EIA Regulations specify which developments are required to undergo EIA and schemes relevant to the NSIP planning process are listed as either 'Schedule 1' or 'Schedule 2'. Those developments listed in Schedule 1 are always subject to an EIA, whilst developments listed in 'Schedule 2' must only be subject to an EIA if they are considered '*Likely to have significant effects on the environment by virtue of factors such as its nature, size or location*[2].' The criteria on which this judgement must be made are set out in Schedule 3 of the EIA Regulations.

1.5.3 The Proposed Development is not of a type listed within Schedule 1 of the EIA Regulations. The Proposed Development is a Schedule 2 development under section 3 'Energy industry' subsection (a) *'industrial installations for the production of electricity, steam and hot water'*.

1.5.4 It is considered that due to the nature, size and location of the Proposed Development, it has the potential to have significant effects on the environment. Therefore, the Applicant has determined that this Development should be

[2] The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, Reg 3

accompanied by an EIA. As a result, no formal Screening process has been undertaken for this Development.

The Purpose of the Scoping Report

1.5.5 The EIA Regulations state at regulation 10(3) that a request for a Scoping Opinion should contain:

- *"a plan sufficient to identify the land;*
- *A description of the proposed development, including the location and technical capacity;*
- *An explanation of the likely significant effects of the development on the environment; and*
- *Such other information or representations as the person making the request may wish to provide or make."*

1.5.6 The guidance highlighted in Planning Inspectorate Advice Note 7 Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements has also been taken into account in the preparation of this Scoping Report.

1.5.7 Accordingly, this Scoping Report presents:

a. A plan sufficient to identify the land for the Proposed Development (**Figure 1.1 and Figure 1.2**);

b. A description of the Development (Section 2) and technical capacity (Section 2); and

c. An explanation of the likely significant effects of the Development on the environment (the Likely Environmental Effects sub-section of the technical sections 7 -18 of this Scoping Report).

2. Project Description

2.1 The Development Site

2.1.1 The Site extends to 943.4 ha and comprises primarily of multiple agricultural fields, with the field boundaries defined by hedgerow and individual trees. The site also includes part of the existing West Burton Power Station site, covering the area around the existing 400kV substation. The nearest settlement to the Site is Sturton le Steeple. There is a network of roads located both within the Site and adjacent to the boundary. The River Trent lies adjacent to the eastern boundary of the Site.

2.1.2 Within the wider surrounding area there are the following settlements including Knaith approximately 250m east on the opposite side of the River Trent, North Leverton with Habblesthorpe and Fenton located adjacent to the southern boundary, South Leverton approximately 1.1km south, Clarborough approximately 850m west, north Wheatley and South Wheatley approximately 1.3km and 1km north-west respectively and Gainsborough is located c. 5km to the north-east of the Site.

2.1.3 A series of Public Rights of Way (PRoW) are located within the Site, including a number of footpaths travelling west from Sturton le Steeple to the surrounding settlements. A footpath routes northwards from Fenton to Sturton le Steeple, travelling northwards through the Site and a further footpath to the east of this also routes north through the Site. The long distance path known as the Trent Valley Way travels through the Site from east to west through the southern edge of the settlement of Sturton Le Steeple. The location of these as they pass through the Site are shown on **Figure 2.1 Site Constraints Plan**.

2.1.4 The Site comprises primarily agricultural land, generally relatively large, regular shaped arable fields, with some dividing hedgerows and individual trees. Small woodland plantations are located within some of the fields. Two settlements or clusters of properties are located beyond the Site boundaries including Sturton le Steeple and Fenton. Individual properties are also located close to the boundaries of the Site and within the wider surrounding area.

2.1.5 There are a number of both overhead electricity transmission lines and underground fuel pipelines which pass through the Site. The locations of these are shown on **Figure 2.1**. In particular, in the eastern extent of the Site there are four

overhead lines which run out from the existing West Burton Power Station site in a southeasterly direction.

2.1.6 **Figure 2.1 Site Constraints Plan** provides an overview of identified environment constraints listed in this section within the Site. Other environmental constraints located outside of the Site boundary are explored in further detail within the individual topic chapters of this Report.

2.1.7 The Proposed Development will connect to the existing 400kV Substation located within the West Burton Power Station site at the north of the Site, as shown on **Figure 1.2**.

2.1.8 **Figure 1.2** provides an indicative parameters plan showing the proposed indicative locations for each element of the proposals and the following Site description is broken up into those areas, including:

- Area for solar panels and associated development;
- Cable Infrastructure;
- Substation, BESS and associated infrastructure; and
- Biodiversity mitigation.

Area for solar panels and associated development

2.1.9 The area proposed for solar panels and associated development forms the majority of the Site and comprises primarily agricultural land with boundary vegetation and small areas of woodland plantation. The Sheffield – Lincoln railway line passes through the western section of the area proposed for solar panels and the Torksey Branch railway line lies adjacent to the southwestern corner of the Site both are located outside the Site boundary and are both minor rail lines.

2.1.10 The proposed West Burton Solar Project's cable route, which would be an underground cable, is currently intended to run through the eastern section of the area of the Proposed Development which is identified for solar panels and associated development also connecting into the existing 400kV substation located within the West Burton Power Station site.

2.1.11 The Catchwater Drain is located in the eastern section of the proposed solar area close to the Site's boundary with the eastern side of Sturton le Steeple, this is not considered a Main River on the Environment Agency's mapping.

2.1.12 The latest Environment Agency (EA) Flood Zone Maps shows the western land parcel lies within Flood Zone 1, representing a less than 1 in 1000 annual probability of fluvial or tidal flooding. The eastern parcel of the land proposed for solar lies within Flood Zone 3 with a greater than 1 in 100 annual probability of fluvial flooding or a greater than 1 in 200 annual probability of tidal flooding.

Cable Infrastructure

2.1.13 The proposed cable infrastructure is located in the northern extent of the eastern parcel at West Burton Power Station, in the northeastern corner of the western parcel and also located in the south of the Site connecting the eastern and western parcels. There are designations or constraints identified within these areas on **Figure 2.1**.

Substation, BESS and associated infrastructure

2.1.14 The area proposed for the BESS, substation and associated infrastructure is located in the northern section of the eastern parcel, adjacent to the existing West Burton Power Station site. It is unlikely that the BESS and substation equipment would be placed across the whole of this parcel and the actual area for this infrastructure is likely to be much smaller with the remainder of the parcel used for solar PV.

2.1.15 The western section of the proposed BESS and substation area lies within Flood Zone 3 according to the latest EA flood zone mapping.

Biodiversity Mitigation

2.1.16 The proposed biodiversity mitigation areas are located along the eastern and western boundaries of the Site. The eastern areas lie adjacent to the River Trent and are located within Flood Zone 3 according to the latest EA mapping. The western biodiversity mitigation areas are located in Flood Zone 1.

2.1.17 There are four Local Wildlife Sites (LWS) located within the eastern biodiversity mitigation area including Out Ings, Mother Drain, Littleborough Lagoons and Thirhill Lane Drain. There is one LWS, known as Blue Stocking Lane, located in the western biodiversity mitigation area.

2.1.18 In the southeastern corner of the eastern biodiversity mitigation area is a Scheduled Monument, Segelocum Roman town (ref 1003669), the Grade I listed Church of St Nicholas (ref 1216860) and the Grade II Ferry House (ref 1275698) are located adjacent to the Scheduled Monument. The Grade II listed Littleborough Cottage (ref

1275674) is located along the line of Littleborough Road and is also within the eastern biodiversity mitigation area.

2.2 Iterative Design and Rochdale Envelope

2.2.1 The Proposed Development design will evolve throughout the EIA process. An iterative design process will be utilised, whereby site-specific constraints and design criteria will be added to the site layout to guide the location of the Proposed Development infrastructure. If necessary, parts of the Site may not be developed on in order to avoid or reduce significant adverse effects.

2.2.2 The iterative design approach will take account of comments made during consultation, including those made in response to this Scoping Report. The ES will describe how the design of the Proposed Development has been influenced by such comments.

2.2.3 In order to maintain flexibility in the development design, it is the Applicant's intention to use the 'Rochdale Envelope'[3] approach within parameter ranges which will be defined in the Project Description chapter of the ES. Advice Note 9 clarifies in section 4 that at the Scoping stage certain matters on the design might not yet be resolved due to an iterative design process. These parameters will be considered in detail by technical authors in the ES to ensure the realistic worst-case effects of the Proposed Development are assessed for each potential receptor. This is of particular importance to maintain flexibility due to the rapid pace of change in solar PV and energy storage technology. A similar approach was used for the Cleve Hill Solar Park that was determined through the NSIP process.

2.3 The Development Proposal

2.3.1 Solar PV and energy storage technologies are rapidly evolving. As a result, the project parameters are required to maintain the flexibility to allow the latest technology to be utilised at the time of construction.

2.3.2 The Development is likely to include the following infrastructure:

- Solar PV modules;
- PV module mounting infrastructure;
- Inverters;

[3] National Infrastructure Planning: Advice Note Nine: Rochdale Envelope

- Transformers;
- Onsite underground cabling;
- Underground cabling to point of connection at existing substation at West Burton Power Station;
- Fencing and security measures;
- Access tracks and construction of new accesses onto the highway;
- Energy storage facility;
- A substation and control building; and
- Equipment facilitating the electrical connection to the existing Substation at West Burton Power Station.

2.3.3 During the construction phase, one or more temporary construction compound(s) will be required as well as temporary roadways to facilitate access to all parts of the Site.

2.3.4 The proposed area for the cable infrastructure is shown on **Figure 1.2**, with two cable connections proposed one from the northern area of the western section of the Site and the second from the northern part of the eastern area. The cable infrastructure will provide a connection to the existing substation located at the West Burton Power Station site.

2.3.5 In areas around the solar array and on other parts of the Application Site, shown on **Figure 1.2** as biodiversity mitigation areas, opportunities for landscaping, biodiversity enhancements and habitat management will be explored and further information is provided within the relevant technical sections of this Scoping Report.

3. Technical Specifications

3.1 Solar PV Modules

3.1.1 Solar PV modules/panels convert sunlight into electrical current (as direct current (DC)). Individual modules/panels are typically 2.3m long and 1.1m wide and typically consist of a series of mono-crystalline cells which make up each panel (66 or 72 cells per panel). The module frame is typically built from anodised aluminium.

3.1.2 Each module could have a DC generating capacity of between 400-650watts (W), or more depending on advances in technology.

3.1.3 The number of modules required at the Development will be highly dependent upon the iterative layout design process, however the initial Indicative Parameters Plan is shown in **Figure 1.2**.

3.1.4 The modules are fixed into a mounting structure in groups known as “strings”. This mounting structure will use a fixed panel system where the panels are fixed in one position and one angle.

3.1.5 The number of modules which will make up each of the string is not yet known. Various factors will help to inform the number and arrangement of modules in each string, and it is likely some flexibility will be required to accommodate future technology developments. As noted in Section 2, in order to maintain flexibility in the development design, it is the Applicant’s intention to use the ‘Rochdale Envelope’[4] approach within parameter ranges which will be defined in the Project Description chapter of the ES.

[4] National Infrastructure Planning: Advice Note Nine: Rochdale Envelope



Image 3.1 Typical Solar Panel (image provided by RES)

3.2 Module Mounting Structures

3.2.1 Each row of modules will be mounted on a rack supported by galvanised steel poles driven into the ground. Various mounting structures are available however, driven poles are currently expected to be the most likely foundation solution. Between each string of panels there are likely to be an average separation distance of approximately 2.6m to maximise generation and allow sufficient access for maintenance.

3.2.2 The panel modules are likely to be mounted on structures with an upper height of a maximum of 3.6m.

3.3 Inverters

3.3.1 Inverters are required to convert the DC electricity generated by the PV modules into alternating current (AC) which allows the electricity to be exported to the National Grid. Inverters are sized to deal with the electrical output from strings of PV modules.

3.3.2 Central inverters are large capacity inverters with ratings above 1MW. Due to their size, they are located in a central location surrounded by the solar cells to which they are connected. The unit itself tends to be containerised with associated control and switchgear equipment within a maximum height of 3m. Compared with string inverters, central inverters tend to offer better efficiencies and economies of scale for PV installations exceeding 20MW.

3.3.3 String inverters are much smaller units with a rating normally above 100kW and tend to be better suited for smaller multi-MW installations.

3.4 Transformers

3.4.1 Transformers are required to control the voltage of the electricity generated across the Site and efficiently transmit the power to the Proposed Development substation. A number of transformers of various sizes and voltages will be needed and will be located throughout the Site.

3.4.2 The transformer units will have a maximum height of 3m.

3.5 Cabling

3.5.1 Onsite electrical cabling is required to connect the PV modules to inverters and the inverters to the transformers onsite. Higher rated cables are then required between the transformers and the Proposed Development substation, and between the Proposed Development substation and the energy storage facilities onsite. This is likely to be underground cabling. Extra high voltage cables will then be required to export all of the electricity produced by the Proposed Development to the existing 400kV substation located within the existing West Burton Power Station site.

3.5.2 Data cables will also be installed, typically alongside electrical cables in order to allow for the monitoring of the development during operation.

3.5.3 The proposed connection point for the Proposed Development is the existing 400kV substation located within the existing West Burton Power Station site. The exact route for the cable route to connect the Proposed Development to this substation is still being determined, however as shown on **Figure 1.2** large areas of cabling are not required due to the proximity of the Site to the West Burton Power Station site. All of the new cabling will be laid underground in trenches or ducting. At certain points along the route, it will be necessary to drill past 'obstacles' such as roads. There will be no new above ground power lines for the cabling.

3.5.4 The cable routes are still being surveyed and so more detail on the extents and locations of the cable routes cannot be offered within this Scoping Request, further information on this will be provided at a later stage.

3.6 Fencing and Security Measures

3.6.1 A fence will enclose the operational areas of the Proposed Development. The fence is likely to be approximately 2.4m in height. Pole mounted closed circuit television

(CCTV) system, which will face towards the Site and away from any land outside of the Site will also be deployed around the perimeter of the site. These cameras will be mounted on poles of 3.5m height located within the perimeter fence.

3.6.2 It is likely that lighting on sensors for security purposes will be deployed around the energy storage area and potentially at any other pieces of critical infrastructure. No areas of the Proposed Development are proposed to be continuously lit during the operational phase of this development.

3.7 Access Tracks

3.7.1 Access is proposed to be taken from appropriate points from the local road network within and surrounding the Site, due to the size of the Site multiple access points will be required. The appropriate visibility splays with be applied for each access point and will be confirmed with the Highways Authority.

3.7.2 These minor access roads will connect into each parcel of the Proposed Development. The tracks will likely be made of crushed aggregate or other suitable reinforcement.

3.8 Energy Storage Facility

3.8.1 A BESS forms part of the Proposed Development and would have a storage capacity of approximately 200 MW. The energy storage is proposed to be located in the northern extent of the eastern section of the Site, the indicative area under consideration for the BESS is shown on **Figure 1.2**. The energy storage system would have a maximum height of 2.9m.

3.8.2 The energy storage system will likely include batteries, inverters and system controllers, however, its final design has not yet been determined.



Image 3.2: Typical battery storage container (image supplied by RES)[5]

3.9 Substation and Control Building

3.9.1 The Proposed Development's substation will consist of electrical infrastructure such as the transformers, switchgear and metering equipment required to facilitate the export of electricity from the Proposed Development to the National Grid. The maximum height of the main substation is proposed to be 2.4m. There may also be smaller sub-stations distributed throughout the Site.

3.9.2 The Development substation is also expected to include a control building which will include office space and welfare facilities as well as operational monitoring and maintenance equipment. The control building is likely to have a maximum height of 4.5m.

3.10 Electricity Export Connection to National Grid

3.10.1 The electricity generated is expected to be exported via a connection from the Proposed Development to an existing substation at West Burton Power Station.

[5] Image supplied of typical battery storage container as a guide, battery containers supplied will depend on the technology available at the time of construction.

3.11 Rochdale Envelope

3.11.1 The details that have been listed above in Section 3 offer the known details of the development at this time but have also tried where possible to indicate where the details of the scheme are not yet known.

3.11.2 However, these uncertainties will be defined, where possible, within the ES and if still to be finalised can be captured and assessed effectively through the 'Rochdale Envelope' approach which is being used for this ES.

4. Phases of Development

4.1 Construction

4.1.1 The construction phase of the Proposed Development is currently anticipated to last up to two years but will be dependent on the final design and the findings of the access and traffic assessment. The types of construction activities that may be required include (but are not limited to):

- Importing of construction materials;
- The establishment of the construction compounds – these will likely move over the course of the construction process as each section is built out;
- Creation of a new access points for the Site;
- Installing the security fencing around the Site;
- Importing the PV panels and the energy storage equipment;
- Erection of PV frames and modules;
- Digging of cable trench and laying cables for connection to the West Burton Power Station substation;
- Installing transformer cabins;
- Construction of onsite electrical infrastructure for the export of generated electricity; and
- New habitat creation.

4.2 Construction Traffic Management Plan

4.2.1 A draft Construction Traffic Management Plan (CTMP) will be developed as part of the EIA which will guide the delivery of materials and staff onto the Site during the construction phase. The principles of the draft CTMP will be available for comment as part of the consultation process to ensure that the comments of local residents and stakeholders are taken into account in its development.

4.3 Temporary Construction Compounds

4.3.1 A main temporary construction compound will likely be established close to the Site entrance. Smaller temporary compounds will be located across the development as the site is built out.

4.4 Temporary Roadways

4.4.1 Depending on weather conditions during construction, temporary roadways (e.g. plastic matting, or other temporary solutions) may be utilised to access parts of the Site.

4.5 Site Reinstatement and Habitat Enhancement

4.5.1 Depending on the season, work needed for habitat enhancement may start during or after construction is completed. A draft Landscape and Ecological Management Plan will be submitted as part of the EIA. This document will set out the proposals for the land and how it will be managed through the operational life of the scheme. It is proposed that the lifetime of this scheme will be 40 years.

4.6 Operation

4.6.1 During operation of the Proposed Development, human activity on the Site will be minimal and would be restricted principally to vegetation management, equipment maintenance and servicing, replacement of any components that fail and monitoring to ensure the continued effective operation of the development.

4.7 Decommissioning

4.7.1 The Proposed Development will be decommissioned at the end of its approved operational phase. All PV modules, mounting poles, energy storage equipment, inverters, transformers etc would be removed from the Site. These items would be recycled or disposed of in accordance with good practice and market conditions at the time. A Decommissioning Plan, to include timescales (expected to take 18 months – two years) and transportation methods would be agreed in advance with the Local Planning Authority.

4.7.2 The effects of decommissioning are often similar to, or to a lesser magnitude than, the construction effects and will be considered where possible in the relevant sections of the ES. However, there can be a high degree of uncertainty regarding decommissioning as engineering approaches as technologies evolve over the operational life of the Proposed Development.

5. Legislative and Planning Framework

5.1 Introduction

5.1.1 The ES will include a chapter setting out the legislative and planning framework. A summary of that framework at the time of writing this Scoping Report is provided in this section.

5.1.2 Under the Planning Act 2008 the Development constitutes an NSIP. The Development falls under the NSIP consenting regime because it consists of:

- "*the construction or extension of a generating station*" (Section 14 (1)(a) of the Act); and
- "*its capacity is more than 50 megawatts*" (Section 15 (2) of the Act).

5.1.3 The Planning Act sets out the process for the consenting of NSIPs and the basis for the decision whether to grant development consent. Energy National Policy Statements (NPS) provide planning guidance for developers of NSIPs. The provisions of the NPSs considered relevant are outlined below, together with other considerations relevant to the planning framework.

5.2 National Policy Statements

Overarching National Policy Statement for Energy (EN-1)

5.2.1 The overarching NPS for Energy (EN-1)[6] was revised in November 2023 and sets out the overall national energy policy for delivering major energy infrastructure.

5.2.2 Part 2 of the statement sets out the Central Government policy context for major energy infrastructure. It comprises the need to meet legally binding targets to cut greenhouse gas emissions to become net zero by 2050; to ensure our supply of energy aways remains secure, reliable, affordable, and consistent with meeting the target of net zero by 2050; transition to a low carbon economy; decarbonise the power sector; reform the electricity market; secure energy supplies; replace outdated energy infrastructure; and widen objectives of sustainable development.

5.2.3 Paragraph 3.1.1 sets out more detail around the importance that Central Government attaches to the need for new energy infrastructure and to its energy policy, including combatting climate change, by stating that:

[6] Department of Energy and Climate Change November 2023, National Policy Statement for Energy (EN-1)

"*the government sees a need for significant amounts of new large-scale energy infrastructure to meet its energy objectives and…considers that the need for such infrastructure is urgent*."

5.2.4 Paragraph 3.3.3 then states clearly that new generating capacity, because of the need to ensure energy security, is a key objective of Government energy policy:

"*To ensure that there is sufficient electricity to meet demand, new electricity infrastructure will have to be built to replace output from retiring plants and to ensure we can meet increased demand*."

5.2.5 The benefits of an energy mix in ensuring a secure energy supply are also recognised in that the characteristics of different types of electricity generation, including renewable energy and other technologies, can complement each other, as described in paragraph 3.3.4.

"*There are several different types of electricity infrastructure that are needed to deliver our energy objectives. Additional generating plants, electricity storage, interconnectors and electricity networks all have a role, but none of them will enable us to meet these objectives in isolation."*

5.2.6 Paragraph 3.3.25 outlines the key role electricity storage will have in achieving net zero.

"*Storage has a key role to play in achieving net zero and providing flexibility to the energy system, so that high volumes of low carbon power, heat and transport can be integrated."*

5.2.7 Both solar and battery are highlighted as key aspects in reaching the Government's target of achieving Net Zero by 2050, through providing greater flexibility and a transition to renewable energy supplies.

5.2.8 Part 4 sets out a number of assessment principles against which applications are to be decided, including the presumption to grant consent for applications for energy NSIPs, and the need to balance potential benefits against potential adverse impacts.

5.2.9 Paragraphs 4.1.5 outlines when considering any proposed development when weighing its adverse impacts against its benefits, the Secretary of State should take into account environmental, social and economic benefits and adverse impacts at national, regional and local levels:

"its potential benefits including its contribution to meeting the need for energy infrastructure, job creation, reduction of geographical disparities, environmental enhancements, and any long-term or wider benefits"

"its potential adverse impacts, including on the environment, and including any long-term and cumulative adverse impacts, as well as any measures to avoid, reduce, mitigate or compensate for any adverse impacts, following the mitigation hierarchy"

5.2.10 Paragraph 4.2.4 states "*Government has therefore concluded that there is a critical national priority (CNP) for the provision of nationally significant low carbon infrastructure*." This includes the provision of NSIP solar schemes.

5.2.11 Paragraph 4.2.14 then sets out how the assessment of the application by the decision maker (Secretary of State) should be carried out for Critical National Priority (CNP) infrastructure:

"The Secretary of State will continue to consider the impacts and benefits of all CNP Infrastructure applications on a case-by-case basis. The Secretary of State must be satisfied that the applicant's assessment demonstrates that the requirements [outlined within the NPS] have been met."

5.2.12 Part 4 Section 3 sets out the environmental effects and considerations to be taken into account, this section sets out both measures for the applicant to take into account in the production of the ES and the decision maker (Secretary of State) for assessing the ES. It is acknowledged that in some instances all aspects of the proposal may not have been confirmed in full detail and therefore the worst-case scenario should be assessed by both the applicant and the decision maker:

"*In some instances, it may not be possible at the time of the application for development consent for all aspects of the proposal to have been settled in precise detail. Where this is the case, the applicant should explain in its application which elements of the proposal have yet to be finalised, and the reasons why this is the case.*

Where some details are still to be finalised, the ES should, to the best of the applicant's knowledge, assess the likely worst-case environmental, social and economic effects of the proposed development to ensure that the impacts of the project as it may be constructed have been properly assessed." (para 4.3.11 and 4.3.12)

5.2.13 Part 5 then sets out guidance on generic impacts for the Applicant's assessment and decision-making on the application. These impacts concern air quality and emissions; greenhouse gas emissions; biodiversity; aviation; coastal change; dust

and various other pollution control related matters; flood risk; historic environment; landscape and visual; land use; noise and vibration; socio-economics; traffic and transport; waste; and water quality and resources.

5.2.14 Where these generic impacts are relevant to the Proposed Development, the anticipated approach to the EIA is set out in the relevant technical section of this Scoping Report.

National Policy Statement on Renewable Energy Infrastructure (EN-3)

5.2.15 The National Policy Statement on Renewable Energy Infrastructure (EN-3)[7] was revised in November 2023 and provides national planning policy in respect of renewable energy infrastructure.

5.2.16 Paragraph 1.1.1 and 1.1.2 of EN-3 underlines the importance of the generation of electricity from renewable sources by stating:

"*There is an urgent need for new electricity generating capacity to meet our energy objectives.*

Electricity generation from renewable sources is an essential element of the transition to net zero and meeting our statutory targets for the sixth carbon budget (CB6). Our analysis suggests that demand for electricity is likely to increase significantly over the coming years and could more than double by 2050. This could require a fourfold increase in low carbon electricity generation, with most of this likely to come from renewables."

5.2.17 EN-3 provides assessment and technology-specific information on certain renewable energy technologies, include solar photovoltaic generation recognising the key role solar will play in reaching net zero:

"*The government has committed to sustained growth in solar capacity to ensure that we are on a pathway that allows us to meet net zero emissions by 2050. As such, solar is a key part of the government's strategy for low-cost decarbonisation of the energy sector*." (Para 2.10.9)

5.2.18 This section of EN-3 outlines the key considerations involved in the siting of a solar farm including: irradiance and site topography; network connection; proximity of site to dwellings; agricultural land classification and land type; accessibility; public

[7] Department of Energy and Climate Change, November 2023, National Policy Statement for Renewable Energy Infrastructure (EN- 3)

rights of way; and security and lighting. In regard to the use of agricultural land and specifically best and most versatile land EN-3 states:

"*While land type should not be a predominating factor in determining the suitability of the site location applicants should, where possible, utilise suitable previously developed land, brownfield land, contaminated land and industrial land. Where the proposed use of any agricultural land has been shown to be necessary, poorer quality land should be preferred to higher quality land avoiding the use of "Best and Most Versatile" agricultural land where possible. 'Best and Most Versatile agricultural land is defined as land in grades 1, 2 and 3a of the Agricultural Land Classification*

Whilst the development of ground mounted solar arrays is not prohibited on Best and Most Versatile agricultural land, or sites designated for their natural beauty, or recognised for ecological or archaeological importance, the impacts of such are expected to be considered" (para 2.10.29 and 2.10.30)

National Planning Policy Statement for Electricity Networks (EN-5)

5.2.19 The National Policy Statement on Electricity Networks Infrastructure (EN-5) was revised in November 2023. Whilst EN-5 principally covers above ground electricity lines of 132 kV or above and electrical transmission systems, paragraph 1.6.4 confirms that EN-5 will also be relevant if the electricity network constitutes an associated development for which consent is sought, such as a generating station. EN-5 is therefore relevant to the Proposed Development, as a grid connection is proposed.

5.2.20 Part 2 of EN-5 sets out a number of assessment and technology specific matters. Paragraph 2.2.2 points out that the location of electricity networks will often be determined by the particular generating station and the existing electricity network. Part 2 sets out particular generic impacts concerning biodiversity and geological conservation, landscape and visual, noise and vibration, and electric and magnetic field effects.

5.2.21 Where these generic impacts are relevant to the development, the proposed approach in the ES to address the technical matter is set out in the relevant technical section of this Scoping Report.

Climate Change and Net Zero

5.2.22 The Climate Change Act 2008 commits the UK Government by law to reducing greenhouse gas emissions by at least 100% of 1990 levels (net zero) by 2050. In April

2021, the Government announced that it will seek to reduce emissions by 78% by 2035 compared to 1990 levels as part of its sixth carbon budget.

5.2.23 The UK's carbon budgets place a restriction on the total amount of greenhouse gases the UK can emit over a five-year period. The UK is currently in the fourth carbon budget period (2023-2027). In 2023 the Climate Change Committee[8] (an independent statutory body established under the Climate Change Act 2008) reported that their confidence in meeting the Fourth Carbon Budget has increased from the previous year due to an improved outlook for transport emissions. The Committee, however, is less positive about reaching the Sixth Carbon Budget and said that 'the rate of emissions reduction will need to significantly increase for the UK to meet its Sixth Carbon Budget' and the Government will have to 'introduce more challenging measures' if the UK is to meet future carbon budgets and the net zero target for 2050.

5.2.24 In October 2021 the Government published its Net Zero Strategy[9] which sets out policies and proposals for meeting the carbon budget targets and its vision for a decarbonised economy by 2050. The document states that low carbon power is expected to become the predominant form of energy in 2050; accounting for approximately 50% or higher share of final energy consumption (up from 10% in 2019) as it displaces petrol in light vehicles and gas for heat in homes. The Net Zero Strategy is intended to accompany the Government's Ten Point Plan for Green Industrial Revolution (November 2020)[10] which sets out its plans to put the UK at the forefront of the global green economy.

5.2.25 The Energy White Paper 2020[11] sets out the UK Government's goal of a fully decarbonised, reliable, and low-cost power system by 2050. Although the White Paper envisaged achieving an overwhelmingly decarbonised power system during the 2030s, the Government revised ambition sets 2035 as the date by which all the UK's electricity will need to come from low carbon sources, subject to security of supply, whilst meeting a 40-60% increase in demand.

[8] Committee on Climate Change- 2023 Progress Report to Parliament
[9] Net Zero Strategy: Build Back Greener- HM Government, October 2021 (published in 2021 and updated in April 2022)
[10] Ten Point Plan for a Green Industrial Revolution – HM Government, November 2020
[11]

National Planning Policy Framework

5.2.26 The National Planning Policy Framework ("the NPPF") was revised in December 2023 and is a material consideration in planning decisions. Whilst the NPPF does not contain any specific policies for NSIP development, paragraph 5 of the NPPF states that, as well as the NPSs, NSIPs are to be determined in accordance with:

"*any other matters that are relevant (which may include the National Planning Policy Framework).*"

5.2.27 The NPPF sets out that the purpose of the planning system is to contribute to the achievement of sustainable development, which can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs. The UK and members of the United Nations have agreed to pursue the 17 Global Goals for Sustainable Development in the period to 2030 – these address social progress, economic well-being and environmental protection. There are a number of specific instances under the NPPF where this presumption does not apply, including as set out by paragraph 188:

"*The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.*"

5.2.28 Paragraph 157 of the NPPF applies a number of core planning principles that are to underpin planning decision making, including the following which is specifically relevant to renewable energy development:

"*The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure*"

5.2.29 Chapter 14 sets out the objectives for planning in meeting the challenge of climate change. Paragraph 157 states that planning is identified as playing a key role in helping shape places to secure radical reductions in greenhouse emissions, minimising vulnerability and providing resilience to the impacts of climate change,

and supporting the delivery of renewable and low carbon energy and associated infrastructure. This is central to all three strands of sustainable development.

5.2.30 Whilst the Local Planning Authorities (LPAs) are not the determining authority, paragraph 161 of the NPPF sets out that in order to increase the use and supply of renewable energy LPAs need to recognise the responsibility of all communities to contribute to energy generation from renewable sources. Paragraph 163 then makes it clear that LPAs should not require applicants to demonstrate the overall need for renewable energy.

5.2.31 The NPPF also provides guidance on a number of environmental matters; where these matters are relevant to the Development, the proposed approach to the EIA to address the technical matter is set out in the relevant technical section of this Scoping Report. The ES Planning Chapter will describe all relevant matters contained within the NPPF.

5.2.32 Chapter 15 of the NPPF sets out the objectives for the planning system in conserving and enhancing the natural environment. Paragraph 180 states that the planning system should contribute to and enhance the natural and local environment by, protecting and enhancing valued landscapes, recognising the intrinsic character and beauty of the countryside, minimising impacts on and providing net gains for biodiversity, prevent new and existing development from contributing to / at risk from unacceptable levels of pollutants and remediating and mitigation despoiled, degraded, derelict, contaminated and instable land where appropriate. Paragraph 180 states when determining applications, LPAs should seek to conserve and enhance biodiversity by encouraging opportunities to incorporate biodiversity in and around developments.

5.2.33 Paragraph 180 states that LPAs should take into account the economic and other benefits of the best and most versatile (BMV) agricultural land.

5.2.34 The NPPF also provides guidance on the weight to be given to policies in existing plans and emerging plans. Paragraph 48 states the weight to be given to relevant policies in emerging plans will depend on the stage of preparation of the plan, the extent to which there are unresolved objections and the degree of consistency with the NPPF.

National Planning Practice Guidance (NPPG)

5.2.35 The NPPG pulls together planning practice guidance for all planning related matters. The Planning Practice Guidance for Renewable and Low Carbon Energy dates from June 2015. The opening paragraph of the NPPG insofar as it relates to renewable and low carbon energy proposals states that:

'*increasing the amount of energy from renewable and low carbon technologies will help to make sure the UK has a secure energy supply, reduce greenhouse gas emissions to slow down climate change and stimulate investment in new jobs and businesses*.'

5.2.36 The NPPG further notes that planning has an important role in the delivery of new renewable and low carbon energy infrastructure in locations where the local environmental impact is acceptable.

5.2.37 In considering applications, paragraph 7 of the Renewable and Low Carbon Energy NPPG makes it clear that:

- *the need for renewable or low carbon energy does not automatically override environmental protections;*
- *cumulative impacts require particular attention, especially the increasing impact that wind turbines and large-scale solar farms can have on landscape and local amenity as the number of turbines and solar arrays in an area increases;*
- *local topography is an important factor in assessing whether wind turbines and large-scale solar farms could have a damaging effect on landscape and recognise that the impact can be as great in predominately flat landscapes as in hilly or mountainous areas;*
- *great care should be taken to ensure heritage assets are conserved in a manner appropriate to their significance, including the impact of proposals on views important to their setting;*
- *proposals in National Parks and Areas of Outstanding Natural Beauty, and in areas close to them where there could be an adverse impact on the protected area, will need careful consideration;*
- *protecting local amenity is an important consideration which should be given proper weight in* planning decisions.

5.2.38 Paragraph 13 of the Renewable and Low Carbon Energy NPPG sets out the particular planning considerations relating to large scale ground-mounted solar photovoltaic farms. It states that these can have a negative impact on the rural environment, particularly in undulating landscapes. However, the Renewable and Low Carbon Energy NPPG notes that the visual impact of a well-planned and well-screened solar farm can be properly addressed within the landscape if planned sensitively. In providing further guidance on the particular factors that a local planning authority will need to consider in the assessment of large-scale solar farms, the NPPG advises:

- *encouraging the effective use of land by focusing large scale solar farms on previously developed and non-agricultural land, provided that it is not of high environmental value;*
- *where a proposal involves greenfield land, whether (i) the proposed use of any agricultural land has been shown to be necessary and poorer quality land has been used in preference to higher quality land; and (ii) the proposal allows for continued agricultural use where applicable and/or encourages biodiversity improvements around arrays. (See also speech by the Minister for Energy and Climate Change, the Rt Hon Gregory Barker MP, to the solar PV industry on 25 April 2013 and written ministerial statement on solar energy: protecting the local and global environment made on 25th March 2015)*
- *that solar farms are normally temporary structures and planning conditions can be used to ensure that the installations are removed when no longer in use and the land is restored to its previous use;*
- *that the proposal's visual impact, the effect on landscape of glint and glare and on neighbouring uses and aircraft safety should be considered;*
- *the extent to which there may be additional impacts if solar arrays follow the daily movement of the sun;*
- *the need for, and impact of, security measures such as lights and fencing;*
- *great care should be taken to ensure heritage assets are conserved in a manner appropriate to their significance, including the impact of proposals on views important to their setting. Depending on their scale, design and prominence, a large-scale solar farm within the setting of a heritage asset may cause substantial harm to the significance of the asset;*

- *the potential to mitigate landscape and visual impacts through, for example, screening with native hedges;*
- *the energy generating potential, which can vary for a number of reasons including, latitude and aspect.*

5.2.39 The guidance adds that the approach to assessing cumulative landscape and visual impact of large-scale solar farms is likely to be the same as assessing the impact of wind turbines. However, in the case of ground-mounted solar panels it should be noted that with effective screening and appropriate land topography the area of a zone of visual influence could be zero.

5.3 Local Development Plan

5.3.1 The Local Development Plan does not carry the same weight under the Act in respect of decision making on NSIPs as it does with the determination of planning applications that are made under the Town and Country Planning Act 1990. Although the NPSs are the primary consideration for NSIP applications, the Local Development Plan is still an important consideration. In relation to the Proposed Development, the Site falls within Bassetlaw District Council local authority area, which is subject to its own Local Development Plan.

Bassetlaw District Council

5.3.2 Bassetlaw District Council are currently in the process of preparing their new Local Plan 2020-2037 which was submitted to the Secretary of State on 18 July 2022 and the council have recently published the Inspectors Report and the Officer Recommendations. As such, it is considered that this emerging document can be given weight in the determination of any current planning applications.

5.3.3 The current adopted Development Plan for Bassetlaw comprises the Core Strategy as adopted in 2011[12].The current Policy Map associated with the Core Strategy shows that the land is located outside of any development limits and will fall within the open countryside under current policy designations. The mapping identifies large areas of flood risk and identifies a number of Local Wildlife Sites (LWS) and the adjacent Clarborough Tunnel SSSI.

5.3.4 The following policies would be considered relevant:

[12] Bassetlaw District Council, 2011, Bassetlaw District Local Development Framework Core Strategy & Development Management Policies DPD, Adopted December 2011.

- Policy CS1 – Settlement Hierarchy
- Policy DM3 – General Development in the Countryside
- Policy DM4 – Design and Character
- Policy DM8 – The Historic Environment
- Policy DM9 – Green Infrastructure; Biodiversity & Geodiversity; Landscape; Open Space and Sports Facilities
- Policy DM10 – Renewable and Low Carbon Energy
- Policy DM11 – Developer Contributions & Infrastructure Provision
- Policy DM12 – Flood Risk, Sewerage and Drainage
- Policy DM13 – Sustainable Transport

5.3.5 Specifically, Policy DM10 Part A states:

The Council will be supportive of proposals that seek to utilise renewable and low carbon energy to minimise CO2 emissions. Proposals for renewable and low carbon energy infrastructure will also need to demonstrate that they:

i. Are compatible with policies to safeguard the built and natural environment, including heritage assets and their setting, landscape character and features of recognised importance for biodiversity;

ii. Will not lead to the loss of or damage to high-grade agricultural land (Grades 1 & 2);

iii. Are compatible with tourism and recreational facilities;

iv. Will not result in unacceptable impacts in terms of visual appearance; noise; shadowflicker; watercourse engineering and hydrological impacts; pollution; or traffic generation; and

v. Will not result in an unacceptable cumulative impact in relation to the factors above. Large-scale renewable and low carbon energy proposals must provide full details of arrangement for de-commissioning and reinstatement of the site if/when it ceases to operate.

5.3.6 Part C of this policy also outlines the expectation that major development will "*deliver specific low-carbon and renewable energy infrastructure in lie with assessments of feasibility and overall viability*."

Emerging Bassetlaw Local Plan 2020-2037

5.3.7 As discussed above, Bassetlaw Council are currently preparing their new Local Plan[13]. The Public Version of the Emerging Policy Map largely carries forward the same allocations as the currently adopted plan in terms of LWS but also introduces a 'Minor Green Corridor in line with the Trent Valley Way.

5.3.8 The following policies would be considered relevant to any future planning application:

- Policy ST1 – Bassetlaw's Spatial Strategy
- Policy ST35 – Design Quality
- Policy ST37 – Landscape Character
- Policy ST39 – Green and Blue Infrastructure
- Policy ST40 – Biodiversity and Geodiversity
- Policy 41 – Trees, Woodlands and Hedgerow
- Policy ST42 – The Historic Environment
- Policy 43 – Designated and Non-Designated Heritage Assets
- Policy ST48 – Protecting Amenity
- Policy ST49 – Contaminated and Unstable Land
- Policy ST51 – Renewable Energy Generation
- Policy ST52 – Flood Risk and Drainage
- Policy ST55 – Promoting Sustainable Transport and Active Travel
- Policy ST58 – Provision and Delivery of Infrastructure

5.3.9 Specifically, Policy ST51 states that:

"1. Development that generates, shares, transmits and/or stores zero carbon and/or low carbon renewable energy will be supported in principle at the Area of Best Fit at the former High Marnham power station site, as identified on the Policies Map as a result of the ability of on site development to connect to the on site national electricity grid infrastructure.

[13] Bassetlaw District Council, 2021, Bassetlaw Local Plan 2020-2037 Publication Version.

2. Proposals for renewable energy development on land at the Area of Best Fit should deliver a scheme in accordance with an agreed masterplan framework, relevant supporting technical assessments, delivery strategy and phasing plan for the site in accordance with Policy ST58, and other relevant policies in this Plan.

3. Outside the Area of Best Fit, development that generate, shares, transmits and/or stores zero carbon and/or low carbon renewable energy including community energy schemes will be expected to demonstrate an operational and/or economic need for the development in that location, and the satisfactory resolution of all relevant site specific and cumulative impacts that the scheme could have on the area, taking into account operational and approved development, as well as any proposed intensification to operation or approved proposals. An assessment should address cumulative visual and landscape impacts, as well as heritage, hydrology, ecology, traffic and transport, noise, recreation and local amenity impacts.

4. All renewable energy development will be expect to provide details of the expected power generation based upon yield or local self-consumption to enable effective monitoring of the district's contribution to the national zero carbon targets.

5. A decommissioning programme will be required to demonstrate the effective restoration of land and/or buildings to their original use (such as agriculture) and condition three years after cessation of operations."

5.3.10 Within the supporting text for this policy, it is clear that the Area of Best Fit is centred around the exiting proposals at the Former High Marnham Power Station. It is however discussed that the Area of Best Fit does not preclude energy development elsewhere in the district nor does it mean that land within the area must be developed for renewable energy exclusively. Draft Paragraph 10.2.15 discusses the other two former power stations sites within the District, including West Burton. The Council recognise that significant regeneration would need to be undertaken at this site long term, which could include some form of zero carbon energy generation.

Neighbourhood Planning

5.3.11 The Site is also covered, in part, by the Sturton Ward Neighbourhood Plan. This document forms part of the Local Plan. The Neighbourhood Plan Review was adopted at Referendum in November 2021. The following policies are applicable to the Proposed Development:

- Policy 1 – Sustainable Development, Infill and the Development Boundary

- Policy 2a – Protecting the Landscape Character, Significant Green Gaps and Key Views.
- Policy 2b – Enhancing Biodiversity
- Policy 4 – Reducing the Risk of Flooding
- Policy 5 – Design Principles
- Policy 6 – Protecting the Historic Environment
- Policy 12 – Energy Efficiency, Renewable Energy and Climate Change

6. Environmental Impact Assessment Process

6.1 Baseline Studies

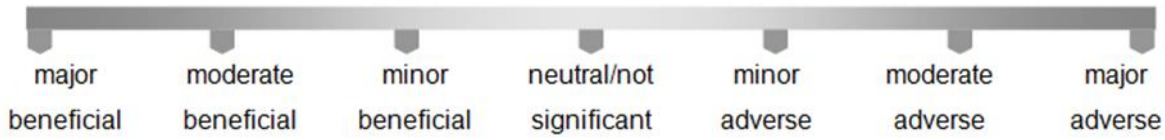
6.1.1 In the case of many of the environmental topics which will be covered in the ES, or which are proposed to be scoped-out of the ES, the baseline studies have already been undertaken, and details of this work, where relevant are discussed within each environmental topic within this report. Baseline conditions will be established within each of the individual environmental assessments through the use of a number of sources including, desk top review of existing available data; site specific survey work; and consultation.

6.2 EIA Methodology and Evaluation of Significance

6.2.1 The purpose of the EIA is to identify the likely 'significance' of environmental effects (beneficial or adverse) arising from a Proposed Development. In broad terms, environmental effects are described as:

- Adverse – detrimental or negative effects to an environmental resource or receptor;
- Beneficial – advantageous or positive effect to an environmental resource or receptor; or
- Negligible – a neutral effect to an environmental resource or receptor.

6.2.2 It is proposed that the significance of environmental effects (adverse, negligible/neutral or beneficial) would be described in accordance with the following 7-point scale:-



6.2.3 Significance reflects the relationship between two factors:

- The magnitude or severity of an effect (i.e. the actual change taking place to the environment); and
- The sensitivity, importance or value of the resource or receptor.

6.2.4 The broad criteria for determining magnitude are set out in Table 6.1.

Table 6.1: Degrees of Magnitude and their Criteria

Magnitude of Effect	Criteria
High	Total loss or major/substantial alteration to elements/features of the baseline (pre-development) conditions such that the post development character/composition/attributes will be fundamentally changed.
Medium	Loss or alteration to one or more elements/features of the baseline conditions such that post development character/composition/attributes of the baseline will be materially changed.
Low	A minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible / detectable but the underlying character / composition / attributes of the baseline condition will be similar to the pre-development.
Negligible	Very little change from baseline conditions. Change not material, barely distinguishable or indistinguishable, approximating to a 'no change' situation.

6.2.5 It is worth noting that the degrees of magnitude defined in the table above can be both positive and negative, as a development can result in a positive effect on the environment.

6.2.6 The sensitivity of a receptor is based on the relative importance of the receptor using the scale in Table 6.2.

Table 6.2: Degrees of Sensitivity and their Criteria

Sensitivity	Citeria
High	The receptor / resource has little ability to absorb change without fundamentally altering its present character, or is of international or national importance.
Medium	The receptor / resource has moderate capacity to absorb change without significantly altering its present character, or is

Sensitivity	Citeria
	of high and more than local (but not national or international) importance.
Low	The receptor / resource is tolerant of change without detrimental effect, is of low or local importance.
Negligible	The receptor / resource can accommodate change without material effect, is of very limited or no importance.

6.2.7 Placement within the 7-point significance scale would be derived from the interaction of the receptor's sensitivity and the magnitude of change likely to be experienced (as above), assigned in accordance with Table 6.3 below, whereby effects assigned a rating of Major or Moderate would be considered as 'significant'.

Table 6.3: Level of Effect

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

6.2.8 The above magnitude and significance criteria are provided as a guide for specialists to categorise the significance of effects within the ES. Where discipline-specific methodology has been applied that differs from the generic criteria above, this will be clearly explained within the given chapter under the heading of Assessment Approach in the ES.

6.2.9 As can be seen from Table 6.3 when an environmental effect is assessed as having a major or moderate degree of significance it is deemed to be "significant". These are the shaded cells in Table 6.3. When such a significant effect occurs consideration of mitigation solutions or enhancements to minimise the effect (which can include

design alterations) will be considered. It should be noted at this point that mitigation can come in the form of embedded design through design alteration to resolve a significant effect and mitigation through additional measures. Once these mitigations and enhancements have been assessed the degree of significance may decrease to minor/moderate, minor or negligible. If such a level of environmental effect occurs the Proposed Development is no longer considered as creating a "significant effect". If an environmental effect remains "significant" (i.e. major/moderate) the assessing planning authority must weigh up the planning balance and determine if this significant, negative/positive environmental effect is outweighed by some other planning gain prior to determining the planning application.

6.2.10 A level of effects would be assigned both before and after mitigation.

6.3 Mitigation

6.3.1 Standard measures and the adoption of construction best practice methods to avoid, minimise or manage adverse environmental effects, or to ensure realisation of beneficial effects, are assumed to have been incorporated into the design of the Proposed Development and the methods of its construction from the outset.

6.3.2 Where mitigation measures are proposed that are specific to an environmental theme (i.e. ecological measures incorporated into the landscaping scheme, exclusion of areas of archaeological significance from development etc) and incorporated into the design.

6.3.3 Where the assessment of the Proposed Development has identified potential for adverse environmental effects, the scope for mitigation of those effects, for example by way of compensatory measures, has been considered and is outlined in the appropriate technical chapter. It is assumed that such measures would be subject to appropriate DCO requirements.

6.3.4 Where the effectiveness of the mitigation proposed has been considered uncertain, or where it depends upon assumptions of operating procedures, then data and/or professional judgement has been introduced to support these assumptions.

6.4 Residual Effects

6.4.1 The assessment process will conclude with an examination of the residual effects after mitigation has been applied, i.e. the overall predicted (likely) effects of the Proposed Development.

6.5 Cumulative and in combination effects

6.5.1 Paragraph 5(e) of Schedule 4 'Information for inclusion in Environmental Statements' to the EIA Regulations make reference a description of the likely significant effects of the development resulting from '*the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources*'.

6.5.2 In accordance with the EIA Regulations cumulative effects will be considered as part of the ES.

6.5.3 Within EIA, cumulative effects are generally considered to arise from the combination of effects from the Proposed Development and from other proposed or permitted schemes in the vicinity, acting together to generate elevated levels of effects. Examples of these kinds of effects that can be readily appreciated could include:

- Traffic generated from developments, affecting the surrounding road network;
- Air quality effects from developments; and
- Discharges to the water environment.

6.5.4 For the cumulative assessment, two types of impact will be considered:

- The combined effect of individual impacts from the Proposed Development, for example noise or pollutants on a single receptor; and
- The combined effects of several development schemes which may, on an individual basis be insignificant but, cumulatively with the Proposed Development, have a new or different likely significant effect.

6.5.5 The Planning Inspectorate's Advice Note 17 on the assessment of cumulative effects identifies a four-stage approach as follows:

- Stage 1 – Establish the NSIP's Zone of Influence and identify a long list of 'other development' – this will include a long list of all proposed applications within the surrounding area.

- Stage 2 - Identify a shortlist of 'other development' for Cumulative Effects Assessment, with those developments from the longlist which are not of a nature or scale to result in potential cumulative effects excluded.
- Stage 3 – Gather information in relation to the shortlisted Cumulative Developments.
- Stage 4 – Assessment to determine the level of significance of the cumulative effect.

6.5.6 A search of the Planning Inspectorate's Projects summary on their website identified the following schemes within the vicinity of the Site:

- Cottam Solar - NSIP development comprising three electricity generating stations, each with anticipated capacity in excess of 50MW, comprising of ground mounted solar arrays, with associated development comprising energy storage, grid connection infrastructure and other infrastructure integral to the construction, operation, and maintenance of the NSIPs. Application is currently in the recommendation stage. Located approximately 8km east of the Site.
- Gate Burton Energy Park - The Scheme comprises the installation of solar photovoltaic (PV) generating panels and on-site energy storage facilities and grid connection infrastructure. The Scheme would allow for the generation, storage and export of up to 500 (MW) electrical generation capacity. Application is currently in the recommendation stage. Located approximately 2km east of the Site.
- Great North Road Solar Park - Solar photovoltaic array generating station, battery energy storage system and grid connection infrastructure, with a maximum generation capacity of 800MW. Application expected to be submitted Q2 2025 and is currently in the pre-application stage. Located approximately 20km south of the Site.
- Tillbridge Solar Project - Generating station with an anticipated capacity in excess of 50MW, comprising ground mounted solar arrays, with associated development comprising energy storage, grid connection infrastructure and other associated development for the construction, operation, maintenance and decommissioning of the solar farm. Application expected to be

submitted Q1 2024 and is currently in the pre-application stage. Located approximately 9.5km north-east of the Site.

- West Burton C Power Station - The proposal is for a power station capable of generating up to 299MW of electrical generation capacity. Granted development consent in October 2020. Located adjacent to the north-eastern boundary of the Site.
- West Burton Solar Project - NSIP development comprising four electricity generating stations, each with anticipated capacity in excess of 50MW, comprising of ground mounted solar arrays, with associated development comprising energy storage, grid connection infrastructure and other infrastructure integral to the construction, operation, and maintenance of the NSIPs. Application is currently in the examination stage. Located approximately 8km south-east of the Site.

6.5.7 An initial search of the Local Authorities Planning Application Portal identifies the following applications for solar development:

- 22/00358/FUL – Installation of a solar farm and battery storage facility with associated infrastructure. Land to the East of Bumble Bee Farm. Granted permission July 2022. Located approximately 2.5km north of the Site.
- 21/01147/FUL – Installation of a solar farm and battery storage with associated infrastructure (49.9 MW). Application Approved December 2021. Located approximately 12km south of the Site.
- 20/01405/FUL – Installation and operation of a solar fam with all associated works, equipment and necessary infrastructure. Application Approved (Delegated Decision) February 2021. Located approximately 3.6km west of the Site.
- 20/00117/FUL – Installation and operation of a solar farm comprising an array of ground mounted solar PV panels with associated infrastructure including housing for inverters a substation compound, point of connection mast, fencing, security cameras, cabling, access tracks and a temporary construction compound. Application Approved August 2020. Located adjacent to the west of the Site.

6.5.8 This list will be reviewed as the EIA process continues and if further major application sites enter the planning system are identified within close proximity

they will be added to the cumulative assessment. Also, if any of these cumulative sites are "built out" they will no longer be cumulative, but instead will form the baseline.

6.5.9 Other than West Burton C Power Station, which is a gas powered power station proposal, all of the sites listed above are large scale ground mounted solar. At this time there are no known other notable developments submitted to planning within close proximity of the Site that are not solar farm developments. However, it is noted that immediately adjacent to the Site there is the consented quarry (ref 1/46/11/00002/R), which will be considered where necessary in the cumulative assessment. It is also acknowledged that the STEP programme for experimental nuclear fusion development is proposed at the existing West Burton Power Station, however due to the timescales of the scheme it is not proposed to be considered cumulatively as it would not be delivered at the same time as the proposals. As stated above, if by the time of submission any major applications, including both solar and non solar developments, come forward to planning they will be included within the cumulative assessment.

6.5.10 These cumulative sites will be considered within each specialist technical chapter rather than as a standalone chapter within the ES. With an appropriate study area to be determined on a topic specific basis.

6.6 Site Selection and Consideration of Alternatives

6.6.1 The EIA Regulations (Schedule 4, Paragraph 2) require for inclusion in an ES:

"*A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.*"

6.6.2 The main alternatives to the Proposed Development which the Applicant has considered include:

- The 'No Development' Alternative
- Alternative Sites
- Alternative Designs / Technologies

6.6.3 In this case the 'No Development' option has not been considered further, as there is an identified capacity for energy generation in the network at this point and an alternative development would not deliver this. The ES will include a description of the alternatives relevant to the Proposed Development and an assessment of how they have been discounted. A detailed appraisal will be presented as part of the ES which will outline the rational for the final site layout and design selection.

6.6.4 Alternative sites will also be considered as part of the Alternatives Assessment presented within the ES and the reasons for selecting the Site will be presented. One of the main reasons for the Site being the preferred option is its location in proximity to the point of connection and having the amount of land available in the control of a single landowner to meet the generation capacity identified for this area.

6.6.5 As further assessments are undertaken the Proposed Development layout and design will be refined to determine the DCO application boundaries and layout for the Site submitted with the DCO application. Full details on this process will be provided within the ES.

6.7 Structure of the Environmental Statement

6.7.1 The Applicant has appointed a team of specialist consultants to consider planning and environmental matters in relation to the Proposed Development and to provide input into the production of this Scoping Report, as listed in **Table 6.5** below. The technical assessment work undertaken by each of the consultants listed has directly informed the consideration of likely significant effects within their respective disciplines.

Table 6.5 Consultant Team

Discipline	Company
Planning	Pegasus Group
Environmental Impact Assessment	Pegasus Group
Landscape and Visual	Pegasus Group
Transport and Access	Pegasus Group
Flood Risk and Drainage	RSK
Ecology and Biodiversity	BSG Ecology

Discipline	Company
Archaeology and Cultural Heritage	Pegasus Group
Socio Economic and Health	Pegasus Group
Air Quality	Hoare Lea
Arboriculture	Barton Hyett
Agriculture	Pegasus Group
Noise and Vibration	RES
Climate Change	Pegasus Group / RES
Glint & Glare	Pager Power

6.7.2 The proposed structure of the ES is set out in Table 6.6.

Table 6.6 Proposed Structure of the Environmental Statement

Non-Technical Summary	
Chapter 1	Introduction
Chapter 2	EIA Methodology & Public Consultation
Chapter 3	Site Description, Site Selection and Iterative Design Process
Chapter 4	Proposed Development
Chapter 5	Planning Policy
Chapter 6	Landscape and Visual Impact
Chapter 7	Residential Amenity
Chapter 8	Ecology & Biodiversity
Chapter 9	Hydrology, Hydrogeology and Flood Risk
Chapter 10	Cultural Heritage
Chapter 11	Socio Economic and Health
Chapter 12	Noise

Chapter 13	Climate Change
Chapter 14	Transport & Access
Chapter 15	Air Quality
Chapter 16	Agriculture
Chapter 17	Glint & Glare
Chapter 18	Miscellaneous – to include Telecoms, TV & Utilities
Chapter 20	Summary
Chapter 21	Glossary

6.7.3 For completeness, the opening section of the ES will present the following information.

Introduction

6.7.4 Chapters 1-3 of the ES will provide an introduction to the ES, the assessment scope and methodology and details of the Site location and current use and alterative designs considered.

6.7.5 In accordance with the EIA Regulations this chapter of the ES will include an outline of the main reasonable alternatives studied by the Applicant which are relevant to the Proposed Development and its specific characteristics and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects (Regulation 14(2) and Schedule 4 of the EIA Regulations).

Proposed Development

6.7.6 Chapter 4 will provide a comprehensive description of the Proposed Development, including consideration of construction and operation.

Planning Policy

6.7.7 Chapter 5 will provide a summary of the planning policy that should be considered when determining this planning application. It will outline National through to Local policy.

7. Landscape and Visual Impact and Residential Amenity

7.1 Introduction

7.1.1 The landscape and visual chapter of the ES will review the Site and its surrounding context in order to describe and identify the relative level of effects arising as a result of the Proposed Development, in relation to the landscape features, the character of the local landscape and the visual amenity of people who view the Site and surrounding landscape. The scoping report has been informed by desktop study and site visits to the Site and surrounding area.

7.2 Preliminary Baseline Conditions

Site Context and Landscape Features

7.2.1 The Site broadly lies between the settlements of Retford and Gainsborough, occupying multiple agricultural fields within a relatively flat agricultural landscape primarily in arable use. The Site also includes part of the existing West Burton Power Station site, covering the area around the existing 400kV substation. Small woodland plantations are located within some of the fields. Two settlements or clusters of properties are located beyond the Site boundaries including Sturton le Steeple and Fenton. Individual properties are also located close to the boundaries of the Site and within the wider surrounding area. A network of roads is located both within the Site and adjacent to the boundary. The Sheffield – Lincoln railway line passes through the western section of the Site and the Torksey Branch railway line lies adjacent to the southwestern corner of the Site both are located outwith the Site boundary and are both minor rail lines. The River Trent lies adjacent to the eastern boundary of the Site. The Catchwater Drain is located in the eastern section of the Site close to the Site's boundary with the eastern side of Sturton le Steeple.

7.2.2 A series of Public Rights of Way (PRoW) are located within the Site, including a number of footpaths travelling west from Sturton le Steeple to the surrounding settlements. A footpath routes northwards from Fenton to Sturton le Steeple, travelling northwards through the site and a further footpath to the east of this also routes north through the Site. The long distance path known as the Trent Valley Way travels through the Site from east to west through the southern edge of the settlement of Sturton Le Steeple.

7.2.3 There are a number of overhead electricity lines which pass through the Site, the locations of these are shown on **Figure 2.1**.

Landscape Designations

7.2.4 The Site is not covered by any designation at a national, regional or local level that recognises a specific landscape importance.

Landscape Character

7.2.5 The Site lies towards the northern extent of National Character Area (NCA) 48: Trent and Belvoir Vales. The NCA is described as a 'gently undulating and low-lying landform in the main, with low ridges dividing shallow, broad river valleys, vales and flood plains'. Amongst the key characterises of the NCA it notes that 'Immense coal-fired power stations in the north exert a visual influence over a wide area, not just because of their structures but also the plumes that rise from them and the pylons and power lines that are linked to them'.

7.2.6 At a district level, the 'Landscape Character Assessment – Bassetlaw, Nottinghamshire' was prepared by Bassetlaw District Council in August 2009. The Character Assessment identifies that the Site lies across both the 'Mid Notts Farmlands' and Trent Washlands' Character Areas.

7.3 Likely Significant Effects

7.3.1 It is proposed that the chapter will consider the potential effects of the Proposed Development upon:

- Individual landscape features and elements;
- Landscape character; and
- Visual amenity and the people who view the landscape.

7.3.2 The chapter will address all phases of the Proposed Development and effects will be considered both during the construction phase, when the development is being built (temporary effects) and following completion of the development (permanent effects). Permanent landscape and visual effects would be assessed both in the winter of year 1 (the year in which the construction is completed and development becomes operational) and also in the summer of year 15 (15 years of operation). In the Year 15 scenario it is assumed that vegetation planted as part of the scheme will have established and exhibit a degree of maturity. In addition, consideration to the decommissioning would also be undertaken.

7.3.3 Consideration shall be given to seasonal variations in the visibility of the Proposed Development and these will be described where necessary.

7.3.4 Both beneficial and adverse effects shall be identified in the assessment and reported as appropriate. Effects shall be described as 'neutral' where beneficial effects are deemed to balance the adverse effects. The adverse and beneficial effects shall be communicated in each case so that the judgement is clear.

7.4 Assessment Methodology

7.4.1 It is acknowledged from the outset that, in common with almost all commercial solar energy development proposals, some landscape and visual effects would occur as a result of the Proposed Development.

7.4.2 A key principle of the European Landscape Convention is that all landscapes matters should be managed appropriately. It is also acknowledged that landscapes provide the surroundings for people's daily lives and often contribute positively to the quality of life and economic performance of an area.

7.4.3 It is therefore proposed that a landscape and visual chapter is undertaken as part of the Environmental Statement. This assessment will be undertaken by Chartered Landscape Architects at Pegasus Group who are experienced in the assessment of landscape and visual effects of energy developments and are familiar with the local landscape.

Overview of Approach and Methodology

7.4.4 It is proposed that the main objectives of the LVIA will be as follows:

- To identify, evaluate and describe the current landscape character of the Site and its surroundings and also any notable individual or groups of landscape features within the Site;
- To determine the sensitivity of the landscape to the type of development proposed;
- To identify potential visual receptors (i.e. people that would be able to see the development) and evaluate their sensitivity to the type of changes proposed;
- To identify and describe any impacts of the scheme in so far as they affect the landscape and/or views of it and evaluate the magnitude of change due to these impacts;

- To identify and assess any cumulative landscape and visual effects;
- To identify and describe mitigation measures that have been adopted to avoid, reduce and compensate for landscape and visual effects; and
- To evaluate the level of residual landscape and visual effects.

Relevant Guidance and Policy

7.4.5 It is anticipated the following legislation, policy and guidance will be referred to as part of the assessment:

- National Policy Statement for Energy (EN-1);
- National Policy Statement for Renewable Energy Infrastructure (EN-3);
- National Policy Statement for Electricity Networks Infrastructure (EN-5);
- National Planning Policy Framework 2023;
- National Planning Practice Guidance 2019;
- Emerging Bassetlaw Local Plan 2020-2037 (2022);
- Guidelines for Landscape and Visual Assessment, 3rd Edition (GLVIA3)[14];
- Landscape Institute (2021) Assessing landscape value outside national designations, Technical Guidance Note 02/21;
- Landscape Institute (2019) Technical Guidance Note 06/19, Visual Representation of Development Proposals; and
- Landscape Institute (2019) Technical Guidance Note 02/19, Residential Visual Amenity Assessment.

7.4.6 The chapter shall be undertaken in accordance with the principles of best practice, as outlined in published guidance documents, notably the third edition of the Guidelines for Landscape and Visual Assessment (GLVIA3).

7.4.7 The methodology and assessment criteria for the assessment shall be developed in accordance with the principles established in this best practice document. It should be acknowledged that GLVIA3 establishes guidelines, not a specific methodology. The preface to GLVIA3 states:

'This edition concentrates on principles and processes. It does not provide a detailed or formulaic 'recipe' that can be followed in every situation – it remains the

[14] Landscape Institute and the Institute for Environmental Management and Assessment, 2013

responsibility of the professional to ensure that the approach and methodology adopted are appropriate to the task in hand.'

7.4.8 The approach shall therefore be developed specifically for this assessment to ensure that the methodology is fit for purpose.

Distinction between Landscape and Visual Effects

7.4.9 In accordance with the published guidance, landscape and visual effects shall be assessed separately, although the procedure for assessing each of these is closely linked. A clear distinction has been drawn between landscape and visual effects as described below:

- Landscape effects relate to the effects of the proposals on the physical and perceptual characteristics of the landscape and its resulting character and quality; and
- Visual effects relate to the effects on specific views experienced by visual receptors and on visual amenity more generally.

Significance Criteria

7.4.10 The level (relative significance) of landscape and visual effects is determined by combining judgements regarding the sensitivity of the landscape or view, magnitude of change, duration of effect and the reversibility of the effect. In determining the level of residual effects, all mitigation measures are taken into account.

7.4.11 The relative level of effect is described as major, moderate/major, moderate, moderate/minor, minor or minor/no effect. No effect may also be recorded as appropriate where the effect is so negligible it is not even noteworthy. Those effects described as major, major/moderate and in some cases moderate, may be regarded as significant effects as required by the EIA Regulations, however the final conclusions are as a result of professional judgement.

Study Area

7.4.12 In order to assist with defining the study area a Screened Zone of Theoretical Visibility (SZTV) has been produced at a range of up to 10km, which identifies the potential locations from which the scheme may be visible. The SZTV has been produced using Digital Terrain Modelling (DTM). Existing built development (8m tall) and larger blocks of woodland have also been modelled (15m tall) to take account of the screening effect that these would provide. However, the screening effect

provided by smaller blocks of woodland and hedgerows/hedgerow trees, particularly those within and surrounding the site, have not been taken into account, and consequently the actual extent of the area from which the Proposed Development is visible is likely to be much smaller.

7.4.13 The SZTV has been run at an average height of 3.6m across the part of the Site identified for solar panels and associated development and 8m for the part of the site identified for the substation, battery energy storage system and associated infrastructure.

7.4.14 The SZTV is a useful tool used to provide a focus on the area and receptors that are most likely to be affected by a Proposed Development but should always be subject to verification in the field. In this regard, site visits were undertaken to understand the actual likely visibility of the scheme at the Site.

7.4.15 Following a review of the 10km SZTV and further on-site analysis it is proposed that an appropriate study area for the assessment is 5km. In locations beyond 5km where the Site and any development on it would be visible, the Proposed Development is unlikely to result in any visual effects greater than minor. This is due to the minimal degree to which the development would alter the overall view, which at this distance and when considering the local topography, would be more heavily influenced by other features and characteristics of the view.

Residential Visual Amenity Assessment

7.4.16 A detailed consideration with regard to the visual amenity of the nearest residential properties to the Site shall be included within the LVIA. For any residential properties located within 0.5km of the Proposed Development, a separate standalone Residential Visual Amenity Assessment (RVAA) will therefore be prepared as an Appendix to the chapter. The RVAA will be prepared in line with the principles set out in best practice guidance 'Residential Visual Amenity Assessment (RVAA) -Technical Guidance Note 02/19, Landscape Institute (2019). This sets out that *'there are no standard criteria for defining the RVAA study area nor for the scope of the RVAA, which should be determined on a case-by-case basis taking both the type and scale of proposed development, as well as the landscape and visual context, into account'*. In this case, it is considered that a detailed 0.5km RVAA study area should be an appropriate basis on which to consider the potential for any overbearing effects on residential properties to arise.

Assessment Viewpoints

7.4.17 The assessment of visual effects will be undertaken with reference to viewpoint analysis as recommended by best practice guidelines. It is however acknowledged that viewpoints are simply snap shots of the view from a small number of the potential locations where the proposals would be visible. The visual assessment will therefore provide a broader discussion of visual effects on a range of visual receptors throughout the study area with reference made to the views represented by the selected viewpoints.

7.4.18 Based on initial site work, a provisional list of viewpoints has been developed which it is considered would be appropriate for the assessment. The proposed locations are set out in the table below and are illustrated on the SZTV plans at **Figure 7.1** and **Figure 7.2**. The list of viewpoints has been selected to represent a range of views and viewer types. The viewpoints cover a variety of different landscape character types and different visual receptor groups.

Table 7.1: List of Viewpoints

Viewpoint no.	Viewpoint description	Approximate Coordinates
1	Springs Lane/Trent Valley Way, west of Sturton le Steeple	478491, 383876
2	Low Holland Lane, east of Sturton le Steeple	479442, 383938
3	Leverton Road, south of Sturton le Steeple	478765, 383615
4	Freeman's Lane, west of Sturton le Steeple	478374, 384081
5	Gainsborough Road, north of Sturton le Steeple	478509, 384853
6	Footpath Sturton le Steeple FP17	479147, 384548
7	Footpath West Burton FP1	479530, 384969
8	Cross Common Lane/ Restricted Byway Sturton Le Steeple RB32	480121, 384423

Viewpoint no.	Viewpoint description	Approximate Coordinates
9	Upper Ings Lane/ Restricted Byway Sturton le Steeple RB33	481836, 384253
10	Trent Valley Way, Junction of Littleborough Road and Thornhill Lane	481470, 383062
11	Trent Valley Way, Littleborough Road – White Bridge	481988, 382775
12	Thornhill Lane	481318, 382617
13	Trent Valley Way/ Fenton Lane, Fenton	479309, 383032
14	Three Leys Lane – Junction with Leverton Road	478669, 383127
15	Footpath North Leverton with Habblesthorpe FP24	478295, 382207
16	Junction of Magpie Lane and Northfield Road, North Leverton with Habblesthorpe	479458, 382257
17	Dog Holes Lane	477954, 382954
18	High House Road/Trent Valley Way	477236, 383574
19	North Leverton with Habblesthorpe FP24, near North Leverton windmill	477487, 382026
20	Trent Valley Way, north of Maumhill Wood	476247, 383632
21	Trent Valley Way, Muspit Lane	475741, 384856
22	South Wheatley, St Helen's Churchyard	476676, 385469
23	Public Footpath, North Wheatley FP1	475982, 387374
24	A620, near Bole Fields	478094, 387137
25	A631, west of Beckingham	476136, 390169
26	Public Footpath, Sturton Le Steeple FP8	481243, 385588

Supporting Visual Material

7.4.19 It is proposed that the LVIA be accompanied by visualisations of the proposals to illustrate the view from several of the viewpoints in the area surrounding the Site. We welcome comments from consultees on the locations of the visualisations.

7.4.20 The visualisations would be undertaken using landscape institute guidance, namely 'Visual Representation of Development Proposals, Technical Guidance Note 06/19, September 2019'. Visualisations would be produced during two different time periods at both Year 1 and at Year 15 with the benefit of maturing vegetation.

7.5 Cumulative Effects

7.5.1 An assessment of the potential for cumulative landscape and visual effects shall be undertaken. It is proposed that this would consider all consented or proposed energy based schemes within 10km of the Site boundary, along with other non-energy developments, where relevant to potential cumulative landscape and visual effects.

7.6 Preliminary Discussions of Potential Mitigation and Enhancement Measures

7.6.1 Mitigation measures may include:

- Avoidance of effects;
- Reduction in magnitude of effects; and
- Compensation for effects (which may include enhancements to offset any adverse effects).

7.6.2 The primary mitigation adopted in relation to landscape and visual matters is likely to be embedded within the design of the Proposed Development and will comprise the consideration given to avoiding and minimising landscape and visual effects during the evolution of the Proposed Development layout. This is sometimes referred to as 'mitigation by design'.

7.6.3 In addition, as part of the Proposed Development, areas of new mitigation planting would be introduced. Newly planted vegetation takes a number of years to mature and average growth rates shall be taken into consideration in the assessment. The effectiveness of vegetation would improve over time (both in terms of integrating

the development into the surrounding landscape and in providing visual screening) and this shall be considered appropriately. Consideration to local landscape character and vernacular would be taken account of, to avoid creating landscape features which are not apparent in the locality.

8. Ecology & Biodiversity

8.1 Introduction

8.1.1 The Ecology and Biodiversity chapter of the ES will consider the likely effects of the Proposed Development on relevant ecology features during construction, operation and decommissioning phases. The ecological features to be considered include:

- Statutory and non-statutory sites designated for biological / nature conservation interest at local, national and international levels;
- National and local priority habitats and species; and
- Protected species.

8.1.2 The Ecology and Biodiversity chapter will present the results of desk-based and field surveys, confirm features to be scoped in or out of assessment, evaluate ecological features and assess likely effects upon these features. It will also set out proportionate avoidance, mitigation, compensation and enhancement measures with reference to relevant nature conservation legislation and planning policies.

8.1.3 The collection of ecological baseline information at the Site commenced in 2023 and will continue through 2024. Summary results of the ecological work undertaken to date are presented as appendices to this chapter, including:

- **Appendix 8A: Designated Sites**
- **Appendix 8B: Habitat Survey**
- **Appendix 8C: Breeding Bird Characterisation Survey**
- **Appendix 8D: Wintering Bird Characterisation Survey**

8.1.4 This section of the scoping report also presents reasoning for the proposed scoping out of any biodiversity features from the ES.

8.1.5 For ease of reference the following will be terms referred to within the Ecology Chapter to define areas within the Site:

- Proposed Solar Areas: areas within the Site which have been provisionally identified for locating the solar panels, battery storage and other associated infrastructure.

- Biodiversity Mitigation Areas (Eastern and Western): areas of the Site that would not be used for development, and provisionally identified for use as biodiversity mitigation and enhancement.

8.2 Preliminary Baseline Conditions

8.2.1 The Site is located around the village of Sturton le Steeple (as shown on **Figure 1.1**) in a rural landscape characterised by agricultural land with occasional villages and individual properties. West Burton Power Station is located adjacent to the north of the Site and the River Trent bounds the Site to the east. Agricultural land is located to all aspects of the Site.

8.2.2 The Site extends to approximately 943.4 hectares and comprises primarily large arable fields with boundary hedgerows and individual trees. There is a network of ditches and drains present and several ponds and waterbodies. There are occasional small woodland blocks, grassland pasture fields, and agricultural buildings.

8.2.3 The following ecological work has been undertaken to date:

- Desk study. Refer to **Appendix 8A** for details on designated sites;
- Extended habitat survey of all land within the Site was completed in January, February and March 2023. Methodology and summary results are presented in **Appendix 8B**;
- Breeding bird characterisation surveys. Five morning surveys completed one per month between March and July 2023, and one dusk / crepuscular survey in June 2023. Methodology and summary results are presented in **Appendix 8C**; and
- Wintering bird characterisation surveys. Completed one per month between October 2023 and March 2024. Methodology and summary results of the October to December surveys are presented in **Appendix 8D**. The January to March results are currently being digitised and have not been presented within this document.

Study Area

8.2.4 The extent of the ecological study area has been informed by published guidance, professional judgement and scoping responses from the Planning Inspectorate on other nearby solar NSIPs.

8.2.5 The Study Area methodology for the Desk Study is detailed within **Appendix 8A**. The Study Area for ecology field surveys undertaken for the Proposed Development are set out in **Table 8.1** below.

Statutory Sites

8.2.6 Within the search areas, there are five biological SSSIs, four SACs, one SPA and one Ramsar site). **Appendix 8A** and **Figures 8.A.1 to 8.A.3** present further details on the locations and designation reasons of these sites.

International Designated Sites

8.2.7 The nearest internationally designated site is Birklands and Bilhaugh SAC which is 17km from the Site. It is designated for the Annex I habitat 'old acidophilous oak woods' and is notable for its rich invertebrate fauna, particularly spiders, and for a diverse fungal assemblage.

8.2.8 Thorne and Hatfield Moors SPA is located 19.5km from Site. It is designated for its populations of European nightjar *Caprimulgus europaeus*, which is closely associated with lowland heathland and felled or recently planted conifer plantations.

8.2.9 The Humber Estuary Ramsar is located 26.5km from the Site, which supports internationally important assemblages of passage and wintering waders and waterfowl, as well as supporting aquatic and marine species.

Nationally Designated Sites

8.2.10 Clarborough Tunnel SSSI is located approximately 40m from the Site's southern boundary and is notified for its unimproved calcareous grassland. The Site falls within the Impact Risk Zone (IRZ) of Clarborough Tunnel SSSI.

Non-statutory Sites

8.2.11 There are 32 non-statutory designated sites and two ancient semi-natural woodlands (ASNW) or plantations on ancient woodland sites (PAWS) within the search area. Summary details of the non-statutory designated sites and ancient woodlands within the search area are provided in **Appendix 8A**.

8.2.12 There are five Sites of Importance for Nature Conservation (SINCs) that are located wholly, or partially, within the Site boundary, which include: Out Ings, Littleborough Lagoons, Mother Drain, Thornhill Lane Drain and Blue Stocking Lane. There are two SINCs (West Burton Meadow and High House Road Verges) which are off-site but adjacent the boundary. Clarborough Tunnel SINC (which is also notified as a SSSI)

is located 40m to the south of the Site. All other non-statutory designated sites and ASNW or PAWS are located over 130m from the Site.

Habitats

8.2.13 The habitats within the Site are primarily cropland bound by managed native species hedgerows or drainage ditches. The cropland was primarily winter stubble during the January to March 2024 walkovers, with signs of being sown with cereal crops during the previous summer. The Site is typical of agricultural farmland; it has areas of pasture, grassland leys, and occasional areas sown with game cover mixes.

8.2.14 Several small blocks of woodland are present, and a traditional orchard is present in the north of the Site.

8.2.15 There are areas of permanent grassland, typically forming arable field margins and the banks of drains, and also several parcels of modified and neutral grassland. Blue Stocking Lane SINC is located partially within the Western Biodiversity Mitigation Area and is designated in part for species-rich grassland along a bridleway.

8.2.16 Several small ponds are present at the Site. There are two larger waterbodies present in the Eastern Biodiversity Mitigation Area which are designated as SINCs (Out Ings and Littleborough Lagoons). Further survey is required to determine the status of the waterbodies (such as whether they qualify as priority habitats). There is a network of watercourses within the Site, including drains and wet ditches, some of which are designated as SINCs (Mother Drain and Thornhill Lane Drain). The River Trent is present directly to the east of the Site. An area of land in the east of the Site adjacent the River Trent is subject to occasional flooding and may be floodplain wetland mosaic and coastal and floodplain grazing marsh (CFGM), but is currently mapped as its constituent sub-habitats (lakes, ponds, ditches, willow scrub, modified grassland, other neutral grassland, ruderal vegetation) for the purpose of this assessment until further survey work has been completed.

8.2.17 The Site contains a large network of native species hedgerows, many of which contain semi-mature and mature trees and have grassland margins. Many of the hedgerows also contain a drainage ditch. Some of the hedgerows are likely to meet the criteria of ‘important hedgerows’ against the wildlife and landscape criteria in the Hedgerow Regulations 1997.

8.2.18 Within and adjacent to the Site there are habitats which meet the description of Habitats of Principal Importance (HPIs)[15] in Maddock (2011)[16] (or they are likely to pending the outcome of further surveys). These include: native hedgerows, woodlands, rivers, standing water / ponds, arable field margins, traditional orchards and coastal and floodplain grazing marsh.

8.2.19 The type, extent and distribution of habitats within the Site were mapped during the habitat survey work and are shown on **Figures 8.B.1 to 8.B. 6**. Further details are provided within **Appendix 8B**.

Protected / Notable Species

8.2.20 Desk study records have been received for protected and notable species. An initial review has been undertaken of these data to aid scoping. Full details will be provided within future application documents.

Badger

8.2.21 [redacted]

Bats

8.2.22 There are records of various species of bat locally. The majority of the Site is open arable farmland of limited value for bats. The woodlands, hedgerows, dense scrub, waterbodies and watercourses provide more suitable bat foraging and commuting habitat and there is habitat connectivity with suitable habitat within the surrounding landscape in all directions. It is likely that the better habitat at the Site is used by a range of bat species for foraging and commuting.

8.2.23 There is a large number of mature trees and several buildings that have potential to support roosting bats.

Breeding Birds

8.2.24 Records of various bird species locally were returned and there is suitable nesting habitat for birds within hedgerows, woodland and trees; and the larger arable fields have suitability for ground nesting species such as skylark *Alauda arvensis*.

[15] The IRZs define zones around each site which reflect the sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts (Natural England, 2019).
[16] Maddock, A. (ed.) (2011) 'UK Biodiversity Action Plan; Priority Habitat Descriptions'.

8.2.25 The breeding bird characterisation surveys in 2023 identified a range of typical farmland bird species within the Proposed Solar Areas. This included red-listed species of conservation concern and Species of Principal Importance (SPI) under Section 41 of the Natural Environment and Rural Communities Act 2006 including skylark that were widespread throughout the Site. Assessment of the 2023 breeding bird survey work is ongoing. To date only skylark territories have been mapped and these are presented on **Figure 8.C.2a-h** in **Appendix 8C**. Results of the 2023 and 2024 surveys will inform the EIA. Details of the 2023 breeding bird survey methodology and summary results are presented in **Appendix 8C**.

8.2.26 A total of 149 skylark territories were recorded during the 2023 surveys, typically on arable habitats. Of these, 115 were in the areas identified for the Proposed Solar Areas, 17 in the Biodiversity Mitigation Areas, and 17 are outside of the current Site boundary. These totals are likely an underestimate due to the restricted access in certain areas of the Site; this limitation will be addressed by further breeding bird survey work that is being undertaken between March and July 2024. Yellow wagtail *Motacilla flava* (an SPI and red-listed species) was the only other ground nesting species recorded that is considered likely to breed at the Site. Curlew *Numenius arquata* was recorded during the 2023 survey work but was not considered likely to be breeding within the survey area.

8.2.27 A total of 48 species were recorded on Site during March to July 2023. This included barn owl, listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), for which there are suitable trees, nest boxes and buildings that may be used for nesting. Eight recorded species are 'red list' species of conservation concern (curlew, greenfinch *Chloris chloris*, linnet *Linaria cannabina*, grey partridge *Perdix perdix*, skylark, starling *Sturnus vulgaris*, yellowhammer *Emberiza citrinella*, yellow wagtail) and a further 18 species are 'amber list' species.

Wintering birds

8.2.28 Local records of various wintering birds were returned. Survey work was undertaken from October 2023 to March 2024. The results from the October to December 2023 Surveys have been digitised and tabulated within **Appendix 8D**. The remaining survey data are pending analysis and digitisation.

8.2.29 The results of the surveys will be presented to show the breakdown of species present within the Proposed Solar Areas, the Western Biodiversity Mitigation Area and the Eastern Biodiversity Mitigation Area (refer to **Appendix 8D**). The

Conservation Status has been considered with reference to Birds of Conservation Concern red lists and amber lists[17].

8.2.30 A total of 58 bird species were recorded within the Proposed Solar Areas from October to December 2023. These included a variety of species, of which 15 are 'red list' and a further 20 are 'amber list'.

8.2.31 Compared to the Proposed Solar Areas, an additional 27 species were recorded within the Eastern Biodiversity Mitigation Area, which had a total of 57 species recorded overall. This area supports a greater diversity of wetland birds and waders than does the Proposed Solar Area. Of the additional 27 species in the Eastern Biodiversity Mitigation Area, six are 'red list' species (dunlin *Calidris alpina*, hen harrier *Circus cyaneus*, house sparrow *Passer domesticus*, lapwing *Vanellus vanellus*, mistle thrush *Turdus viscivorus*, and pochard *Aythya ferina*) and nine are amber list species (refer to **Appendix 8D** for the full list).

8.2.32 The Western Biodiversity Mitigation Site had a total count of 28 species observed from October to December 2023. The majority were also observed in the Proposed Solar Areas; there were three species in the Western Biodiversity Area not being recorded within the Proposed Solar Areas- house sparrow, long-tailed tit *Aegithalos caudatus*, and mistle thrush.

Great crested newt

8.2.33 A data search for records of protected and notable species was requested from Nottinghamshire Biodiversity Records Centre (NBRC) and Lincolnshire Environmental Records Centre (LERC) in March 2024. The desk study returned records of great crested newt within the search area.

8.2.34 There are several ponds / areas of standing water within the Site which may provide suitable breeding habitat for great crested newt *Triturus cristatus*. The drains, streams and wet ditches are likely to be unsuitable breeding habitat for great crested newt due to factors including one or more of: the flow of the water, shallow water depth, limited presence of aquatic or marginal vegetation and presence of fish. There are further off-site waterbodies within 250m of the Site that may provide suitable breeding habitat for great crested newt.

[17] Eaton, M.A., et al. (2021). 'The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain'. British Birds 114: 723-747

8.2.35 Potential terrestrial (non-breeding) habitats are present at the Site, such as hedgerows, arable field margins, scrub, woodland and grasslands. Arable habitats are considered to be sub-optimal terrestrial habitat.

Water vole

8.2.36 The desk study returned records of water vole *Arvicola amphibius* within the search area.

8.2.37 There are numerous ditches, drains and other waterbodies at the Site that have suitability for water vole, and which are well connected to wider landscape and River Trent.

Otter

8.2.38 The desk study returned records of otter *Lutra lutra* within the search area.

8.2.39 There are numerous ditches, drains and other waterbodies that have suitability for foraging and commuting otter, and which are well connected to wider landscape and River Trent.

8.2.40 There are some terrestrial habitats that may potentially offer suitable places for rest / shelter, including holts, such as hollow tree stumps adjacent to watercourses, dense flood debris, woodland and dense scrub.

Reptiles

8.2.41 The desk study returned records of reptile species within the search area.

8.2.42 The arable and grassland pasture fields at the Site are low suitability habitat for reptiles due to the limited vegetation cover and levels of disturbance from agricultural management. The field margins, ditches, hedgerows, ponds and the edges of the woodland and dense scrub are more suitable. Some of these habitats are well-connected to off-site habitats with high suitability for reptiles such as the railway line and River Trent corridor.

Terrestrial invertebrates

8.2.43 As set out in paragraph 8.2.33, a data search for records of protected and notable species was undertaken in March 2024. The desk study returned records of various invertebrate species within the search area.

8.2.44 The arable habitats within the Site are common and widespread in the local area and are unlikely to be of high importance for notable invertebrate species as pesticides are likely to be regularly applied.

8.2.45 There are several dead trees and many large trees in hedgerows that provide a resource of deadwood, potentially of value for a range of saproxylic invertebrates. Some arable margin grasslands may have suitability where these are flower-rich, or where they included areas of bare ground.

Aquatic invertebrates

8.2.46 The desk study returned records of invertebrates within the search area. Thornhill Lane Drain and Mother Drain SINCs are partially located within the Site and are designated for notable aquatic invertebrate species.

8.2.47 There are aquatic habitats present at the Site that have the potential to support notable aquatic invertebrate species and assemblages; such habitats may include flowing ditches / drains, and areas of standing water.

Other species

8.2.48 The terrestrial Site habitats have some suitability for SPI such as brown hare Lepus europaeus, hedgehog *Erinaceus europaeus*, harvest mouse *Micromys minutus* and polecat *Mustela putorius*. The waterbodies and wet ditches may support common toad *Bufo bufo* which is an SPI.

Survey scope

8.2.49 **Table 8.1** below sets out the proposed survey scope for ecological features. The scope of the surveys may be modified following the results survey work and / or consultation with stakeholders.

8.2.50 In summary, it is anticipated that the following further surveys will be undertaken:

- Terrestrial habitat
- Hedgerows
- Flowing watercourses - wet ditches and drains
- Standing waterbodies – ponds
- Breeding birds
- Barn owl
- Bats – roosts
- Bats – activity (foraging / commuting)
- Great crested newt

- Badger
- Water vole
- Otter
- Reptile
- Terrestrial invertebrates
- Aquatic invertebrates

Table 8.1: Summary of the proposed ecology surveys to be undertaken.

Feature	Study Area	Methodology
Terrestrial habitats	The Site. Significant effects unlikely beyond this zone.	UK Habitat Classification Definitions[18]. Habitat types and conditions to be recorded to enable completion of the Statutory Biodiversity Metric. Hedgerow Survey Handbook[19] to allow assessment of importance against the wildlife and landscape criteria as specified in The Hedgerows Regulations 1997. This work will be undertaken May to August to address the seasonal limitations of the habitat survey work completed January to March 2024. A search for invasive non-native species will also be undertaken.
Aquatic habitats	The Site. Significant effects unlikely beyond this zone.	Condition assessments in line with the Statutory Biodiversity Metric User Guide[20] and its technical annex [21]. Watercourses that require 'river condition assessment' will be

[18] UKHab Ltd (2023). 'UK Habitat Classification Version 2.0'. Available at https://www.ukhab.org
[19] Defra (2007). 'Hedgerow Survey Handbook. A standard procedure for local surveys in the UK'. Defra, London.
[20] Defra (2024) 'Statutory Biodiversity Metric: User Guide'. Natural England.
[21] Defra (2024) 'Statutory Biodiversity Metric- Technical Annex 1- Condition Assessment Sheets and Methodology'. Natural England.

Feature	Study Area	Methodology
		subject to Modular River Physical (MoRPh) survey in accordance with Modular River Survey guidance[22]. A search for invasive non-native species will also be undertaken.
Breeding birds	The Site and immediate surrounding areas. Significant effects from construction phase disturbance are possible close to the Site. Off-site areas will be surveyed from the Site boundary unless the land is within the same ownership as the on-site areas.	Five morning surveys to be completed, one per month between March and July 2024, and one dusk / crepuscular survey in June 2024. Methods with reference to Gilbert et al (1998)[23] and the Bird Survey & Assessment Steering Group (2023)[24]. This work will be undertaken to supplement the 2023 breeding bird survey work and address the access limitations.
Barn owl	The Site and up to 50m off-site (where access can be secured). Given the additional protection afforded to barn owl nest sites, consideration of off-site nesting locations would allow potential indirect impacts to be assessed / mitigated.	Ground level inspection of all trees and buildings within the Proposed Solar Areas (i.e., areas impacted by the solar and associated infrastructure) for their suitability for nesting and roosting barn owl with reference to Shawyer (2012)[25]. This work is being undertaken between January and April 2024. Depending findings and risk to the features, further surveys may be required to

[22] Modular River Survey (2022) 'The MoRPh Survey Technical reference Manual 2022 Version'. Updated by Angela Gurnell and Lucy Shuker.
[23] Gilbert, G., Gibbons, D.W. & Evans, J. (1998). 'Bird Monitoring Methods'. RSPB.
[24] Bird Survey & Assessment Steering Group. (2023). 'Bird Survey Guidelines for assessing ecological impacts, v.1.1.1'. Available at https://birdsurveyguidelines.org
[25] Shawyer, C. R. (2011) 'Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment: Developing Best Practice in Survey and Reporting'. IEEM, Winchester.

Feature	Study Area	Methodology
	Significant effects beyond this zone are unlikely.	determine whether nesting barn owl are present or likely absent. Trees within Biodiversity Mitigation Areas (Eastern and Western) will not be surveyed as they are likely to be retained and unaffected.
Bat – activity	The Site. Significant effects unlikely beyond this zone.	Bat activity survey work will be undertaken with reference to industry bat survey guidance[26] and based on a 'moderate' habitat suitability. It is comprised of two survey methods: 1) Night-time bat walkover survey. One survey to be completed in spring (April / May), summer (June – August) and autumn (September / October) 2024. Currently proposed that five routes will be sampled across representative habitats. 2) Remote bat detector survey. Monthly surveys between April and October, deploying remote bat detectors for a period of at least five nights per month. It is currently proposed that 18 recording locations will be sampled across representative habitats. Surveys will not be undertaken in the Biodiversity Mitigation Areas (Eastern and Western) as there will not be any negative effects on bat foraging / commuting habitats.

[26] Collins, J. (ed.) (2023) 'Bat Surveys for Professional Ecologists: Good Practice Guidelines, 4th Edition', Bat Conservation Trust, London

Feature	Study Area	Methodology
Bats – roosts	The Site and up to 50m off-site (where access can be secured). Consideration of off-site roost locations would allow potential indirect impacts to be assessed / mitigated. Significant effects unlikely beyond this zone.	Ground level inspection of all trees and buildings within the Proposed Development areas (i.e., areas impacted by the solar and associated infrastructure) for their suitability for roosting bats. The survey work will be undertaken with reference to industry bat survey guidance. This work is being undertaken between January and April 2024. Depending on the findings of this survey and risk to the features, further surveys may be required to determine whether bat roosts are present or likely absent. Surveys will not be undertaken in the Biodiversity Mitigation Areas (Eastern and Western) as there will not be any negative effects on bat foraging / commuting habitats.
Great crested newt	The Site and up to 250m off-site (where access can be secured). Significant effects unlikely beyond this zone.	Waterbodies within the Site and up to 250m off-site will be assessed for their suitability to supporting great crested newt using the Habitat Suitability Index (HSI) assessment [27]. This work is likely to be undertaken April / May 2024. Where suitable breeding waterbodies are identified during the HSI assessment, they will be subjected to an eDNA survey with reference to industry standard

[27] ARG UK, (2010). 'Advice Note 5: Great Crested Newt Habitat Suitability Index'. Amphibian and Reptile Groups of the United Kingdom

Feature	Study Area	Methodology
		methodology[28]. eDNA survey can be undertaken 15 April to 30 June.
Badger	The Site and up to 50m off-site (where access can be secured). Significant effects unlikely beyond this zone.	A badger survey of the survey areas will be completed with reference to industry standard survey methodology such as Harris et al (1989)[29] and Neal and Cheeseman (1996)[30]. Badger survey can be undertaken throughout the year, although winter / early spring most effective to find sets when vegetation cover is lower. Evidence of badger was recorded during the extended habitat survey in January / February 2024. Badger field signs will be collected during various other field surveys through 2024.
Water vole	The Site and up to 10m off-site (where considered to be appropriate and access can be secured).	Suitable habitat for water vole will be surveyed for presence / likely absence of the species with reference to industry standard survey methodology such as Dean (2021)[31] and Strachan and Moorhouse (2006)[32]. Two separate survey visits required, one early season (May / June) and one later season (July / August / September); each

[28] Biggs J., Ewald N., Valentini A., Gaboriaud C., Griffiths R.A., Foster J., Wilkinson J., Arnett A., Williams P., and Dunn F. (2014). 'Analytical and methodological development for improved surveillance of the Great Crested Newt'. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA. Freshwater Habitats Trust, Oxford.
[29] Harris et al, (1989). 'Surveying Badgers'. The Mammal Society, London.
[30] Neal, E., and C. Cheeseman (1996) 'Badgers'. T & AD Poyser Natural History Ltd, London.
Nottinghamshire Dormouse Group (2020). 'Nottinghamshire's Dormice'. Available at https://nottsdormousegroup.uk/nottinghamshires-dormice/
[31] Dean, M., (2021). 'Water Vole Field Signs and Habitat Assessment: A Practical Guide to Water Vole Surveys'. Pelagic Publishing.
[32] Strachan, R., and Moorhouse, T., (2006) 'Water vole conservation handbook 2nd Edition'. Wildlife Conservation Research Unit, Oxford.

Feature	Study Area	Methodology
		survey visit will be timed at least two months apart.
Otter	The Site and up to 100 m off-site (where considered to be appropriate and access can be secured).	Suitable waterbodies and terrestrial habitat will be surveyed with reference to industry standard survey methodology such as Chanin (2003)[33] and Natural England (2014)[34]. This work can be undertaken at any time of year.
Reptiles	The Site. Significant effects unlikely beyond this zone.	Where suitable habitat for reptiles could be impacted by the Proposed Development, presence / likely absence surveys may be undertaken to inform mitigation. Depending on the extent of habitat affected, it may be possible to scope out reptile surveys and put precautionary measures in place to avoid killing / injury during construction. If undertaken, surveys would take place from April to October with reference to industry standard survey methodology such as Froglife (1999)[35]. April / May and September are typically optimal, although surveys can be undertaken between these periods during suitable weather conditions.
Terrestrial invertebrates	The Site. Significant effects unlikely beyond this zone.	A habitat assessment will be undertaken using desk-based resources and a walkover to identify and characterise any habitats

[33] Chanin, P., (2003). 'Monitoring the Otter Lutra lutra. Conserving Natura 2000 Rivers Monitoring Series No. 10', English Nature, Peterborough.
[34] Natural England (2014). 'Otters: surveys and mitigation for development projects.' Natural England and Department for Environment, Food & Rural Affairs, Worcester. Available at https://www.gov.uk/guidance/otters-protection-surveys-and-licences
[35] Froglife, (1999). 'Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10'. Froglife, Halesworth

Feature	Study Area	Methodology
		potentially suitable to support notable terrestrial invertebrate assemblages. This would be undertaken April to June 2024. The survey and assessment would be undertaken by an experienced entomologist using professional judgment. Where habitats that have potential to support notable invertebrate assemblages are present and could be significantly impacted by the Proposed Development, further survey may be undertaken. These would be completed with reference to the appropriate survey methodology for the invertebrate group(s).
Aquatic invertebrates including white-clawed crayfish	The Site. Significant effects unlikely beyond this zone.	A habitat assessment will be undertaken using desk-based resources and a walkover to identify any habitats potentially suitable to support notable terrestrial invertebrate assemblages. This would be undertaken April to June 2024. The survey and assessment would be undertaken by an experienced entomologist using professional judgment. Where habitats that have potential to support notable invertebrate assemblages are present and could be significantly impacted by the Proposed Development, further survey may be undertaken. These would be completed with reference to the appropriate survey methodology for the invertebrate group(s).

8.2.51 Other species are to be scoped out of further survey at this stage, but the potential for significant impacts to arise on these species will be considered as appropriate. Such species may include:

- Reptiles
- SPI mammals such as brown hare, harvest mouse, polecat and hedgehog.
- Fish

8.2.52 Dormouse will be scoped out of survey and assessment. No records of dormouse *Muscardinus avellanarius* were returned during the desk study. It is understood that this species was extinct in the county until reintroduction attempts were made within three woodlands in the 1990s and 2000s[36]; the nearest of these woodlands to the Site is located 2.6 km south. Monitoring by the Nottinghamshire Dormouse Group has shown that populations of dormice in these woodlands are now relatively stable, and monitoring work in the 2020s has shown that there is some evidence of modest dispersal to other suitable woodland habitats that are close by, and have good habitat connectivity, to the reintroduction sites. Habitats at the Site are considered to be sub-optimal for dormouse due to lack of suitable woodland habitats, and the unfavourable management of the hedgerows. The Site has poor habitat connectivity to known dormouse populations.

8.2.53 Wintering bird characterisation have been completed October 2023 to March 2024 and there were no significant limitations to the work. No further wintering bird survey work is proposed.

8.3 Likely Significant Effects

8.3.1 This section considers the potential effects of the Proposed Developed on ecology and biodiversity features.

8.3.2 Ecological effects will be characterised with reference to CIEEM (2018) guidelines.

Potential Impact Sources

8.3.3 The following types of impacts have been identified as potentially occurring during the various phases of the Proposed Development and which may result in significant effects.

[36] Nottinghamshire Dormouse Group (2020) Available online ttps://nottsdormousegroup.uk/nottinghamshires-dormice/

Construction

- Habitat loss. Agricultural land (arable and grassland pasture). Some minor loss of hedgerow and grassland field margins may occur.
- Habitat gains. Conversion of areas of arable land underneath solar arrays to permanent grassland. Habitat creation or enhancement elsewhere such as woodland and hedgerows.
- Temporary habitat loss. Arable farmland with crops to be cleared for construction processes (laydown areas and compounds) and hedgerow and field margins where underground cable routes cross.
- Habitat damage / degradation. Direct and indirect damage to retained features such as trees, and hedgerows adjacent to works from soil compaction or damage from vehicles. In combination with habitat loss is likely to result in displacement of ground nesting farmland birds such as skylark and yellow wagtail.
- Disturbance of species within the Site and in retained habitats adjacent to Site, from noise, light, vibration and the presence of vehicles and people.
- Damage, destruction, killing or injuring of ecology features such as badger setts and active bird nests.
- Contamination / pollution. Potential ground, water and air pollution from spillages, dust and vehicles.

Operational

- Fragmentation of habitats and species populations. Indirect impacts of the Proposed Development causing barrier effects to certain species such as from security fencing or installation of built infrastructure.
- Disturbance of species within the Site and in retained habitats adjacent to the Site, from noise, light and the presence of vehicles and people. This is likely to be infrequent and localised, and unlikely to be significant.
- Changes to foraging and commuting behaviours. Installation of solar arrays could result in avoidance / attraction to bats, birds, and invertebrate species.
- Beneficial effects from increased habitat diversity and reduction of pesticide application.

Decomissioning

8.3.4 Potential impacts during decommissioning are likely to be similar to those during construction. However, the Site's biodiversity baseline will have changed during the operational phase and would be likely to support a range of habitats and species requiring consideration. Further survey work would be required in advance of decommissioning to determine the baseline and provide appropriate recommendations for mitigation / compensation.

Consideration of Effects

8.3.5 The majority of the impacts will arise during the construction and decommissioning stages. During the operational phase limited impacts are envisaged, however these will be considered. Preliminary mitigation and enhancement measures are outlined in Section 8.6 of this chapter. All mitigation measures will be included in a Construction Environmental Management Plan (CEMP) or similar document. Creation of new habitat areas and enhancement of retained areas would be included in a Landscape and Ecological Management Plan (LEMP) or similar document.

Statutory Designated Sites

8.3.6 Due to the nature of the Proposed Development, the location of the Site and its separation from the internationally designated sites, direct impacts for example as a result of land-take or indirectly, for example as a result of pollution, are highly unlikely. The breeding and wintering bird surveys undertaken in 2023 / 24 have not identified any significant activity at the Site from qualifying bird species of the European sites. The initial assessment is that the Site is not functionally linked to the internationally designated sites, i.e., it is not likely to provide an important role in maintaining or restoring the population of qualifying species at favourable conservation status. It is highly unlikely that any significant adverse effects will occur indirectly to statutory sites at any phase of the Proposed Development. A formal report to inform a Habitats Regulations Assessment will be provided as part of the application process.

8.3.7 Clarborough Tunnel SSSI is located adjacent the Sites southern boundary and has been notified due to its calcareous grassland. The areas within the Site adjacent the SSSI have been identified for biological mitigation, and the nearest area of development is over 750m from the SSSI. Due to the nature of the Proposed

Development and the distance from areas of development within the Site, there will be no direct or indirect impacts to Clarborough Tunnel SSSI.

8.3.8 All other nationally designated sites are located over 1.6km from the Site, and there would be no direct or indirect impacts upon them.

8.3.9 Residual effects on statutory designated sites are considered likely to be neutral. Effects on statutory designated sites are **scoped in** to the EIA.

Non-statutory Designated Sites

8.3.10 There are six non-statutory designated sites either wholly or partially within the Site, and three within 100m. These include terrestrial and wetland habitats. No direct impacts in terms of habitat loss are expected as these will be retained and buffered where these are located within, or adjacent to the development areas.

8.3.11 Measures will be implemented during all development phases to prevent accidental damage such as by encroachment of vehicles, or accidental pollution from on Site works. These features will be identified and protected through semi-natural habitat buffers and appropriate fencing and signage.

8.3.12 The changes in land management, and reduction of agricultural chemical use and run-off into watercourses and waterbodies will be of benefit to the non-statutory designated sites that are hydrologically connected to the Site. Enhancements to the non-statutory sites within the Site will be considered.

8.3.13 Residual effects on non-statutory designated sites are considered likely to be neutral, and with the potential for beneficial effects. Effects on non-statutory designated sites are **scoped in** to the EIA.

Habitats

8.3.14 Notable habitats (such as HPIs, mature and veteran trees) within the Site will be a priority for retention. These will largely be retained with the exception of minor loss of hedgerows to facilitate access routes and cable corridors, where these cannot utilise existing gaps (such as field gateways). Some hedgerow loss could also occur to facilitate the substation, BESS and associated infrastructure. Where appropriate the HPIs will be enhanced with additional planting to increase the extent and diversity of the habitat, such as by infilling hedgerow gaps with diverse species planting, or by improving habitat structure such as adding scrub areas with an informal edge adjacent to woodlands.

8.3.15 Habitat loss will be largely limited to arable fields which will be converted to grassland under the solar arrays. It is expected that there will be some permanent loss of arable and grassland habitat for the installation of solar array footings, internal access routes and for the substation, BESS and associated infrastructure. Arable and modified grassland pasture are of low intrinsic ecological value.

8.3.16 It is expected that improved management of retained habitats, such as hedgerows and woodland can also be delivered and this would have biodiversity benefits.

8.3.17 Opportunities for landscape-scale habitat connectivity improvements will be explored that could be delivered through structural habitat creation such hedgerows, woodland and scrub.

8.3.18 Measures to enhance the overall biodiversity of the Site will be implemented. Biodiversity Net Gain will be addressed in a separate report.

8.3.19 Residual effects on habitats are considered likely to be neutral, and with the potential for significant beneficial effects. Effects on habitats are **scoped in** to the EIA.

Badger

8.3.20 The Proposed Development will retain the habitats of highest value as a foraging resource for badgers, such as woodland, field margins and hedgerows. The locations of any setts will be considered and either retained within an appropriate buffer or be closed under an appropriate licence. The number of setts to be closed will be limited and priority for retention will be given to the more significant setts, such as main setts.

8.3.21 Suitable gaps to allow badgers to pass through security fencing will be incorporated. This will also benefit other mammal species such as brown hare. The habitat creation and enhancements will increase the amount of foraging habitat for badgers, including the extent of permanent grassland (a more favourable habitat for foraging than arable land).

8.3.22 Residual effects on badger are considered likely to be neutral, and with the potential for beneficial effects overall. Effects on badger are **scoped in** to the EIA.

Bats

8.3.23 Trees and buildings with confirmed and potential roosts will be a priority to be retained and protected through semi-natural habitat buffers. Where impacts

cannot be avoided, appropriate mitigation / compensation will be implemented, under licence from Natural England if necessary.

8.3.24 The retention of habitats with increased suitability for foraging and commuting bats such as hedgerows, trees, woodland, watercourses and scrub will largely be retained to ensure continued habitat connectivity within the Proposed Development. Additional planting will also increase habitat corridors and strengthen existing ones.

8.3.25 Habitat changes on the Site will be from arable farmland to permanent grassland with less intensively managed hedgerows and more diverse margins, benefitting bat species in terms of foraging resources.

8.3.26 Where artificial lighting is required, further mitigation may be required such as the avoidance of light spill onto foraging / commuting habitats and potential / confirmed roost locations.

8.3.27 Residual effects on bats are considered likely to be neutral, and with the potential for beneficial effects overall. Effects on bats are **scoped in** to the EIA.

Birds

8.3.28 The majority of the breeding bird interest within the Proposed Development area at the Site is currently associated with hedgerow, scrub and woodland. As these are to be retained and buffered and enhanced by providing higher value supporting habitat such as diverse grassland and additional scrub, the majority of breeding bird species will benefit from the Proposed Development, resulting in a beneficial effect.

8.3.29 Ground nesting birds, particularly skylark and yellow wagtail, are likely to be displaced from the Proposed Solar Areas. Skylark is known to continue foraging in operational solar farms but is not considered to typically nest in the array areas. Mitigation will be put in place to enhance the value of retained habitats or newly created habitats for the species, particularly within the Biodiversity Mitigation Areas. This may include creation of tussocky grassland with a range of sward height and bare patches, and the introduction of more favourable agricultural land management to increase skylark nesting densities.

8.3.30 Where barn owl nest and roost locations are identified in trees and buildings, these will be a priority to be retained and protected through semi-natural habitat buffers. Where impacts cannot be avoided, appropriate mitigation / compensation will be

implemented. The general site habitat creation strategy and increase in grassland resource will be of benefit to foraging barn owls.

8.3.31 Further mitigation measures will be required to avoid impacts to active bird nests during construction / decommissioning at certain times of year.

8.3.32 The habitats within the biodiversity mitigation areas support a range of breeding and wintering bird species, particularly the eastern mitigation area adjacent to the River Trent; these habitats would be retained and opportunities for enhancement explored.

8.3.33 The magnitude of the effect upon displaced breeding ground nesting bird species will depend on the extent of the Proposed Solar Areas within the Site resulting in the removal or change of use of suitable habitats; it is possible that adverse effects will not be fully mitigated. Residual effects on other bird species are considered likely to be neutral, and with the potential for beneficial effects overall. Effects on birds are **scoped in** to the EIA.

Amphibians

8.3.34 Great crested newt surveys of suitable on and off-site waterbodies within the survey areas will inform the details of any specific mitigation or licences needed. The presence of common toad within the Site can be assumed as likely within areas of standing water.

8.3.35 Aquatic habitat and adjacent terrestrial habitats are likely to be to be retained and incorporated into semi-natural habitat buffers that will protect them from direct or indirect impacts.

8.3.36 Arable fields that form the majority of the Site habitats are sub-optimal for great crested newt and other amphibian species. Suitable terrestrial habitats present at the Site include hedgerows, scrub, grassland (including arable field margins) and woodlands. Damage to small areas of suitable terrestrial habitat may occur during construction. Similar impacts to larger areas of suitable terrestrial habitats (those that have been created) may occur during decommissioning.

8.3.37 The habitat creation proposals for the Site will result in an overall increase in value of the terrestrial habitats for all amphibian species that may be present. Enhancement for amphibians such as log and brash piles and hibernacula will also be considered.

8.3.38 Residual effects on amphibians are considered likely to be neutral, and with the potential for beneficial effects overall. Effects on great crested newt and common toad are **scoped in** to the EIA.

Reptiles

8.3.39 The majority of suitable reptile habitats would be retained, although damage to small areas of suitable habitat may occur during construction. The need for further survey or mitigation measures would be informed by the extent of suitable habitat to be impacted.

8.3.40 The proposed habitat enhancement and creation will benefit reptile species. Enhancement for reptiles, such as log and brash piles and hibernacula will also be considered.

8.3.41 Residual effects on reptiles are considered likely to be neutral, and with the potential for beneficial effects overall. Effects on reptiles are **scoped in** to the EIA.

Otters and water vole

8.3.42 Otter and water vole habitat will be largely retained and incorporated into appropriate semi-natural habitat buffers. If new vehicle access crossings are necessary over suitable habitats, appropriate mitigation measures, informed by survey work and professional judgement, would be implemented; this could include measures such as directional drilling for cabling beneath watercourses.

8.3.43 Otter and water vole habitat is likely to benefit from the changes in land management, and reduction of agricultural chemical run-off into watercourses and waterbodies. Opportunities for further aquatic / wetland habitats suitable for otter and water vole will be considered as part of the overall Site design.

8.3.44 Residual effects on otter and water vole are considered likely to be neutral, and with the potential for beneficial effects overall. Effects on otter and water vole are **scoped in** to the EIA.

Terrestrial Invertebrates

8.3.45 Terrestrial habitats that are likely to be of the highest value to invertebrates are largely to be retained and incorporated into semi-natural habitat buffers; this includes hedgerows, mature and veteran (if present) trees, woodlands, orchard, arable field margins. There may be minor impacts to some of these habitats, such as hedgerows to facilitate access routes, but impacts are unlikely to be significant due to the overall resource that would be retained.

8.3.46 The creation of new grassland habitats (including wildflower grassland) within and around the solar arrays, hedgerows and other habitats would benefit a range of invertebrate species. Woody material felled during hedgerow section removal would be retained and used to create log / brash piles within habitat buffers; this will benefit a range of invertebrate species.

8.3.47 Residual effects on terrestrial invertebrates are considered likely to be neutral, and with the potential for significant beneficial effects overall. Effects on invertebrates are **scoped in** to the EIA.

Aquatic invertebrates and fish

8.3.48 Aquatic habitats that are likely to be of the highest value to invertebrates and fish are likely to be retained and incorporated into semi-natural habitat buffers; this includes drains, wet ditches and waterbodies.

8.3.49 If new vehicle access crossings are necessary over suitable habitats, appropriate mitigation measures, informed by survey work (if considered necessary), professional judgement and the significance of any likely effect, would be implemented. This could include measures such as directional drilling for cabling beneath watercourses during construction.

8.3.50 Aquatic invertebrates and fish are likely to benefit from the changes in land management, and reduction of agricultural chemical run-off into watercourses and waterbodies. Opportunities for further aquatic / wetland habitats suitable for aquatic invertebrates and fish will be considered as part of the overall design.

8.3.51 Residual effects on aquatic invertebrates and fish are considered likely to be neutral, and with the potential for beneficial effects overall. Effects on aquatic invertebrates and fish are **scoped in** to the EIA.

Other SPI mammal species (hedgehog, polecat, harvest mouse, brown hare)

8.3.52 Habitats likely to be of the highest value to SPI mammal species that may be present at the Site such as hedgerows, grassland field margins, woodlands and scrub, will be retained and incorporated into semi-natural habitat buffers. Impacts to small areas of suitable habitat may occur during construction but are unlikely to lead to significant negative effects.

8.3.53 The creation of new grassland, hedgerows and other habitats would benefit a range of SPI mammal species. Woody material felled during hedgerow section removal

would be retained and used to create log / brash piles within habitat buffers; this will benefit to hedgehog by providing further areas of shelter and potential use for hibernation.

8.3.54 Residual effects on SPI mammals are considered likely to be neutral, and with the potential for beneficial effects overall. Effects on other SPI mammals are **scoped in** to the EIA.

8.3.55 **Table 8.2** provides a summary of the key issues to be considered in relation to biodiversity.

8.3.56 **Table 8.1: a summary of the potential effects to ecological features.**

Ecological feature	Scoped in / out	Potential likely significant effect
Statutory designated sites	In	Neutral
Non-statutory designated sites	In	Neutral, potentially beneficial
Habitats	In	Neutral, potentially beneficial
Badgers	In	Neutral, potentially beneficial
Bats	In	Neutral, potentially beneficial
Birds (non-ground nesting species)	In	Neutral, potentially beneficial
Birds (ground nesting species)	In	Adverse, potentially significant
Bats	In	Neutral, potentially beneficial
Amphibians	In	Neutral, potentially beneficial
Otter	In	Neutral, potentially beneficial
Water vole	In	Neutral, potentially beneficial
Reptiles	In	Neutral, potentially beneficial
Terrestrial invertebrates	In	Neutral, potentially beneficial
Aquatic invertebrates	In	Neutral, potentially beneficial

Fish	In	Neutral, potentially beneficial
SPI mammal species	In	Neutral, potentially beneficial
Dormouse	Out	None

8.4 Assessment Methodology

8.4.1 A qualitative and quantitative ecological impact assessment (EcIA) will be undertaken, following the principles set out in the CIEEM (2018) publication 'Guidelines for Ecological Impact Assessment in the United Kingdom'[37], and will include an assessment of cumulative effects, details of appropriate mitigation measures and details of any residual effects (should any exist following mitigation). Details of biodiversity enhancements will also be provided. The EcIA will be supported by technical survey reports detailing the baseline survey work undertaken.

8.4.2 Relevant legislation relating to habitats and species which has been considered in identifying potential ecological features for further considerations includes:

- Environment Act 2021[38]
- Natural Environment and Rural Communities (NERC) Act 2006[39]
- The Conservation of Habitats and Species Regulations 2017[40]
- Wildlife and Countryside Act 1981[41]
- Protection of Badgers Act 1992[42]
- The Hedgerow Regulations 1997[43]

[37] CIEEM (2018). 'Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2'. Chartered Institute of Ecology and Environmental Management, Winchester.
[38] Environment Act (2021). Available at https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted
[39] Natural Environment and Rural Communities Act (2006). Available at https://www.legislation.gov.uk/ukpga/2006/16/contents
[40] The Conservation of Habitats and Species Regulations 2017. Available at https://www.legislation.gov.uk/uksi/2017/1012/contents/made
[41] Wildlife and Countryside Act 1981 (as amended). Available at https://www.legislation.gov.uk/ukpga/1981/69
[42] Protection of Badgers Act 1992. Available at https://www.legislation.gov.uk/ukpga/1992/51/contents
[43] The Hedgerow Regulations 1997. Available at https://www.legislation.gov.uk/uksi/1997/1160/contents/made

8.5 Cumulative Effects

8.5.1 Cumulative effects of consented or emerging development projects in the area will be assessed with reference to EcIA guidance (CIEEM, 2018).

8.5.2 The assessment will consider the need for further mitigation or compensation for important ecological features, and any likely residual effects. Section 6 of this Scoping Report identifies the process and likely projects that will form the basis for the cumulative effects assessment.

8.6 Preliminary Discussions of Potential Mitigation and Enhancement Measures

8.6.1 Ecological input will be provided throughout the evolution of the Proposed Development by BSG Ecology. This input will be used to 'design-in' a range of primary ecological mitigation into the layout of the Proposed Development.

8.6.2 In order of priority, this approach will look to avoid impacts wherever possible, or to mitigate impacts or finally to compensate for impacts that cannot be avoided or mitigated. This will demonstrate that the ecology mitigation hierarchy has been employed in this scheme from inception. The biodiversity gain hierarchy and biodiversity net gain good practice principles[44] will also be considered.

The following measures that may be applicable during all development phases includes:

- Designed-in mitigation:
    - Retain and protect habitats and species that are of greater ecological value within appropriate buffers. The semi-natural buffers will ensure habitat connectivity is maintained throughout the Site and should avoid damage or disturbance to important ecological features. The width of the buffers would be informed by the outcome of survey work and following consultation with stakeholders.
    - Installation of protective fencing around sensitive important ecological features.

[44] Baker, J., Hoskin, R., and Butterworth, T. (2019). 'Biodiversity net gain. Good practice principles for development.' CIRIA, London

- Installation of mammal gaps in security fencing to allow access by badger and other SPI mammals.
- Standard measures for pollution prevention and dust management.
- Artificial lighting strategy.

- Additional mitigation for residual effects, some of which would be informed by the outcome of survey work:
  - Appropriate timing of certain works to avoid impacts on features, for example avoiding vegetation clearance during the bird nesting period.
  - Precautionary methods of working to avoid disturbance, damage, killing / injury, such as precautionary vegetation clearance methods in areas suitable for reptiles.
  - Submission of protected species licences, such as for bats, badgers, where impacts to avoid an offence under the relevant legislation cannot be avoided.

- Enhancements measures:
  - Habitat creation that could include wildflower grassland, species-rich hedgerows, woodlands, trees, scrub, aquatic habitats.
  - Habitat improvements such as infilling existing gaps in hedgerows, removal of non-native invasive species (if present), improvements to plant species diversity by additional planting / seeding in retained habitats,
  - Improved management of retained habitats, such as hedgerows, woodlands, aquatic habitats to improve their biodiversity value.
  - Installation of other wildlife features such as bat and bird boxes.

Consultation

8.6.3 There is a commitment to engage and consult with relevant stakeholders from the scoping stage onwards in relation to the scope of study for ecology and to identify appropriate biodiversity mitigation and enhancements for the Proposed Development. Relevant stakeholders are likely to include, but is not limited to,

Natural England, Environment Agency, local planning authorities, local wildlife trusts, and other environmental conservation bodies.

9. Hydrology, Hydrogeology, Flood Risk & Drainage

9.1 Introduction

9.1.1 This chapter sets out the proposed approach to the assessment of likely significant effects of the Proposed Development on Hydrology, Hydrogeology and Flood Risk. It considers the construction, operational and decommissioning phases of the Project. Specifically, this chapter will consider the likely effects on:

i. Hydrology including Main Rivers and Ordinary Watercourses;

ii. Surface water and groundwater quality, including consideration of the Water Framework Directive (WFD);

iii. Hydrogeology, including impacts on groundwater abstractions and Groundwater Dependant Terrestrial Ecosystems (GWDTEs);

iv. Water resources with regard to water usage; and

v. Flood risk from all sources.

9.2 Preliminary Baseline Conditions

9.2.1 An initial baseline assessment has been undertaken for the Site including a chosen buffer of 1km based on the likely zone of influence for hydrological, hydrogeological and flood risk impacts.

9.2.2 Reference to Ordnance Survey (OS) mapping suggests that the Site generally slopes from west to east, towards the River Trent. Levels along the eastern boundary are at approximately 3m AOD, rising gradually westwards towards the village of Sturton le Steeple at approximately 10m AOD, then rising more steeply to high ground at approximately 75m AOD along the western boundary.

9.2.3 OS mapping and the Environment Agency's (EA's) web-based mapping indicates that the nearest EA Main River is the River Trent which runs along the eastern Site boundary. It generally flows in a northerly direction, eventually discharging into the Humber Estuary at Blacktoft Sands approximately 38km north of the Site. A large flood storage area is located on the River Trent approximately 3km north (downstream) of the Site, to the west of Gainsborough.

9.2.4 OS mapping also identifies a number of Ordinary Watercourses crossing the Site, as shown in **Figure 9.1**. The EA categorise these watercourses as primary, secondary and tertiary rivers. Two primary rivers are shown within the Site. The first is the

Catchwater Drain which flows from south to north through the eastern part of the Site, discharging to the River Trent approximately 1km to the northeast of the Site. The second is the Mother Drain which flows from south to north just within the southeastern Site boundary, also discharging into the River Trent to the northeast of the Site. A significant number of unnamed secondary and tertiary rivers pass through the Site, generally flowing from west to east, and discharging into the Catchwater Drain or the Mother Drain.

9.2.5 The Ordinary Watercourses in the eastern half of the Site, including and to the east of the Catchwater Drain, are managed by the Trent Valley Internal Drainage Board (IDB). Those Ordinary Watercourses that do not fall under the IDB's jurisdiction are the responsibility of Nottinghamshire County Council, the Lead Local Flood Authority (LLFA). The River Trent (Main River) falls within the EA's control.

9.2.6 Based on published geological records for the area (British Geological Survey (BGS) online mapping), the eastern part of the Site between the Catchwater Drain and the River Trent is underlain by Alluvium (clay, silt, sand and gravel) and River Terrace Deposits. A small, isolated area of Till is located in the northeast of the Site. The western part of the Site has no mapped superficial deposits. The bedrock geology for the whole Site is recorded as Mercia Mudstone Group (mudstone, siltstone and sandstone).

9.2.7 Hydrogeological information was obtained from the online Magic Maps service. These maps indicate that the Alluvium and River Terrace Deposits are classified as a Secondary A superficial aquifer. The pocket of Till deposits is classified as a Secondary (Undifferentiated) aquifer. The bedrock geology is classified as a Secondary B aquifer.

9.2.8 Defra's MAGIC maps confirm that the Site is not located within 1km of a groundwater Source Protection Zone or within 1km of a Drinking Water Safeguard Zone (surface water or groundwater). However, the eastern part of the Site (land lying east of the Catchwater Drain) falls within a Drinking Water Protected Area. These are defined as locations where raw water is abstracted for human consumption providing, on average, more than 10 cubic metres per day, or serving more than 50 persons, or is intended for such future use.

9.2.9 MAGIC maps show there are no SSSIs, SACs, SPAs or Ramsar sites within the Site boundary. The Clarborough Tunnel SSSI is located adjacent to the western Site boundary. It is an area of calcareous grassland designated due to its biological

interest. No other statutory designations for nature conservation and ecology are identified within 1km of the Site. EA mapping confirms that no GWDTEs are located within, or within 1km of, the Site.

9.2.10 The latest EA published Flood Zone map included as **Figure 9.2** shows that the western c.50% of the Site lies within Flood Zone 1, representing a less than 1 in 1000 annual probability of fluvial or tidal flooding. A central band of the Site (affecting approximately 5% of the site) lies within Flood Zone 2, representing a 1 in 100 to 1 in 1000 annual probability of fluvial flooding or a 1 in 200 to 1 in 1000 annual probability of tidal flooding. The eastern part of the Site (approximately 45% of the Site) falls within Flood Zone 3 with a greater than 1 in 100 annual probability of fluvial flooding or a greater than 1 in 200 annual probability of tidal flooding. The flood risk in this area is primarily fluvial but there is a degree of tidal influence on the River Trent. Flood defences are present along the River Trent. It is noted that initial enquiries with the EA have identified that the Flood Zone map published online is based on outdated modelling, with the latest EA model (Jacobs, 2023) showing a much-reduced area of the site being affected by Flood Zones 2 and 3. Further analysis will be provided within the Flood Risk Assessment (FRA) supporting the application.

9.2.11 Areas of surface water flood risk are shown on the EA's mapping, most notably along the flow paths of the Ordinary Watercourses and within the fields to the east of the Catchwater Drain. The village of Sturton le Steeple has an identified area of high surface water flood risk at the crossroads at the southern end of Cross Street. The EA's Surface Water Flood Risk Mapping is included as **Figure 9.3**.

9.2.12 EA mapping shows that the eastern part of the Site, to the east of Catchwater Drain, has a risk of reservoir flooding when there is also flooding from rivers, but no part of the Site has a risk of reservoir flooding when river levels are normal.

9.2.13 As the majority of the Site overlies the Mercia Mudstone, the risk of groundwater flooding is considered to be low for most of the Site. There is the limited potential for shallow groundwater to be encountered during groundworks particularly in the eastern part of the Site where superficial deposits are present.

9.2.14 Given the rural setting of the Proposed Development, it is unlikely that significant formal drainage infrastructure exists, with runoff likely to be conveyed across undeveloped areas via overland flow at greenfield rates towards the existing surface watercourses, or infiltrating directly into the ground.

9.2.15 The Catchwater Drain (located on-site) and the River Trent (Carlton-on-Trent to Laughton Drain) (located adjacent to the eastern boundary) were both classified as of 'moderate' ecological status under Cycle 3 of the WFD. Chemical quality for both watercourses had been 'fail' under previous Cycles but 'does not require assessment' under Cycle 3. Wheatley Beck, which lies approximately 750m north of the Site at its closest point, also has the same Cycle 3 WFD ecological and chemical classifications. In the baseline situation, it is likely that the watercourses within the Site would be subject to limited inputs of pollutants, particularly nutrients and metals, associated with farming activities, urban runoff and sewer company discharges.

9.3 Likely Significant Effects

9.3.1 Based on the initial baseline assessment, the sensitivity of potential receptors to impacts associated with the scheme are identified as follows.

9.3.2 Potential receptors to water quality impacts include habitats and species associated with the numerous identified watercourses located on and close to the Site and any sensitive abstractions from these watercourses. Watercourses classified under the WFD (the Catchwater Drain, the River Trent and the Wheatley Beck) are particularly sensitive to any water quality impacts. As the Site falls partially within a Drinking Water Protected Area, it suggests local surface water is used for drinking supply, further increasing the sensitivity of watercourses to inputs of pollution and significant water usage.

9.3.3 Groundwater receptors in this location are assessed to be of limited sensitivity due to the low permeability of the underlying mudstone bedrock within limited overlying superficial deposits; the Site's location outside any groundwater SPZ or GWDTE; and the absence of any WFD classified groundwater bodies in close proximity to the Site.

9.3.4 Potential receptors to any increases in flood risk include residential properties located close to the watercourses within or downstream of the Site, low lying agricultural land, and other sensitive land uses downstream of the Proposed Development. The village of Sturton le Steeple has an identified existing surface water flood risk affecting properties within the village centre.

9.3.5 Likely significant effects to be scoped into the assessment are discussed in the following sections. Where matters have been scoped out of the EIA, justification is provided below.

Construction Phase

Hydrology

9.3.6 During the construction phase, there is the potential for transfer of sediment and pollutants to surface watercourses. Robust precautions would be taken to avoid any service strikes, but due to the potentially significant impact of striking one of the existing buried fuel pipes, this scenario has been considered in relation to potential water quality impacts. Surface watercourses within the Site are of increased sensitivity due to the WFD designations, and the Site's location within a Drinking Water Protected Area. In view of this, and the current uncertainty regarding the nature of works in close proximity to Site watercourses, surface water quality impacts during construction have been **scoped in**. A WFD Screening assessment has also been **scoped in** and will support the assessment of water quality impacts on surface watercourses.

9.3.7 No significant surface water use demand is anticipated during the construction phase. Therefore, impacts on surface water resources due to abstraction during construction have been **scoped out**.

9.3.8 Impacts on the Clarborough Tunnel SSSI adjacent to the west of the Site, for example due to release of contaminants or sediment during construction, are considered unlikely due to the location of the SSSI topographically up-gradient of the Site and above an area of low permeability mudstone geology which further limits the potential for mobilisation of any pollutants. The impact of hydrology impacts during construction on the adjacent SSSI are therefore **scoped out**.

Hydrogeology

9.3.9 Construction activities could result in accidental release of pollutants to underlying groundwater. However, as described above the sensitivity of groundwater in this location is limited by the underlying low permeability mudstone geology, the Site's location outside any groundwater SPZ or GWDTEs, and the absence of any WFD designated groundwater bodies in close proximity. It is considered that the potential for release of pollutants can be adequately controlled through a

Construction Environmental Management Plan (CEMP). The impact of pollutant release to groundwater during construction has therefore been **scoped out**.

9.3.10 No significant groundwater use demand is anticipated during the construction phase. Therefore, impacts on groundwater resources due to abstraction during construction have been **scoped out**.

9.3.11 Given the nature of the underlying geology (low permeability mudstone), significant disruption to subsurface water flow routes during excavation works is considered unlikely. The impact of construction works on groundwater flow has therefore been **scoped out**.

Flood Risk

9.3.12 During the construction phase, an increase in flood risk could result from uncontrolled runoff from construction compounds, temporary access tracks, compacted soils or other impermeably surfaced areas. Flood risk impacts could also result from storage of materials or groundworks within flood zones or within overland flow routes. Construction of crossings over existing watercourse could also result in disruption to existing flows and increase in flood risk. Due to the existing high flood risk areas within the Site and the potential for construction activities to increase this risk, flood risk during the construction phase has been **scoped in**.

Operational Phase

Hydrology

9.3.13 During the operational phase, there is the potential for water quality impacts to local watercourses due to accidental releases of chemicals or contaminated runoff, for example associated with chemical use within the BESS and substation areas and the release of contaminated runoff in the event of a fire (considered a possibility particularly for the BESS area). Due to the uncertainty regarding the exact location of proposed infrastructure and the potential proximity of infrastructure (including the higher risk BESS and substation area) to surface watercourses, impacts on surface water quality have been **scoped in**. A WFD Screening assessment has also been **scoped in** and will support the assessment of water quality impacts on surface watercourses.

9.3.14 Any significant ongoing water demand during the operational phase could deplete existing surface water reserves. However, it is understood that the Proposed

Development will require minimal water resource during the operational phase (limited process water for BESS cooling, firefighting water and limited welfare requirements). Therefore, the impact of the Proposed Development on surface water resources during the operational phase has been **scoped out**.

Hydrogeology

9.3.15 During the operational phase, there is the potential for accidental releases of chemicals to adversely impact any underlying groundwater bodies. However, this risk primarily relates to the use of cooling chemicals and the potential for release of firefighting runoff in the BESS area. It is noted that this area is located above the Mercia Mudstone (Secondary B aquifer) which limits the sensitivity of the receptor. Additionally, the systems engineer has advised that a leak detection system and alarm will be fitted to the cooling system, and the drainage strategy for the BESS area will include provision for the retention of any contaminated fire fighting runoff. On this basis, the impact on groundwater quality during the operational phase has been **scoped out**. In addition, a Fire Risk Statement relating to the BESS would be submitted as part of the application, and therefore the matter of fire prevention and safety would be covered appropriately outside of the ES.

9.3.16 Any significant ongoing water demand during the operational phase could deplete existing groundwater reserves. However, it is understood that the development will require minimal water resource during the operational phase (limited process water for BESS cooling, firefighting water and limited welfare requirements). Therefore, the impact of the development on groundwater water resources during the operational phase has been **scoped out**.

9.3.17 Given the nature of the underlying geology (low permeability mudstone), significant long-term disruption to subsurface water flow routes associated with foundations, piles or underground pipes is considered unlikely. The impact of subsurface structures on groundwater flow has been **scoped out**.

Flood Risk

9.3.18 At present, it is assumed as a conservative approach that some infrastructure will be located within the 'design' 1 in 100 year plus climate change fluvial flood extent or the 1 in 200 year plus climate change tidal flood extent. Some infrastructure is also likely to be located within areas at increased risk of surface water flooding. Any disruption to overland flow routes or displacement of floodwater could result in an increase in flood risk. Any land raising, for example for the creation of roads or

landscaping works within the biodiversity mitigation area, could also impact existing overland flow routes or flood storage. An increase in flood risk could also result from creation of additional hardstanding areas where runoff is not appropriately managed.

9.3.19 No works are proposed within the watercourse channels. However, the creation of the proposed access road / haulage road is likely to require a number of new watercourse crossings over Ordinary Watercourses. There is the potential for these to cause an increase in flood risk if not properly designed to accommodate existing flows. Any infrastructure proposed close to watercourses also has the potential to restrict access to these watercourses for future inspection and maintenance.

9.3.20 In view of the above, and given the applicant's commitment to avoid exacerbating the existing flood risk within Sturton le Steeple village, flood risk impacts during operation have been **scoped in**.

9.3.21 A Flood Risk Assessment (FRA) including Surface Water Drainage Strategy has been scoped in and will support the assessment of flood risk impacts. The FRA is likely to include consideration of the Exception Test and Sequential Test.

Decommissioning Phase

9.3.22 The potential effects during decommissioning will be similar to those expected during the construction phase.

9.4 Assessment Methodology

9.4.1 The below sets out the proposed assessment methodology for those aspects scoped into the EIA, i.e. those considered likely to be significant, at this stage. The purpose of the ES Chapter is to:

i. identify the hydrological, hydrogeological and flood risk baseline for the Site.

ii. assess the potential effect of the proposed development on this baseline environment.

iii. propose suitable mitigation for the reduction of any significant effects.

iv. present the predicted residual effects.

v. identify any cumulative effects.

9.4.2 The zone of influence for impacts on surface water and groundwater is considered to be 1km due to the significant reduction in magnitude of impacts beyond this distance due to dilution / dispersion of contaminants and deposition of silts. Similarly for flood risk, significant effects are unlikely to be observed more than 1km from the cause of increased risk, due to the effect of floodwater spreading out across a flood envelope, with the impacts quickly reducing in magnitude towards the edge of the flood extent. This is a generalised approach, however more specific assessment may indicate a much-reduced zone of influence, for example when considering areas up-gradient of the Site, within separate hydrological catchments, or from a hydrogeological perspective when located on low permeability geology.

9.4.3 The baseline assessment will include a review of the following data:

- EA flood mapping datasets, including fluvial / tidal Flood Map for Planning[45], Surface Water Flood Risk mapping and Reservoir flood risk mapping[46];
- OS mapping[47];
- Defra's Catchment Data Explorer platform[48];
- BGS mapping[49];
- Defra's MAGIC maps[50];
- Modelled flood data from the EA (fluvial / tidal sources).
- Mapping and data relating to surface water flood risk, reservoir flood risk, groundwater flood risk and other sources of flooding from the LLFA and IDB.
- Details of any historical flood events obtained from the EA, LLFA and IDB.
- Details of nearby surface water abstractions (public and private) obtained from the LLFA and / or a third party data provider (e.g. Envirocheck).

[45] Environment Agency Flood Map for Planning https://flood-map-for-planning.service.gov.uk/, accessed March 2024
[46] Environment Agency mapping of Groundwater Dependent Terrestrial Ecosystems https://www.data.gov.uk/dataset/72a149a2-1be7-441f-bc37-94a77f261e27/groundwater-dependent-terrestrial-ecosystems-england-only
[47] Ordnance Survey mapping, 2024
[48] Environment Agency Catchment Data Explorer https://environment.data.gov.uk/catchment-planning/, accessed March 2024
[49] British Geological Survey mapping https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.15207478.1054941605.1660058459-1946525719.1660058459, accessed March 2024
[50] Defra MAGIC maps online mapping https://magic.defra.gov.uk/magicmap.aspx, accessed March 2024

- Local Authority Surface Water Management Plan and Strategic Flood Risk Assessment.

9.4.4 A targeted visual inspection of any key hydrological features will be undertaken e.g. proposed watercourse crossings, location of sensitive abstractions, locations with infrastructure proposed within the flood zones.

9.4.5 A FRA will be prepared as an appendix to the ES, in accordance with the requirements of the NPPF[51] and NPPG[52]. This will include a review of the above data sources, an assessment of the flood risk to the Proposed Development from all flooding sources (including consideration of climate change), and identification of any mitigation measures required to ensure the Proposed Development will be safe, will remain operational during a flood event, and will not result in an increase in flood risk elsewhere.

9.4.6 The FRA will include a Surface Water Drainage Strategy based on the use of Sustainable Drainage Systems (SuDS), which will demonstrate how surface water runoff from the Proposed Development will be managed. The FRA may include a fluvial flood modelling exercise and / or floodplain compensation calculations, dependent on the nature of the scheme elements proposed within the 1 in 100 year / 1 in 200 year plus climate change flood extent. A Sequential Test will be undertaken to support the FRA (full scope to be confirmed though LPA consultation) and the Exception Test will form part of the FRA should any development be proposed within Flood Zone 3.

9.4.7 A WFD Screening Assessment is proposed, in accordance with the guidance in Nationally Significant Infrastructure Projects - Advice Note Eighteen: the Water Framework Directive[53]. This will form an appendix to the ES. The Screening Assessment will identify any WFD water bodies that could be impacted by the Proposed Development and will determine whether any activities associated with the Proposed Development require further consideration through subsequent stages of WFD assessment. The Screening Assessment will be undertaken in consultation with the EA.

[51] Communities and Local Government, 'National Planning Policy Framework', published March 2012 and last updated September 2023
[52] Communities and Local Government, 'Planning Practice Guidance - Flood Risk and Coastal Change, ID 7', published March 2014 and last updated August 2022
[53] The Planning Inspectorate, June 2017, Nationally Significant Infrastructure Projects - Advice Note Eighteen: the Water Framework Directive

9.4.8 The EIA methodology will include consultation with the EA for further details of the modelled flood levels and floodplain extents within the Site and for data regarding flood risk from non-fluvial sources (e.g. surface water, reservoir flooding). The Lead Local Flood Authority (LLFA) (Nottinghamshire County Council) will be consulted for details of any Ordinary Watercourses within the study area, details of flood risk from surface water and groundwater, details of any historical flood events and records of any surface water abstractions. Trent Valley IDB will be consulted regarding any issues or constraints associated with the Ordinary Watercourses within their control.

9.4.9 The assessment of effects will assume that the relevant embedded mitigation and standard good practice measures and any applicable consents / permits are in place before assessing the effects. The assessment will be based on a source-pathway-receptor methodology, where the sensitivity of the receptors and the magnitude of change upon those receptors is identified within the study area. The significance of the likely effects of the Proposed Development will be classified by taking into account the sensitivity of receptors and the magnitude of the effect on them. Likely significant effects would be those effects identified as of moderate or major significance.

9.4.10 The assessment will use standard criteria to describe the sensitivity/importance of the existing receptor that may be impacted (**Table 9.1**) and definitions of the magnitude of envisaged effects (**Table 9.2**). The significance matrix is set out in Table **9.3**.

Table 9.1 Sensitivity/importance of the water environment

Receptor Sensitivity / Importance	Description
High	• Area of international designations i.e. Ramsar site, Special Protection Areas (SPAs) and Special Areas of Conservation (SACs). • Area of national and regional importance i.e. Site of Special Scientific Interest (SSSI) and National Nature Reserves (NNR).

Receptor Sensitivity / Importance	Description
	• A waterbody which is of high or good ecological status and highly sensitive to change. • EA designated main rivers. • Areas of high surface water flood risk or critical drainage areas. • EA groundwater Source Protection Zone 1 – inner protection zone and EA defined highly vulnerable Principal Aquifers. • Areas of Flood Zone 3a and 3b (high fluvial flood risk and the functional floodplain). • Water sensitive and highly vulnerable developments in the area. • Local flood defences/flood storage areas/major schemes necessary to protect highly vulnerable development in the area.
Medium	• Non-statutory sites of regional importance designated for water dependent ecosystems. • A waterbody of moderate ecological status and moderately sensitive to change. • EA designated ordinary watercourses. • Areas of medium surface water flood risk. • EA Groundwater Source Protection Zone 2 – outer protection zone and EA defined Secondary Aquifers. • Areas of Flood Zone 2 (medium fluvial flood risk). • More vulnerable developments in the area.

Receptor Sensitivity / Importance	Description
	• Local flood defences/flood storage areas/schemes necessary to protect more vulnerable development in the area.
Low	• Areas of local importance which are not formally designated. • A waterbody of poor ecological status with little sensitivity to change. • Minor local drainage networks or land drains. • Areas of low surface water flood risk. • EA groundwater Source Protection Zone 3 – total catchment protection zone and EA defined Unproductive Strata. • Areas of Flood Zone 1 (low fluvial flood risk). • Less vulnerable and water compatible development. • Local embankments for minor drains.
Negligible	• A water resource with little or no interest or value.

9.4.11 Once the sensitivity of the identified receptor has been established, the magnitude of the impact is determined. The nature and characteristics of impacts will be described to enable their magnitude to be determined. The nature of the impacts will be expressed as:

- Adverse: detrimental or negative impacts on an environmental resource or receptor;
- Beneficial: advantageous or positive impact on an environmental resource or receptor; or

- Negligible – an impact on a resource/receptor of insufficient magnitude to affect the use/integrity.

9.4.12 The magnitude of any identified adverse or beneficial impacts will be assessed using the criteria described in **Table 9.2.**

Table 9.2 Magnitude of effect

Magnitude	Definition
Large	Total loss or major alteration to key elements of features of the baseline conditions to the extent that post-development character or composition of baseline conditions will be fundamentally changed.
Medium	Loss or alteration to one or more key elements/features of the baseline conditions to the extent that post-development character or composition of the baseline conditions will be materially changed.
Small	Minor shift away from baseline conditions. Changes arising will be detectable but not material; the underlying character or composition of the baseline conditions will be similar to the pre-development situation.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a 'no change' situation.

Table 9.3 illustrates the Significance of Effect. The shaded boxes indicate effects considered significant in current EIA regulations. Effects can be either negative or positive.

Table 9.3: Significance of Effect

Magnitude	Sensitivity /importance		
	High	Medium	Low
Large	Major	Moderate	Minor
Medium	Moderate	Moderate	Minor
Small	Minor	Minor	Negligible

Negligible	Minor	Negligible	Negligible

9.4.13 Following the general framework of the ES, an effect may be classified as adverse, negligible or beneficial, and may be defined temporally as short to medium or long term.

9.5 Cumulative Effects

9.5.1 As discussed in the proposed methodology, the zone of impact for hydrology, hydrogeology and flood risk is considered to be 1km. It is therefore likely that the key developments to be considered as part of the cumulative assessment will include, but not be limited to:

- 20/00117/FUL – Installation and operation of a solar farm comprising an array of ground mounted solar PV panels with associated infrastructure including housing for inverters a substation compound, point of connection mast, fencing, security cameras, cabling, access tracks and a temporary construction compound. Application Approved August 2020. Located adjacent to the west of the Site.
- West Burton C Power Station - The proposal is for a power station capable of generating up to 299MW of electrical generation capacity. Granted development consent in October 2020. Located adjacent to the north-eastern boundary of the Site.
- Tarmac consented quarry located adjacent to the northeastern boundary of the Site. Permission for the quarry was originally consented under reference 1/46/06/00014 for a new sand and gravel quarry on land at Sturton le Steeple. The original consent also included for the construction of a new access and erection of processing plant, ancillary buildings and a wharf facility with restoration to agriculture, woodland and water areas for amenity and nature conservation after uses. In March 2012 planning consent was granted under reference 1/46/11/00002/R to extend the implementation deadline set out within the original consent. In May 2016 further planning consent was granted under reference 1/16/00354/CDM to vary Conditions 8 and 11 of the 2012 consent to enable the quarry access road, associated with implementation, to be constructed in two stages.

- West Burton Solar Project - NSIP development comprising four electricity generating stations, each with anticipated capacity in excess of 50MW, comprising of ground mounted solar arrays, with associated development comprising energy storage, grid connection infrastructure and other infrastructure integral to the construction, operation, and maintenance of the NSIPs. Application pending. Located approximately 8km south-east of the Site, but with the proposed underground cable route currently proposed to run through the eastern section of the Site.

9.5.2 These nearby developments could have similar construction and operational phase impacts as the Proposed Development in terms of hydrology, hydrogeology and flood risk. However, similar controls are likely to be in place for these schemes as for the Proposed Development, for example a CEMP will be implemented to manage pollution and siltation risks during the construction phase, and construction and operational phase drainage strategies will be developed to control the rate and quality of runoff. FRAs will also be required for these nearby developments, which will require the applicant to demonstrate there is no increase in flood risk as a result of the works. As a result of these controls, it is currently considered unlikely that any significant cumulative effects will be identified for the construction, operational or decommissioning phases, however this will be assessed further in the EIA.

9.6 Preliminary Discussions of Potential Mitigation and Enhancement Measures

9.6.1 Mitigation and enhancement measures that are likely to be considered for inclusion at the various phases of development are indicated below. These will be secured via planning conditions attached to the planning consent, or in the case of post-planning consenting requirements will be enforced by the relevant regulatory body (EA / LLFA / IDB).

Construction phase

9.6.2 A CEMP will be prepared for the construction phase to ensure best practice is followed to minimise the risk of release of pollution or sediment.

9.6.3 The relevant permits or consents will be obtained from the EA / LLFA / IDB for any works affecting watercourses.

9.6.4 Existing watercourse crossings will be utilised where possible. Any new bridges / culverts will be designed to ensure flow capacity is retained and access to watercourse for maintenance is retained.

9.6.5 Trenchless Horizontal Directional Drilling (HDD) methods are likely to be used for laying any cables beneath existing watercourses. These methods will be supported by a drilling fluid breakout plan.

9.6.6 A Flood Management Plan will be prepared for the construction and decommissioning phases to ensure the works are scheduled to avoid periods of increased flood risk.

9.6.7 A temporary drainage strategy will be implemented during construction works to control runoff rates and sediment mobilisation.

Operational phase

9.6.8 Sensitive aspects of the Proposed Development (e.g. BESS, substation) have been directed to the parts of the Site with the lowest flood risk. The highest risk parts of the Site, notably the fluvial and tidal floodplain adjacent to the River Trent, have been left as open land for biodiversity mitigation. The Proposed Development will be designed to remain operational during a fluvial / tidal flood event, for example setting invertors a minimum of 300mm above the design flood level.

9.6.9 A drainage strategy will be implemented, promoting infiltration where possible and utilising SuDS to provide attenuation of runoff. This will consider the potential for contaminated runoff, including in the event of a fire, and will ensure that provision is made for the detention / treatment of any such runoff. There is the possibility for enhancement by designing SuDS features with additional capacity to provide a reduction in flood risk downstream, with particular consideration to be given to the area of existing flood risk in the village of Sturton le Steeple.

9.6.10 Access roads will be surfaced with a permeable material to encourage infiltration and limit increases in runoff.

9.6.11 For any aspects of the Proposed Development proposed within the fluvial or surface water flood extent, consideration will be given to requirements for compensatory floodplain storage or features to retain / divert existing overland flow paths.

Decomissioning phase

9.6.12 Similar mitigation measures are anticipated for the decommissioning phase as for the construction phase.

10. Cultural Heritage

10.1 Introduction

10.1.1 An assessment of the likely significant effects of the Proposed Development with respect to cultural heritage will be undertaken.

10.1.2 The Cultural Heritage chapter will consider all aspects of the historic environment, comprising archaeology, built heritage and the historic landscape, both designated and non-designated. The chapter will identify heritage assets with the potential to experience effects from the Proposed Development and will assess their importance, the magnitude of the impact and conclude with the resultant residual effect.

10.2 Study Area

10.2.1 Best practice guidance does not suggest a specific radius for assessing the effects resulting from a Proposed Development on the historic environment, and therefore professional judgement and experience of undertaking assessments of solar schemes of a similar scale has been used. Two study areas are proposed to assess the likely significant effects of the Proposed Development upon the historic environment resource.

10.2.2 For designated heritage assets (comprising scheduled monuments, listed buildings, conservation areas, registered parks and gardens, registered battlefields and World Heritage Sites), a study area of 3km from the Site will be used. The 3km study area has been measured from the Site boundary. Given the scale and height of the Proposed Development's solar arrays, at a height of approximately 3.6m above existing ground levels, it is considered that a radius of 3km from the Site boundary is proportionate and provides a sufficient extent to identify any designated assets for which the Site might form part of the setting of, and therefore contribute to the significance of, either through visual aspects, or historic association. The designated heritage assets within the 3km study area are shown on **Figure 10.1 – 10.6.**

10.2.3 This study area crosses the River Trent, into Lincolnshire and the West Lindsay District Council Area.

10.2.4 For non-designated heritage assets (comprising archaeological Sites and findspots, locally listed buildings, locally important parks and gardens or other historic

landscapes), a study area of 1km from the Site boundary will be used. It is considered that this is an appropriate and proportionate scale of study area to establish the below-ground archaeological context of the Site in its surroundings, particularly given the size of the Site at 943.4ha and the scale of the Proposed Development.

10.2.5 In addition to the study area, the preliminary Screened Zone of Theoretical Visibility ('SZTV') has been referenced to identify areas where the Proposed Development may be theoretically visible within the surrounding landscape. The preliminary SZTV produced at this scoping stage is a 'screened' ZTV, using the topography of the landscape to provide an indication of visibility, with existing blocks of vegetation and built form taken into account. It should be noted that this SZTV does not take into account roadside hedgerows or smaller blocks of vegetation, such as garden planting.

10.2.6 The preliminary SZTV indicated that the level of visibility of the Proposed Development would be greater north-south with more limited views to the east and particularly to the west. At this stage, the SZTV has been used to provide an indication of which assets would not have visibility of the Proposed Development though it is recognised that the setting of an asset does not rely solely on visibility. Other historic and functional associations mean that although an asset may not have sight of a Proposed Development, there may be other factors which require consideration in terms of assessment of effect.

10.2.7 As the assessment continues, the SZTV will be used to exclude assets from assessment once they have been assessed to check that there are no other factors contributing to their significance other than visibility which could experience effects.

10.2.8 At this scoping stage, assets beyond the 3km study area but within the preliminary SZTV have also been considered for their potential to experience significant effects resulting from the Proposed Development. It has been assessed that there are no heritage assets beyond the 3km study area, within the SZTV which have the potential to experience significant adverse effects from the Proposed Development.

10.3 Preliminary Baseline Conditions

10.3.1 There is one designated asset within the Site. The Scheduled Monument of Segelocum Roman Town (NHLE Ref: 1003669) is located at the very eastern point of the proposed Site, on the western bank of the River Trent.

10.3.2 Within the 3km study area from the Site boundary, the following designated heritage assets are located (shown on Figure 10.1 – 10.6):

- Nine Grade I Listed Buildings:
- Eight Grade II* Listed Buildings;
- Seven Scheduled Monuments;
- Two Conservation Areas, and
- 123 Grade II Listed Buildings.

10.3.3 Once the SZTV was applied this reduced the numbers of designated assets within 3km to:

- One Grade I Listed Buildings (also a Scheduled Monument);
- Two Grade II* Listed Buildings;
- Four Scheduled Monuments (including one Grade I Listed Building);
- Two Conservation Areas; and
- Thirty-three Grade II Listed Buildings.

10.3.4 No registered parks and gardens, world heritage sites or registered battlefields are located within the 3km search area and therefore there will be no effects upon these assets.

10.3.5 In accordance with paragraphs 5.9.30 and 5.9.31 of the Overarching National Policy Statement for Energy (EN-1)[54], grade I and II* listed buildings and scheduled monuments are considered to be designated heritage assets of the highest significance. Grade II listed buildings are considered to be designated heritage assets of less than the highest significance. Conservation areas are considered to hold heritage significance of a level proportionate to their special historic and architectural interest.

[54] Department for Energy Security & Net Zero, 2023., Overarching National Policy Statement for Energy (EN-1)

Listed Buildings

10.3.6 There are a number of listed buildings in proximity to the Site boundary. Located immediately outwith the Site's eastern boundary, just west of the River Trent is the Grade I listed Church of St, Nicholas (1216860) and the grade II listed Ferry House (1275698). Slightly further west and located at the junction of Littleborough Road and Thornhill Lane, directly adjacent to the Site boundary is the Grade II listed Littleborough Cottage, a former toll house (1275674).

10.3.7 Located in the settlement of Fenton, approximately 140m west of the Site boundary is the Grade II listed Manor Farmhouse (1216698) and further west, approximately 260m south of the western Site boundary is the Grade II listed Whinleys Farm House (1045699).

10.3.8 Also in proximity are two listed building on the eastern bank of the River Trent, comprising the Grade II* Church of St. Mary (1064050) and the Grade II Knaith Hall (1359480).

10.3.9 The settlement of Sturton le Steeple is located in the centre of the proposed Site but outwith the Site boundary. This settlement is not a Conservation Area, but does contain a number if listed buildings. There are 17 Grade II listed buildings and one Grade II* - the Church of St. Peter and Paul (1275773) located within this settlement.

10.3.10 Immediately south of the Site boundary is the settlement of North Leverton with Habblesthorpe. Again, this is not a Conservation Area but does contain a large number of listed buildings. There are 18 Grade II listed buildings and one Grade I – the Church of St. Martin (1234265).

10.3.11 To the northwest of the Site boundary, approximately 700m distance is the settlement of South Wheatley and North Wheatley. These two settlements are covered by a Conservation Area and contain a number of listed buildings comprising 16 Grade II and one Grade II* - the Church of St. Peter and St. Paul (1234572). To the east of South Wheatley, located outside of the Conservation Area and 500m north east of the Site boundary is the Grade I listed Remains of the Church of St Helen (1216694) which is also a Scheduled Monument (1006391).

10.3.12 In general, there are relatively few discrete, isolated listed buildings within this study area. The listed buildings tend to be clustered within settlements rather than being dispersed across the area, for example as isolated farmhouses or similar.

Scheduled Monuments

10.3.13 As stated above, there is the Scheduled Monument of Segelocum Roman Town (NHLE Ref: 1003669) is located within the Site boundary and another scheduled monument is the ruins of the Church of St. Helen which is also a Grade I Listed Building.

10.3.14 Located 200m to the north of the Site, and directly south of the West Burton Power Station is the scheduled Medieval settlement and open field system immediately south east of Low Farm (1017741).

10.3.15 Three Scheduled Monuments are located on the eastern side of the River Trent. The northern-most is Hermit Dam moated Site (1016110), 1.2km north east of the Site boundary; Heyrnings Priory (1008685) 1.9km east of the Site boundary and Roman fort, south of Littleborough Lane (1004935) 0.7km southeast of the Site boundary.

Conservation Areas

10.3.16 The Conservation Area of Wheatley is discussed above, with the other Conservation Area of Saundby located straddling the 3km search area to the north of the Site. This Conservation Area contains three listed buildings, including one Grade I building – the Church of St. Martin (1045083).

Historic Background

10.3.17 To inform this Scoping Report, a search of the Nottinghamshire Historic Environment Record (NHER) was undertaken within the Site boundaries. Relatively few previously known features were identified. No records of prehistoric activity were identified within the Site.

10.3.18 A number of the records in the NHER are related to the scheduled Roman Site at Segelocum within the eastern portion of the Site with the majority located within the scheduled boundary, but some are located further north. This indicates that Roman activity is, of course, not confined to the scheduled boundary but rather it is the Roman archaeology within the scheduled boundary which is of national importance. Further evidence of Roman activity is located within the Site, including cropmarks of linears and pits located south of Littleborough Road, near the Grade II listed toll house and a findspot of Roman artefacts locates south of Dog Holes Lane, west of Leverton Road.

10.3.19 The route of Littleborough Road follows a Roman road likely through Sturton and on into Wheatley. It is noted, the route of the road skews south of Sturton and it is

likely the original route travels to the north of the settlement. This is a portion of the road which travels from Lincoln to Doncaster. There is clear Roman potential within the Site, focussed on the eastern portion of the Site.

10.3.20 The settlements of Sturton le Steeple and North Leverton with Habblesthorpe were recorded in the Domesday survey, along with a number of other settlements in this general area. This means they were established from at least the early medieval period onwards, indicating that this landscape has been occupied and utilised for a lengthy period.

10.3.21 There are a number of records of ridge and furrow across the Site and an area of earthworks has been identified to the east of Sturton le Steeple which may be evidence of a deserted portion of the medieval extent of Sturton.

10.3.22 The majority of the listed buildings in this area date to the post-medieval and early modern periods. These indicate the increased wealth within the settlements during these periods and the increase in the population. This period also sees the enclosure of the landscape, creating the smaller field parcels and patterns some of which are legible today.

10.3.23 The modern period sees significant changes within this landscape with the construction of the power stations which dominate the skyline. To the north, the West Burton Power station was constructed in 1968 with the Cottam Power Station constructed to the south in 1969. These are very large buildings with towers which dominate the skyline, influencing views and the character of the surrounding landscape.

10.3.24 A bomb crater is identified within the Site, east of Sturton le Steeple caused by a V1 flying bomb during WWII. There is no indication that there is further unexploded ordnance within the Site.

10.4 Likely Significant Effects

10.4.1 All of the designated assets within the 3km study area and the assets within the 1km will be subject to assessment within the baseline, PEIR and ES. However, at this stage, it is considered useful to identify those assets which, in the opinion of Pegasus, have the potential to experience significant adverse effects from the Scheme. In this way, consultees are free to agree with these identifications and/or suggest further assets. This allows the baseline, PEIR and ES to be a focussed document.

10.4.2 Effects are considered to have the potential to arise during the Construction, Operational and Decomissioning phase of the Proposed Development. It is noted that the Proposed Development is temporary. NPS for renewable energy infrastructure EN-3 (November 2023) is clear in providing guidance to the decision-maker at paragraph 2.10.160 stating: *"Solar farms are generally consented on the basis that they will be time-limited in operation. The Secretary of State should therefore consider the length of time for which consent is sought when considering the impacts of any indirect effect on the historic environment, such as effects on the setting of designated heritage assets."*

10.4.3 In addition, as an NSIP, this scheme is considered to meet the criteria of a Critical National Priority scheme. The implications of this in decision making are set out at section 4.2 of NPS EN-1 (2023). Of particular note are paragraphs 4.2.15 – 4.2.17:

"4.2.15 Where residual non-HRA or non-MCZ impacts remain after the mitigation hierarchy has been applied, these residual impacts are unlikely to outweigh the urgent need for this type of infrastructure. Therefore, in all but the most exceptional circumstances, it is unlikely that consent will be refused on the basis of these residual impacts. The exception to this presumption of consent are residual impacts onshore and offshore which present an unacceptable risk to, or unacceptable interference with, human health and public safety, defence, irreplaceable habitats or unacceptable risk to the achievement of net zero. Further, the same exception applies to this presumption for residual impacts which present an unacceptable risk to, or unacceptable interference offshore to navigation, or onshore to flood and coastal erosion risk.

4.2.16 As a result, the Secretary of State will take as the starting point for decision making that such infrastructure is to be treated as if it has met any tests which are set out within the NPSs, or any other planning policy, which requires a clear outweighing of harm, exceptionality or very special circumstances.

4.2.17 This means that the Secretary of State will take as a starting point that CNP Infrastructure will meet the following, non-exhaustive, list of tests:

• where development within a Green Belt requires very special circumstances to justify development;

• where development within or outside a Site of Special Scientific Interest (SSSI) requires the benefits (including need) of the development in the location proposed to

clearly outweigh both the likely impact on features of the Site that make it a SSSI, and any broader impacts on the national network of SSSIs;

• *where development in nationally designated landscapes requires exceptional circumstances to be demonstrated; and*

• *where substantial harm to or loss of significance to heritage assets should be exceptional or wholly exceptional." (author's emphasis)*

Construction Phase

10.4.4 There is the potential that if archaeological remains are found to exist within the Site, that the Proposed Development would cause some harm to these. However, given the nature of the Proposed Development and the relatively small impact footprint of the panels and cable runs, it is considered that this would not result in a significant effect upon non-designated archaeological assets.

10.4.5 The construction phase would not result in any direct, physical impacts to any designated assets.

10.4.6 It is also the case that construction effects could arise from vehicle movements, construction noise and activity. It is considered this could have a significant effect upon the following assets:

- Scheduled Monument Segelocum Roman town (1003669);
- Grade II Littleborough Cottage (1275674);
- Grade II North Leverton Manor House (1234342); and
- Grade II Gainsborough House (1234264).

10.4.7 This is not a closed list, merely a starting point for consideration.

Operation Phase

10.4.8 It is considered that there is the potential for a significant adverse effect on a number of heritage assets within the 3km study area. No built form is proposed within or in proximity to the scheduled Segelocum Roman town and as such, all harm would arise from changes to the setting of the asset which contributes to significance.

10.4.9 Without prejudice for what further assessment and Site reconnaissance may identify, the following assets are considered to have the potential to experience significant effect from the operation of the Proposed Development:

- Grade II Littleborough Cottage (1275674);
- Listed buildings within Sturton le Steeple but in particular the Grade II* Church of St. Peter and St Paul (1275773);
- Grade II Manor Farmhouse (1216698);
- Grade I Church of St. Martin (1234265); and
- Grade I Remains of Church of St. Helen (1216694).

Decommissioning Phase

10.4.10 The effects arising from this phase will include beneficial effects in removing built form which had been identified as causing adverse effects during the operational period.

10.4.11 Decommissioning effects may also arise from activity and movement associated with the removal of built form – it is anticipated this phase will be of a short duration and the level of effect will be similar to that at the construction phase with the potential to affect the same assets as identified at this stage.

10.5 Assessment Methodology

10.5.1 There is no specific heritage guidance or proscribed heritage methodology for undertaking an EIA. Therefore, the proposed methodology has been developed using Historic England guidance and advice notes, which include Statements of Heritage Significance: Analysis Significance in Heritage Assets, Commercial Renewable Energy Development and the Historic Environment, The Setting of Heritage Assets and Managing Significance in Decision-Taking in the Historic Environment together with professional judgment and guidance as set out in the NPS's. In addition, the Chartered Institute for Archaeologists Code of Conduct will be followed.

Value/Sensitivity

10.5.2 The value/sensitivity of a heritage asset for the purposes of Environmental Impact Assessments is determined by professional judgement guided by statutory and non-statutory designations, national and local policies.

Table 10.1 – Criteria for establishing value/sensitivity

Value/sensitivity	Criteria
High	Remains of inscribed international importance, such as World Heritage Sites Grade I and II* Listed Buildings Grade I and II* Registered Parks and Gardens Scheduled Monuments Registered Battlefield Non-designated archaeological assets of schedulable quality Non-designated buildings, monuments, Sites or landscape that can be shown to have a very important quality in their fabric or historical association
Moderate	Grade II Listed Buildings Conservation Areas Grade II Registered Parks and Gardens Assets of high archaeological resource value identified through consultation
Low	Non-designated buildings, monuments or Sites or landscapes of local importance and of modest quality Locally important historic or archaeological assets, assets with a local value for education or cultural appreciation and of medium archaeological value Locally Listed buildings identified on a local list Non-designated buildings, monuments, Sites or landscape that can be shown to have important qualities in their fabric or historical association Historic townscapes with historic integrity Parks and gardens of local interest
Not Significant	Assets identified as being of no historic, artistic, archaeological or architectural value Assets that are so badly damaged that too little remains to justify inclusion into a higher grade

	Assets whose values are compromised by poor preservation or survival to justify inclusion in a higher category

Magnitude of Impact

10.5.3 Once a level of value/sensitivity has been assigned, the magnitude of impact as a result of the Proposed Development is assessed. Potential impacts are defined as a change resulting from the Proposed Development which affects the significance of a heritage asset. These impacts are considered in terms of being either direct, indirect or cumulative, from construction or operation and temporary, long-term or permanent. The assessment will include consideration of an asset's setting in terms of its contribution to the asset's significance.

10.5.4 The magnitude of an impact can be judged in a five-point scale. The impact score is arrived at without reference to the value/sensitivity of the asset and the impact is assessed without taking into account any subsequent mitigation proposals, but does take into account embedded mitigation derived throughout the design process.

Table 10.2 Criteria for establishing level of impact

Level of Impact	Description of Impact
High	Change such that the significance of the asset is totally altered or destroyed. Comprehensive change to setting affecting significance, resulting in substantial changes in our ability to understand and appreciate the resource and its historical setting
Medium	Change such that the significance of the asset is affected. Changes such that the setting is noticeable different, affecting significance resulting in moderate changes to significance and in our ability to understand and appreciate the resource
Low	Change such that the significance of the asset is slightly affected. Changes to the setting that have a slight impact on significance resulting in changes in our ability to understand and appreciate the resource

Minimal	Changes to the asset that hardly affect significance. Changes to the setting of an asset that have little effect on significance and no real change in our ability to understand and appreciate the resource
No change	The development results in no change or such a negligible level of change that it does not affect the significance of the asset. Changes to the setting do not affect the significance of the asset or our appreciation of it.

Residual Effect

10.5.5 The assessment of effects will be undertaken in two stages. The magnitude of impact is cross-referenced with the value of the asset to categorise the effect that is likely to result from the Proposed Development prior to additional mitigation measures.

10.5.6 Following this stage, further consideration of additional mitigation is carried out, and the mitigation is assessed as to whether this would reduce the significance of the effect. Once additional mitigation is applied, the asset is re-assessed, allowing the residual significance of effect to be determined, as seen in Table 10.3.

Table 10.3 Levels of Effect

Value/sensitivity of asset	Magnitude of Impact				
	No Change	Minimal	Low	Medium	High
High	Neutral	Minor	Moderate	Major	Major
Moderate	Neutral	Minor	Minor/Moderate*	Moderate	Major
Low	Neutral	Neutral	Minor	Minor/Moderate*	Moderate
Not significant	Neutral	Neutral	Neutral	Neutral	Neutral

* - professional judgement to be applied when assigning a level of effect

Proposed Approach to Baseline

10.5.7 A baseline will be prepared which will identify the heritage resource within the study areas identified above. Data has already been sourced from a number of repositories, with further data to be obtained during the preparation of the baseline assessment. The sources of data include:

- National Heritage List for England;

- Nottinghamshire HER;
- NRHE (if required);
- National Mapping Programme data;
- Nottinghamshire Archives, Northallerton, for documentary and cartographic resources;
- Retford Library & Worksop Library (if necessary) local studies collection;
- Historic England Archive, Swindon for aerial photographs;
- LiDAR; and
- Other sources identified during the preparation of the baseline assessment.

10.5.8 The baseline will consider the archaeology, built heritage and historic landscape resource within the relevant study area. The baseline will identify and describe assets and their significance, including the contribution to significance made by their setting. This will help to identify which assets have the potential to experience likely significant effects resulting from the Proposed Development. There will be heritage assets which will clearly not experience any effect from the Proposed Development, either due to their function or location in an area with no visibility of the Site and with no historic association. These assets will be discussed in broader terms, grouped where appropriate and dismissed from further assessment within the baseline.

10.5.9 The baseline will be supplemented by a Site and study area walkover. The walkover will focus on visiting surrounding heritage assets identified in the initial baseline to assess their setting and relationships with surrounding assets.

10.5.10 In terms of viewpoints, Pegasus, the project Heritage specialist, will liaise with the Pegasus landscape team to identify any viewpoints which may assist with the assessment of the Proposed Development's likely significant effects on heritage assets. These will also be discussed and agreed with consultees as the Proposed Development progresses. At this stage, it is considered that viewpoints may be required from representative locations within Sturton le Steeple to assess the Proposed Development from the vicinity of the listed buildings within. Locations will be refined through consultation and further Site reconnaissance.

10.5.11 Throughout the completion of the baseline, PEIR and ES chapter, consultation will be undertaken with relevant stakeholders including Historic England, the

Nottinghamshire CC Archaeological Advisors, the Bassetlaw DC Archaeological Advisor, and the Bassetlaw Conservation Officer.

10.5.12 The study area of 3km crosses into Lincolnshire and into the West Lindsey District Council area. As the assessment progresses, where required, consultation will be undertaken with the relevant historic environment officers including the Conservation Officer and LPA Archaeologist.

10.5.13 To support the Cultural Heritage assessment, it is proposed that a staged programme of fieldwork will be undertaken to assist in the identification of areas of archaeological activity. This will commence with a programme of geophysical survey, with further work following from this as required.

10.5.14 This information will be incorporated into the baseline, PEIR and ES chapters.

10.5.15 The scope of the pre-determination fieldwork will be discussed with the Nottinghamshire Archaeological Advisors and the Archaeological Advisor for Bassetlaw District Council.

Proposed Approach to ES (and PEIR)

10.5.16 Baseline data will be used to inform the PEIR and ES chapter. The PEIR will be prepared as a 'draft ES' and will provide a summary of the findings of the assessment at that point in time. The PEIR will set out any likely significant effects which have been predicted, including any considered to be significant under the EIA Regulations. The assessment will be finalised within the ES.

10.5.17 For both PEIR and ES chapters, the same general methodology will be used. Both will assess the potential for the Proposed Development to cause significant effects upon the significance of the heritage resource. Should potentially significant adverse effects be identified, mitigation will be proposed seeking to reduce the significance of the identified adverse effects.

10.5.18 When discussing heritage assets, the term 'significance' is used in the NPS EN-1 document to describe the sum of the heritage interests that a heritage asset holds (this definition is set out in NPS EN-1 – also adding that significance derives not only from a heritage asset's physical presence, but also from its setting) and that some assets have a level of significance that justifies official designation. The term 'significance' has a specific meaning within EIA and therefore to avoid confusion, when discussing heritage significance, this will be made clear and distinct from discussion of significance in EIA terms.

10.5.19 In order to assess the effect of the Proposed Development upon heritage assets, these will first be assigned a value. This is not merely a reflection of any designated status but also accounts for the heritage interests of the asset. This will be expressed as the value/sensitivity of the asset to change. Following this, the magnitude of impact or change to the significance of the asset will be assessed, including impacts to its significance through changes within its setting. The value of the asset will be considered against the magnitude of impact and the resultant effect will be assessed.

10.5.20 The ES chapter will also assess any likely significant cumulative effects upon the heritage resource resulting from the Proposed Development in combination with other schemes, as appropriate.

10.5.21 The assets with the potential to experience likely significant effects from the Proposed Development will be set out in a summary table at the end of the ES chapter.

10.5.22 In accordance with the requirements of the EIA Regulations, the ES chapter will assess the significance of effects resulting from the Proposed Development's impacts. However, the NPS EN-1 considers impacts in terms of levels of harm or loss to the significance of an asset from a Proposed Development. A significant effect identified in the ES chapter would not necessarily equate to a finding of substantial harm, as defined in NPS EN-1. Equally, a less significant effect identified in the ES chapter may result in a higher level of harm according to NPS EN-1. A level of professional judgement will be used throughout the EIA process to ensure that where a matrix-based system is employed, this accounts for professional judgement to ensure that a robust assessment of the level of effect to the significance (in EIA terms) of the heritage asset is reported within the ES chapter. In addition, a narrative conclusion will be set out which will discuss the level of harm (if any) the Proposed Development will have upon the significance of the heritage assets. As a DCO, this application will be judged against the policies contained within the NPS documents and these require an assessment of harm and a judgement of whether the Proposed Development results in no harm, less than substantial harm or substantial harm.

10.6 Cumulative Effects

10.6.1 An assessment of cumulative effects arising from the Proposed Development in combination with other schemes shall be included in the EIA. The list of schemes to

be considered will be provided and an assessment will be undertaken to establish if there would be any cumulative effects arising.

10.7 Preliminary Discussions of Potential Mitigation and Enhancement Measures

10.7.1 It is considered that embedded mitigation will be in the form of the design changes and iterations arising from data gathering, including identification of areas of significant archaeology will be taken into account within the assessment process. In addition, landscaping mitigation proposed as part of the Proposed Development will also be considered as embedded mitigation.

10.7.2 Further mitigation arising from the Proposed Development could consist of further archaeological works. The scale and scope of such works is yet to be determined. Additional mitigation may be in the form of identification of areas to be preserved in-situ, where significant archaeology may be present, or the identification of other forms of construction methods which do not require below-ground disturbance. Any such areas of preservation in-situ or 'no-dig' areas will be agreed with the LPA Archaeological Officers and set out within an Archaeological Mitigation Strategy (if required) which would be submitted with the DCO.

10.7.3 Potential enhancement measures may include the provision of interpretation boards identifying key heritage assets or themes within the study area, or the creation of a walking route which allows visitors to understand any historic aspects of the landscape. This would help to better reveal the significance of identified heritage assets and enhance public knowledge.

11. Socio-Economics

11.1 Introduction

11.1.1 This chapter of the ES will provide an assessment of the likely significant socio-economic effects generated by the Proposed Development. This will include the identification and assessment of likely effects during the construction phase, the operational phase, and the decommissioning phase, and including cumulative effects.

11.2 Preliminary Baseline Conditions

11.2.1 The assessment will establish baseline socio-economic conditions within those areas likely to be affected by the Proposed Development. Study areas are defined based on an understanding of relevant local and wider economic geographies, and the extent to which socio-economic effects are likely to be contained within these established statistical geographies. It is proposed to analyse data (where available) for the geographies set out in **Table 11.1**. A plan depicting the Primary Impact Zone is presented at **Figure 11.1**, and a plan depicting the Secondary Impact Zone is presented at **Figure 11.2**.

Table 11.1: Study area for the socio-economic assessment

Spatial scale	Title	Justification for inclusion
Primary Impact Zone	Bassetlaw District	The Site is located within the Bassetlaw district and most impacts are expected to be retained within the local authority.
Secondary Impact Zone	Bassetlaw District & Nottinghamshire County	The district of Bassetlaw sits within the county of Nottinghamshire and some impacts may affect this wider scale.
Comparator Areas		
Regional	East Midlands	Looking at the region enables analysis to compare the

Spatial scale	Title	Justification for inclusion
		primary and secondary impact zones to the wider area in order to further understand the local context.
National	England / Great Britain *	Looking at the national scale enables analysis to compare the primary and secondary impact zones to the rest of the country in order to further understand the local context.

*Dependent on availability of data

11.2.2 Baseline socio-economic conditions will be established using the most up-to-date available secondary data, establishing the extent to which the following key indicators have changed over time. Baseline information will be sought from, but will not be limited to, the following sources:

- Overarching National Policy Statement for Energy (EN-1).
- National Policy Statement for Renewable Energy (EN-3).
- The National Planning Policy Framework (NPPF).
- Office for National Statistics (ONS) data.
- Ministry of Housing, Communities & Local Government (for deprivation data).
- The Government's Levelling Up White Paper.
- Information obtained from the Applicant.

11.2.3 A summary of key baseline characteristics of the relevant geographies at this present time is as follows:

- **Population**: Between 2012 and 2022 the population of Bassetlaw grew by 6.0%. This compares to a population growth of 8.0% in The East Midlands and 6.7% in England. The fastest growing age group in Bassetlaw in this time was those aged 65+ with an increase of 21.6%. Between 2018 and 2038, the

population of Bassetlaw is projected to increase by 11.4%, compared to 12% for the East Midlands and 8.6% for England.

- **Employment**: Based on data from the Office for National Statistics, as of 2022, there were 52,000 jobs in Bassetlaw. This was a rise of 2% (1,000) since 2015. This increase was below the equivalent changes in employment for the East Midlands (7.1%) and Great Britain (7%). Of the 52,000 jobs in Bassetlaw, 3,500 (6.7%) were in the construction sector.
- **Unemployment**: As of February 2024, the claimant count in Bassetlaw was 3.4%, which has decreased from 5% in February 2021. The latest rate was below the corresponding figures for the East Midlands (3.5%) and Great Britain (3.8%).
- **Commuting data**: according to census data, as of 2021 there were 40,690 people that worked and lived in Bassetlaw. Beyond this, there was a net outflow as 13,097 people lived outside of Bassetlaw and worked in Bassetlaw, whilst 14,221 people lived in Bassetlaw and worked elsewhere.
- **Economic Output**: Between 2011 and 2021, the gross value added (GVA) in Bassetlaw grew by 40% (£716million) to reach £2.5 billion. This was above the growth in GVA that was seen in the East Midlands (38.8%) and the United Kingdom (37.3%).
- **Deprivation**: Based on data from the Index of Multiple Deprivation, Bassetlaw 002E has an overall rank of 25,959 putting it in the top 30% least deprived LSOAs in England (out of 32,844, rank 1 is most deprived and 32,844 is least). Bassetlaw 002E has its' highest rank in crime with an overall rank of 30,480, putting it in the top 10% least deprived LSOAs. It has its lowest rank in living environment with a rank of 12,990, putting it in the top 40% most deprived LSOAs for this domain.

11.2.4 Other key indicators that will be included in the baseline analysis are:

- Business base.
- Qualifications and skills.
- Economic activity.
- Economic output.
- Visitor Economy.

- Accommodation provision.

11.3 Likely Significant Effects

11.3.1 During construction, it is anticipated that the Proposed Development will generate the following socio-economic effects:

- Employment – direct, indirect and induced jobs based in the local and wider impact areas.
- Economic output – measured in gross value added (GVA, generated by the employment supported during the construction phase).
- Accommodation – potential impacts on available accommodation as a result of construction workers required during the construction phase.

11.3.2 Once completed and fully operational, it is anticipated that the socio-economic effects associated with the Proposed Development will include the following:

- Employment – direct, indirect and induced jobs based in the local and wider impact areas.
- Economic Output – measured in gross value added (GVA, generated by the employment supported once operational).
- Business rates revenue – measured in terms of the business rates generated by the Proposed Development comparing to existing levels, where available.

11.3.3 During decommissioning, it is anticipated that the Proposed Development will generate the following socio-economic effects:

- Employment – direct, indirect and induced jobs based in the local and wider impact areas.
- Economic output – measured in gross value added (GVA, generated by the employment supported during the decommissioning phase).
- Accommodation – potential impacts on available accommodation as a result of workers required during the decommissioning phase.

11.3.4 **Table 11.2** presents a summary of the scope of the assessment, including consideration of potential effects, the study areas within which the effect is applicable, and the relevant receptors.

Table 11.2: Summary of assessment scope

Potential effect	Relevant study area	Potential receptors(s)
Construction		
Employment	Primary & Secondary impact zones	District and county level economy
Economic contribution	Primary & Secondary impact zones	District and county level economy
Accommodation Demand	Primary impact zone	District visitors
Operation		
Employment	Primary & Secondary impact zones	District and county level economy workforce
Economic contribution	Primary & Secondary impact zones	District and county level economy
Business rates	Primary impact zone	District economy
Decommissioning		
Employment	Primary & Secondary impact zones	District and county level economy
Economic contribution	Primary & Secondary impact zones	District and county level economy
Accommodation Demand	Primary impact zone	District visitors

11.4 Assessment Methodology

11.4.1 There is no overarching Government guidance that sets out the preferred methodology for assessing the likely socio-economic effects of development proposals. Accordingly, the approach adopted for the assessment will be based on professional experience and best practice, and in consideration of the policy requirements/tests set out within the NPPF and the Local Plan.

11.4.2 The first step in the assessment will be to identify the sensitivity of the receptors. In socio-economic assessments, receptors are not sensitive to changing environmental conditions in the same way as many environmental receptors are. To address this, the assessment will draw on a combination of measurable indicators (jobs, population, etc.) and a consideration of the importance of the receptor in policy terms to gauge the receptor's sensitivity. The sensitivity criteria proposed to be used in the Socio-Economics ES chapter is presented in **Table 11.3**.

11.4.3 The magnitude of change upon each receptor will then be determined by considering the predicted deviation from baseline conditions, both before and, if required, after mitigation. The magnitude of effect criteria proposed to be used in the Socio-Economics ES chapter is presented in **Table 11.4**.

11.4.4 Wherever possible the magnitude of change will be quantified. Where this is not possible, for example, for the number of the social related considerations, consideration of magnitude of change will be on a qualitative basis and justified through baseline research, review of relevant policy, and consultation undertaken.

11.4.5 There are no industry standard significance criteria for the assessment of socio-economic effects. The assessment is quantitative where possible. In circumstance where this is not possible, the assessment is qualitative in nature based on professional judgement. The significance of effect is identified by combining the sensitivity of the receptor against the magnitude of impact using the matrix in **Table 11.5**.

Table 11.3: Criteria for Sensitivity of Receptor

Sensitivity	Evidence for sensitivity assessment
High	Evidence of direct and significant socio-economic challenges relating to receptor. Accorded a high priority in local, regional or national economic regeneration policy. Evidence of direct and significant socio-economic challenges including: • Areas with levels of unemployment well in excess of / below regional / national averages and high levels of relative deprivation (i.e. top 10%).

Sensitivity	Evidence for sensitivity assessment
	• Areas with claimant count well in excess of / below regional / national averages. • Areas with economic activity rate well in excess of / below regional / national averages. • Areas with a significant oversupply / undersupply of visitor accommodation.
Medium	Some evidence of socio-economic challenges linked to receptor, which may be indirect. Change relating to receptor has medium priority in local, regional and national economic and regeneration policy. Some evidence of socio-economic challenges, including: • Areas with levels of unemployment above / below regional / national averages and levels of relative deprivation (i.e. top 50%). • Areas with claimant count well above / below regional / national averages. • Areas with economic activity rate above / below regional / national averages. • Areas with a moderate oversupply / undersupply of visitor accommodation.
Low	Little evidence of socio-economic challenges relating to receptor. Receptor is accorded a low priority in local, regional and national economic and regeneration policy. Little evidence of socio-economic challenges, including: • Areas with levels of unemployment in line with regional / national averages and levels of relative deprivation (i.e. bottom 50%). • Areas with claimant count in line with regional / national averages.

Sensitivity	Evidence for sensitivity assessment
	• Areas with economic activity rate in line with regional / national averages. • Areas with a sufficient supply of visitor accommodation.
Negligible	No socio-economic issues relating to receptor. Receptor is not considered a priority in local, regional and national economic development and regeneration policy. No socio-economic issues relating to a receptor, including: • Areas with levels of unemployment less than regional / national averages and low levels of relative deprivation (i.e. bottom 10%). • Areas with claimant count higher than average regional / national averages. • Areas with economic activity rate higher than average regional / national averages. • Areas with a surplus supply of visitor accommodation.

Table 11.4: Criteria for Magnitude of Effect

Magnitude of impact	Description / criteria
High	Proposed Development would cause a large change to existing socio-economic conditions in terms of absolute and/or percentage change. • Greater than 5% increase / decrease on existing baseline levels of employment. • Greater than 5% increase / decrease in GVA from baseline. • Greater than 5% increase / decrease in business rates from baseline.

Magnitude of impact	Description / criteria
	• Greater demand required than available accommodation supply.
Medium	Proposed Development would cause a moderate change to existing socio-economic conditions in terms of absolute and/or percentage change. • 1% - 5% increase / decrease on existing baseline levels of employment. • 1% - 5% increase / decrease in GVA from baseline. • 1% - 5% increase / decrease in business rates from baseline. • Increased demand in respect of accommodation but below available supply.
Low	Proposed Development would cause a minor change to existing socio-economic conditions in terms of absolute and/or percentage change. • Limited increase / decrease on existing baseline levels of 0.1% - 0.99% increase / decrease on existing baseline levels of employment. • 0.1% - 0.99% increase / decrease in GVA from baseline. • 0.1% - 0.99% increase / decrease in business rates from baseline. • Limited increase in demand in respect of accommodation.
Negligible	No discernible change in baseline socio-economic conditions.

Table 11.5: Significance of Effect

Magnitude of change	Sensitivity of receptor			
	High	**Medium**	**Low**	**Negligible**
High	Major	Major	Moderate	Negligible
Medium	Major	Moderate	Minor to Moderate	Negligible
Low	Moderate	Minor to Moderate	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Assumptions & Limitations

11.4.7 Baseline information is derived from the latest available statistics, however there is often a time-lag associated with the publication of this data. As such, the latest available data at the time of finalization of assessment documentation will be presented.

11.4.8 The Applicant is intending to accommodate any construction or decommissioning workers who reside from outside of the local area in Serviced and/or Non-Services Accommodation as opposed to residential dwellings (rental or otherwise). As such, consideration of potential effects on housing supply, be it affordable or otherwise, is scoped out of the assessment.

11.5 Cumulative Effects

11.5.1 Cumulative schemes will be studied as part of this assessment. The schemes chosen will align with other chapters and will be assessed in the same manner as the Proposed Development in isolation. The schemes which will be assessed will be those within the Primary and Secondary Impact Zones which are also associated with renewable energy development, and for which there is potential for overlap in respect of potential effects with the Proposed Development.

11.6 Preliminary Discussions of Potential Mitigation and Enhancement Measures

11.6.1 Requirements for mitigation and opportunities for enhancement measures will be identified and discussed with relevant consultees and the Applicant as soon as practicable.

12. Noise and Vibration

12.1 Introduction

12.1.1 This Section sets out the proposed approach for the assessment of potential effects resulting from the Proposed Development in relation to noise and vibration emissions during construction and operation.

12.2 Preliminary Baseline Conditions

12.2.1 The existing environment at properties neighbouring the Proposed Development is expected to be typical of a relatively rural area and to consist of noise generated by vehicle movements along the local and more distant wider road network, birds and wildlife, farm machinery, localised human activities and aircraft overhead with some industrial noise from existing industry located to the north. Existing sources of vibration are expected to primarily emanate from traffic movements in the area, from HGVs in particular.

12.2.2 The specific baseline noise environment will be determined using the procedures set out in BS 4142:2014+A1:2019 'Methods for Rating and Assessing Industrial & Commercial Sound'. Where necessary, background noise measurements will be undertaken at certain properties neighbouring the Proposed Development, the specific locations of which, will be discussed with representatives of Bassetlaw District Council (BDC). This information may also be supplemented by survey information gathered as part of other planning applications in the area depending on its relevance.

12.2.3 A selection of potential background noise measurement locations and wider property locations, which are expected to experience the highest noise levels from the Proposed Development, are shown in **Figure 12.1**. The proposed monitoring locations may be scaled back depending on the expected impact resulting from the introduction of the proposals (i.e. if very low levels of operational noise are expected at certain properties), the quality and scope of survey information already available from other applications and the consultation process.

12.3 Likely Significant Effects

12.3.1 The solar farm, substation and proposed battery storage facilities have the potential to generate noise via the operation of the various plant to be installed, including the several proposed inverters (PCS units), transformers and, in certain

locations, battery storage facilities. The operation of the Proposed Development will not generate any substantial vibratory effects.

12.3.2 Noise and vibration generated during the various activities required to construct and decommission the Proposed Development may well be perceptible to residents. However, the resultant levels of which are unlikely to breach typical construction Noise limits.

12.3.3 The main activities which have the potential to generate noise and vibration during construction and decommissioning are the formation of the access tracks, piling of the solar panel frame supports, construction of hard-standings, cable trenching and landscaping (including the removal and reinstatement of the land) when occurring relatively close to neighbouring residences. Other activities will either occur at distances which are very unlikely to result in levels that would breach typical construction sound limits or involve relatively light construction methods/techniques that would equally result in the generation of comparably low temporary levels of noise and vibration. Additional traffic movements generated during the construction process, along existing local roads and access tracks, also have the potential to have sporadic noise and vibration impacts at residences adjacent to these. However, this essentially only tends to result in a minor increase in the average noise levels from existing roads, with the most noticeable noise and perceptible vibration effects resulting from the sporadic and increased number of HGVs passing residences along the access routes, with the resulting levels for individual events being similar to that created by existing HGV movements. In the case of the use of the introduced access tracks, overall levels are highly unlikely to breach typical overall construction noise limits.

12.4 Assessment Methodology

12.4.1 The assessment will reference and account for all relevant planning policy relating to operational and construction noise, including the NPPF, Noise Policy Statement for England (NPSE), NPPG: Noise, The Overarching National Policy Statement for Energy (EN-1), National Policy Statement for Renewable Energy Infrastructure (EN-3), The National Policy Statement for Electricity Networks Infrastructure (EN-5) and any applicable local guidance,

12.4.2 The operational assessment will be carried out using specified source noise levels for the relevant ancillary equipment, with penalties applied for certain potential acoustic features, as per BS 4142:2014+A1:2019 ‘Methods for Rating and Assessing

Industrial & Commercial Sound' which is referred to within the policy documentation discussed above. The magnitude of impact will be described as 'negligible' if the rating level associated with the introduction of the Proposed Development is 10 dB or more below the background noise level; 'low' if less than or equal to the background noise level plus 5 dB; 'medium' if not more than 10 dB above the background level and 'high' if more than 10 dB above, all subject to a lower limiting value of 35 dB LAr, where the magnitude of impact will be considered 'low' regardless.

12.4.3 Construction and decommissioning noise and vibration emissions will be considered with reference to BS 5228:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites'. The most appropriate method for assessing the noise impacts is the ABC Method which sets threshold levels for specific periods based on the pre-existing ambient levels, subject to average lower Category A limiting values of 65, 55 and 45 dB LAeq for daytime (07:00 - 19:00 weekdays and Saturdays 07:00 – 13:00), evenings and weekends (19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays) and night-time (23:00 – 07:00) periods respectively, for instances where existing ambient noise levels are relatively low, which is the case for the Proposed Development. The magnitude of impact will be described as 'negligible' if the expected noise levels are 10 dB below the respective limits, 'low' if they are at the limits, 'medium' if up to 10 dB over limits and 'high' if more than 10 dB above.

12.4.4 Residential locations, including schools and hospitals will be regarded as having high sensitivity, commercial offices and workspaces a medium sensitivity and farm/industrial buildings and premises assumed to have a low sensitivity.

12.4.5 The significance of a potential effect will be determined using the following matrix.

Table 12.1 – Significance of Effects Matrix

Magnitude	**Sensitivity**		
	High	**Medium**	**Low**
High	Major	Major/moderate	Moderate
Medium	Major/moderate	moderate	Moderate/minor
Low	Moderate/minor	Moderate/minor	Minor

Negligible	Minor	Minor	Negligible

12.5 Cumulative Effects

12.5.1 Where necessary, the operational assessment of the noise generated by the Proposed Development will also account for the potential combined impact of other neighbouring planned, consented or operational developments, for which a similar assessment according to BS 4142:2014+A1:2019 would be required.

12.5.2 The construction of other developments in the area is unlikely to result in any substantial cumulative impacts when considered to be occurring at the same time as the construction of the Proposed Development and standard controls on construction noise and vibration will likely apply in any case. As a result, it is considered that this aspect is not required to be considered in any specific detail. However, the potential for cumulative construction impacts will be kept under review throughout the development process.

12.6 Preliminary Discussions of Potential Mitigation and Enhancement Measures

12.6.1 The Site will be designed such that the separation distance from the various plant to be installed and any neighbouring residences is maximised and mitigation measures, in the form of noise attenuation devices and or barriers, will be employed to reduce the level and character of potential operational noise where necessary. A Requirement is also expected to be included in the DCO that would restrict operational noise levels associated with the Proposed Development.

12.6.2 Construction noise and vibration levels can be mitigated using a variety of measures including the restriction of certain activities for nominated time periods, the imposition of planning controls, the use of less impactful equipment and ensuring that residents local to any works are properly informed as to planned works. A more extensive list of potential mitigation measures will be provided within an acoustic impact assessment report and preliminary and/or outline Construction Environmental Management Plan (CEMP) supplied in support of the submission for the Proposed Development.

13. Climate Change

13.1 Introduction

13.1.1 Climate change is regarded as an important environmental, social and economic policy concern and this is relevant to project level assessment and decision-making. In line with the EIA Regulations' and relevant IEMA Guidance, this chapter of the scoping report considers effects arising as a result of the Proposed Development in relation to:

- Greenhouse gas emissions (GHG);
- In-combination climate change impact (ICCI) assessment; and
- Climate change resilience review.

13.2 Preliminary Baseline Conditions

Greenhouse Gas Emissions (GHG)

13.2.1 The baseline for the GHG emissions assessment will consider the 'business as usual scenario' whereby the Proposed Development has not been implemented and the Site remains in its current state. The baseline will consider the current Site use, including existing carbon stock and sources of GHG emissions within the Site boundary and reflect the current existing activities on-site. Alongside this it will also consider the emissions that may be avoided as a result of the Proposed Development, i.e. existing emissions from the generation of grid electricity if the Proposed Development where to not go ahead.

13.2.2 Where data is available the baseline will also include emissions associated with the existing road network with proximity to the Site boundary, as well as rail emissions due to the Sheffield-Lincoln Railway Line which runs through the western Site area, although outwith the Site boundary. The proposals are not anticipated to affect the operations of the railway line.

13.2.3 The current land use within the Site consists of predominantly agricultural land mainly in arable use with some areas of pastoral use, with hedgerow, woodland copses and individual trees. This will be taken into consideration within the baseline for the assessment noting the abundance of vegetation within the Site suggesting a relatively high carbon sink potential.

In-combination Climate Change Impact (ICCI) Assessment

13.2.4 The receptors for in-combination climate change impact are receptors within the surrounding environment that will be impacted by the Proposed Development in-combination with future climatic conditions. Baseline conditions for the in-combination climate change impact assessment will be determined using the climate change projections data.

Climate Change Resilience

13.2.5 The assessment of climate change resilience would use the Proposed Development as the receptor including construction, operation and decommissioning and will use future baseline weather conditions in the final decade of the Proposed Development's life-cycle, which is anticipated to be 40 years.

13.3 Likely Significant Effects

Greenhouse Gas Emissions (GHG)

13.3.1 In line with the IEMA (2022) guidance, which states that all increases in GHG emissions have the potential to be significant, it is considered that any increase in GHG emissions above the baseline levels has the potential to have an impact on the global climate.

13.3.2 During the lifetime of the proposals GHG emissions will be produced through both on and offsite activities. During construction of the development there would be the generation of GHG emissions both during the production of the solar panels themselves, transporting them to Site and also during the construction of the development from on-site construction activities and the disposal of waste materials. Once operational these emissions will likely be offset, which will have an overall net positive effect on emissions reduction.

13.3.3 The proposals are for 400 MW solar electricity generation and 200 MW of battery storage, therefore providing a renewable energy source for the National Grid. Such a development would lead to a substantial reduction in CO2 released from the generation of electricity from fossil fuel sources, with the creation of an energy storage facility enabling the renewably generated electricity to be released to the Grid when it is required.

In-combination Climate Change Impacts (ICCI) Assessment

13.3.4 In-combination effects are described as "*the extent to which climate exacerbates or ameliorates the effects of the project on the environment*" [55]. This is scoped into further assessment within the ES and further details are provided on the assessment methodology in the following section.

Climate Change Resilience Review

13.3.5 The UK Climate Projections (UKCP18) highlight key changes in weather conditions that may affect the Proposed Development or exacerbate other predicted impacts if not considered as part of the project design and elsewhere in the ES:

- Summers will become hotter and drier;
- Winters will become milder and wetter;
- Soils will become drier on average;
- Snowfall and the number of very cold days will decrease; and
- Storms, heavy and extreme rainfall days (rainfall greater than 25mm) and heatwaves will become more frequent.

13.3.6 The climate resilience review will provide a description of how the proposals will be designed to be more resilient to the climate change impacts identified during the review of the UKCP18 data, looking at the topics as stated above. A more detailed assessment of climate change projections will be conducted for the land within the Site boundary as part of the ES.

13.4 Assessment Methodology

Relevant Legislation, Guidance and Policy

13.4.1 It is anticipated the following legislation, guidance and policy will be referred to as part of the assessment:

- The Paris Agreement 2015;
- The Glasgow Climate Pact 2021;
- The UK Climate Change Act 2008;
- The Carbon Budgets Order 2009;
- National Policy Statement for Energy (EN-1);

[55] IEMA (2020)Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation

- National Policy Statement for Renewable Energy Infrastructure (EN-3);
- National Policy Statement for Electricity Networks Infrastructure (EN-5);
- National Planning Policy Framework 2023;
- National Planning Practice Guidance 2019;
- Emerging Bassetlaw Local Plan 2020-2037 (2022);
- Lincolnshire County Council Carbon Management Plan (2019);
- Nottinghamshire County Council Carbon Management Plan (2007);
- IEMA Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (2020)
- IEMA Climate Change Adaptation Practitioner Guidance (2022); and
- IEMA Guide: Assessing Greenhouse Gas Emissions and Evaluating their Significant (2022).

Greenhouse Gas Emissions (GHG)

13.4.2 The study area for the GHG assessment will be the Site boundary and the assessment will cover all direct and indirect GHG emissions arising from activities undertaken on the Site during the construction, operation and decommissioning of the Proposed Development. Indirect GHG emissions include emissions embedded within construction materials from the energy used for their production, as well as emissions from transportation of material, waste and workers during the construction period.

13.4.3 The approach to the GHG assessment will follow the IEMA guidance (2022) and best practice measures. The guidance presents a series of principles developed by IEMA, stating that all GHG emissions are arguably significant and contribute to global climate change.

13.4.4 The GHG assessment will be a quantified assessment where possible. The global climate will be the direct receptor. Direct impacts upon the global climate will have subsequent effects on global ecosystems and the species which they support.

13.4.5 The approach to the assessment will consider the full life-cycle of the Proposed Development and potential sources of GHG emissions. GHG emissions offset through the production of lower carbon electricity compared to grid average

emissions during the operational phase will be accounted for within the GHG emissions calculations.

13.4.6 Baseline and full life-cycle GHG emissions will be quantified using a calculation based methodology aligned with the GHG Protocol [56].

13.4.7 With respect to GHG emissions, there are no established thresholds for assessing the significance of the contribution an individual project can make towards climate change. However, section 6 of the IEMA Guidance (2022) states:

"*The crux of significance therefore is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*."

13.4.8 The significance of likely effects (including beneficial effects) will therefore be determined by using baseline road traffic data and with reference to stated commitments to reasonable and deliverable measures to reduce emissions in accordance with established thresholds and/or other benchmarks for performance, including relevant policy and guidance.

In-combination Climate Change Impact (ICCI)

13.4.9 In-combination climate impact assessment identifies how the resilience of various receptors in the surrounding environment are affected by a combination of future climate conditions and impacts from the Proposed Development. For in-combination effects, each environmental topic chapter's respective effects and corresponding mitigation measures will be considered as part of the assessment. Environmental topic chapters will consider the future proposed climate conditions; however, these changes will be more relevant to receptors identified in some topic chapters than others. The assessment of in-combination effects in the ES will include proportionate discussion on the potential for significant effects on identified receptors and justify the topic chapters which have been scoped out of the assessment.

13.4.10 The topics likely to be scoped into the assessment include:

- Landscape and Visual Amenity: Implications of changes in average temperatures, precipitation and extreme weather events will be given

[56] World Business Council for Sustainable Development and World Resources Institute (2015) The GHG Protocol, A Corporate Accounting and Reporting Standard.

further consideration for landscape character, including any proposed planting associated with the Proposed Development.

- Cultural Heritage: consideration will be given as to whether changes in temperature and rainfall patterns could affect above and below ground heritage assets. For example, waterlogged archaeological sites are susceptible to changes and fluctuations within the water table.
- Flooding and Drainage: consideration of climate change will form an integral part of the assessment of flood risk and will be cross-referenced in this assessment.
- Ecology: increased rainfall and flooding events, coupled with rising temperatures, may modify UK flora and fauna over time, with shifts in species' ranges. Natural England's 'Climate Change Risk Assessment and Adaptation Plan' sets out the risks and threats posed by current climate change projections. In association with the RSPB, Natural England has also published a Climate Change Adaptation Manual which details the potential effects of climate change on different habitat types.

13.4.11 It is anticipated that the following topics can be scoped out of the in-combination climate change impact assessment and will not require further consideration within the ES:

- Air Quality: An increase in winter rainfall and/or in heavy rain days could lead to a possible decrease in relevant pollutant concentrations, with a decrease in summer rainfall leading to a possible increase in concentrations. Overall, however, at this stage, it is not anticipated that air quality conditions at the Site will fail to meet relevant air quality objectives as a consequence of projected climate change.
- Noise: As a result of higher temperatures, any building services equipment that provides cooling for components of the Proposed Development will be required to operate at a higher intensity and for longer periods in the future, resulting in increased noise emissions. However, at this stage, this is not considered likely to increase the significance of overall noise emissions associated with the development. Furthermore, potential future temperature rises would be considered as part of the noise assessment and inform appropriate mitigation measures.

- Transport and Access: Increased rainfall/ storms have the potential to lead to traffic disruption during flooding episodes. Increased summer temperatures may cause some disruption and discomfort, although this is unlikely to be a significant concern, particularly for the operational phase of the development.
- Ground Conditions: The projected increase in rainfall/possible storm events has the potential to result in the mobilisation of ground contaminants when the soil is saturated leading to potential consequences for human health or water quality. During the projected warmer and drier summers, there is potential for soil to become airborne leading to impacts on air quality and human health. However, due to the historical uses of the Site it is not considered to contain contaminated land.
- Socio-Economics and Human Health: Recent flooding events in the UK highlighted the extent to which economic activity and human welfare can be affected by flooding from increased rainfall. Temperatures are also likely to increase, which may lead to overheating concerns, particularly during construction. However, at this stage, it is considered that this topic can be scoped out of the in-combination assessment.

Climate Change Resilience

13.4.12 A qualitative assessment will be provided for the Proposed Development resilience to climate change. This will be completed in connection with other environmental disciplines and the Proposed Development's design team, by considering the climate projects for the geographical location and timeframe of the Proposed Development.

13.4.13 The Chapter will describe how the Proposed Development has been designed to be as resilient as is reasonably practicable to future climate change.

13.4.14 As there is no legislative definition of 'significance', the conclusion as to whether an effect is significant and its magnitude comes down to professional judgement. For climate change resilience, significance should reflect the aims/ purpose of the project. For example, as the proposals are for a solar development with the ability to provide electricity supply, an impact which temporarily removes this supply should be considered potentially significant.

13.4.15 The receptor in terms of project resilience to climate change will be the Proposed Development itself and land within the area as defined by the Site boundary.

13.5 Cumulative Effects

13.5.1 In respect to GHG emissions climate change is an inherently cumulative topic and all GHG emission from project are arguably significant to the receptor. All development which will be included in the cumulative assessment are likely to involve the generation of direct, indirect and embodied GHG emissions during construction and operation. It is considered appropriate to assume that all proposed schemes within the area surrounding the Site will be required to meet the relevant standards for emissions reduction and to comply with relevant planning policy. In this context, it is considered appropriate to assume that any applications that are consented include 'reasonable' measures to avoid, reduce and/or offset the generation of GHG emissions and therefore that no significant cumulative effects will be anticipated. Therefore, GHG emissions is scoped out of the cumulative assessment.

13.5.2 Climate change resilience is largely a project specific consideration, namely the resilience of the Proposed Development to climate change and the extent to which projected climate change could alter the predicted impact judgements. The Proposed Development resilience is not likely to be affected by the presence of other developments and therefore will be scoped out of the cumulative assessment. In relation to the other ES technical assessments and possible interactions with other developments, potential cumulative 'in combination climate impacts' will be given further consideration as the assessment work progresses.

13.6 Preliminary Discussions of Potential Mitigation and Enhancement Measures

13.6.1 As the assessment progresses relevant mitigation measures if required will be embedded within the design of the development where possible. This may include mitigation measures during construction, operation and decommissioning of the scheme.

13.6.2 In line with IEMA Guidance (2022), mitigation will be considered as early as possible in accordance with the hierarchy for managing project related GHG emissions: (1) Avoid, (2) Reduce, (3) Substitute and (4) Compensate.

14. Transport & Access

14.1 Introduction

14.1.1 The Transport and Access chapter of the EIA will be prepared with reference to the Institute of Environmental Management and Assessment (IEMA) 'Guidelines for the Environmental Assessment of Traffic and Movement', as appropriate.

14.1.2 This section of the Scoping Report sets out the proposed methodology for the assessment of the Proposed Development against transportation matters. In particular, the methodology would consider the potential effects of the Proposed Development on the local highway network.

14.1.3 The transport impact of the Proposed Development will be considered with reference to local and national guidance and policy contained in the following as appropriate:

- National Policy Statement for Energy (EN-1);
- National Policy Statement for Renewable Energy Infrastructure (EN- 3);
- National Planning Policy Framework (NPPF) (2023);
- National Planning Practice Guidance (NPPG) - Travel Plans, Transport Assessments and Statements (2014);
- IEMA Guidelines for the Environmental Assessment of Traffic and Movement (2023);
- Design Manual for Roads and Bridges (various years) including CA185 (Vehicle Speed Measurement), CD109 (Highway Link Design), CD123 (Geometric design of at grade priority and signal-controlled junctions), GG142 (Walking, cycling and horse-riding assessment and review); and
- Nottinghamshire Local Transport Plan 2011-2026.

14.2 Preliminary Baseline Conditions

14.2.1 As part of the assessment work, the transport chapter would consider baseline transportation conditions including traffic flows and highway safety. Separate consideration shall be given to the construction period, operation/ maintenance period and decommissioning period given the different traffic impacts of each phase.

Construction Period

14.2.2 At this stage, it is proposed that Annual Average Daily Traffic (AADT) will be assessed at the following links as set out in **Table 14.1** below. The proposed link extents are indicatively shown below at **Figure 14.1**.

14.2.3 Automatic Traffic Count (ATC) surveys and Manual Classified Counts will be carried out to provide the baseline traffic flows at each link and supplemented by publicly available information from Department for Transport and WebTRIS where appropriate. At this stage we have included for all links which could potentially be used for construction routing or points of access to ensure the impacts of the Site are fully considered. The final links for consideration will depend on the proposed construction route(s) and points of access further to consultation with the Local Highway Authority(s) and National Highways.

Table 14.1 – Proposed highway links for Construction Routing and Access

Link	Description	Construction route / access
Sturton Road/ Gainsborough Road	Unclassified road but assumed to already accommodate HGVs in relation to West Burton Power Station.	Potential construction route and point of access.
Station Road/ Wheatley Road	Unclassified road subject to 7.5t (except for access) weight restriction.	Potential construction route and point of access.
Sturton Road/ Church Hill/ Middlefield Road	Unclassified road subject to 7.5t (except for access) weight restriction routing through North and South Wheatley	Potential construction route.
Cross Street/ Leverton Road	Unclassified road subject to 18t (except for access) weight restriction routing	Potential construction route.

Link	Description	Construction route / access
	through Sturton le Steeple.	
North Street/ Common Lane	Residential street leading to rural single track then byway. Unclassified road subject to 18t (except for access) weight restriction.	Potential construction route and point of access.
Low Holland Lane/ Church Lane/ Littleborough Road	Residential street leading to rural single track. Unclassified road subject to 18t (except for access) weight restriction.	Potential construction route and point of access.
Three Leys Lane	Rural single track. Unclassified road subject to 18t (except for access) weight restriction.	Potential construction route and point of access.
Springs Lane	Residential street leading to byway/ track. Unclassified road subject to 18t (except for access) weight restriction.	Potential construction route and point of access.
Freeman's Lane	Residential street leading to byway/ track. Unclassified road subject to 18t (except for access) weight restriction.	Potential construction route and point of access.
A620 (Saundby Road)	'A' classification assumed to already accommodate HGVs serving West Burton	Potential construction route.

Link	Description	Construction route / access
	Power Station and other uses.	
A631 (Gainsborough Road/ Bawtry Road)	'A' classification, partially dualled, assumed to already accommodate HGVs routing through Beckingham (bypass), Gringley on the Hill (bypass), Everton and Bawtry.	Potential construction route.
A638 (Great N Road)	'A' classification assumed to already accommodate HGVs.	Potential construction route.
A614 (Bawtry Road)	'A' classification assumed to already accommodate HGVs.	Potential construction route.
A1 (M)	Strategic Road Network dual carriageway with grade-separated junctions. 'A' classified trunk road assumed to already accommodate HGVs and significant traffic volumes.	Potential construction route.
A620 (Gainsborough Road/ Retford Road/ Main Street/ Welham Road/ Moorgate/ Amcott Way/ Babworth Road/ Straight Mile)	'A' classification assumed to already accommodate HGVs routing through North Wheatley (bypass), Clarborough and Retford.	Potential construction route.

Link	Description	Construction route / access
A631 (The Flood Road)	'A' classification, partially dualled, assumed to already accommodate HGVs	Potential construction route.
A156 (Ashcroft Road/ Lea Road)	'A' classification assumed to already accommodate HGVs routing through Gainsborough. Height restriction.	Potential construction route.
A156 (Gainsborough Road/ High Street)	'A' classification assumed to already accommodate HGVs routing through Lea, Marton, Torksey, Torksey Lock and Fenton.	Potential construction route.
A57	'A' classification assumed to already accommodate HGVs routing through Newton on Trent, Dunham and East Markham (bypass).	Potential construction route.
Station Road/ Treswell Road/ Cottam Lane/ Laneham Road	Unclassified road subject to 18t (except for access) weight restriction routing through the villages of Laneham, Stokeham, Treswell, South Leverton and North Leverton with Habblesthorpe.	Potential construction route.
Main Street/ Retford Road/ Leverton Road	Unclassified road subject to 18t (except for access) weight restriction. Rural	Potential construction route and point of access.

Link	Description	Construction route / access
	carriageway leading to a residential street within Retford.	
Church Lane/ Winleys Road/ High House Road	Unclassified road subject to 18t (except for access) weight restriction. Byway/ rural single track leading to a residential street within Clarborough.	Potential construction route and point of access.

14.2.4 The construction period will be temporary with the peak construction years anticipated to be 2027 - 2029. However, in order to provide a worst case assessment it is considered appropriate to consider this against the baseline survey year, which is anticipated to be in 2024.

14.2.5 Subject to the Local Highway Authority(s) and National Highways views, an appropriate TEMPro growth rate in order to estimate background traffic growth between the base and future year will be agreed.

14.2.6 Whilst we will engage with National Highways for completeness, it is anticipated that the development impact, compared to the existing flows on the Strategic Road Network will be negligible and therefore it is anticipated these links will be scoped out of any further assessment.

Operation/ Maintenance Phase

14.2.7 A future year of 2029 is proposed for the consideration of operational/ maintenance traffic, on the basis that all construction activities at the site will be complete.

14.2.8 Operational/ maintenance trip generation will be significantly lower than traffic volumes during construction and predominantly comprise LGVs. Whilst the routes to the Site are anticipated to be similar to those used during construction, it is anticipated the study area will be limited to the immediate vicinity of the Site. The details of the study area will be confirmed subject to scoping with the Local Highways Authorities (LHA) and National Highways (NH).

Decommissioning Phase

14.2.9 The development is expected to be temporary with decommissioning after circa 40 years. As such decommissioning traffic will also be considered in a future year of 2069.

14.2.10 It is assumed at this stage the decommissioning route(s) and points of access would be similar to that used during construction. The study area for the decommissioning phase would therefore be the same as that used for the construction phase at this stage, again subject to scoping with the LHA(s)/ NH.

14.3 Likely Significant Effects

14.3.1 Access to the Site is currently under consideration with a combination of temporary construction/ decommissioning accesses and permanent accesses which may be used for operation/ maintenance only or for the full project cycle (construction, operation/ maintenance and decommissioning). It is currently anticipated points of access could be provided at an appropriate location along Gainsborough Road, Common Lane, Littleborough Road, Fenton Lane, Springs Lane, Freeman's Lane, Station Road, Wheatley Road and High House Road. The final access strategy is subject to further assessment, discussion with the LHA(s)/ NH and the evolving masterplan.

14.3.2 The proposals will also be supported by a Construction Traffic Management Plan (CTMP). This will summarise the traffic movements anticipated throughout the construction period and the associated mitigation measures to be agreed with the LHA at Nottinghamshire County Council (NCC). A scope for the CTMP and the merits of supporting the planning application with a Transport Assessment/ Transport Statement and Decommissioning Traffic Management Plan will be agreed upon with NCC as LHA for the site location in due course.

14.3.3 The proposals and scope of work may also be subject to discussion with National Highways (NH), Lincolnshire County Council (LCC) and South Yorkshire County Council (SYCC) who all may have interest in the construction routing to site, with at least one of the links for assessment within their jurisdiction.

14.4 Assessment Methodology

14.4.1 IEMA "rules of thumb" criteria will be applied to assist in defining the threshold impacts for development traffic which will inform the scale and extent of the transport chapter work. On this basis, links where the traffic flows are expected to

increase by more than 30%, or where HGV flows are expected to increase by more than 30% as a result of the Proposed Development will be considered (Rule 1). Links in proximity to sensitive receptors, where traffic flows are expected to increase by more than 10% as a result of the Proposed Development will also be considered (Rule 2). Sites that are considered to be sensitive receptors with reference to IEMA are Conservation Areas, schools, health facilities, community facilities and congested junctions. Any sensitive receptors will be agreed with the highway authority at NCC (or the relevant LHA/ NH for the link) in due course.

14.4.2 Where the predicted increase in traffic and HGV flow is lower than these thresholds then the significance of the effects can be considered to be low and not significant, then it is considered that detailed assessment is not required.

14.4.3 The transport chapter would provide an assessment of the predicted impact on the local highway network by using pre-defined significance criteria set out within the IEMA guidance. Those criteria will be based on the net change in journeys as a result of construction, operational/ maintenance and decommissioning traffic values and any mitigation to be delivered as part of the proposals. The significance criteria would establish the magnitude of any beneficial or adverse effects the proposed development will have on the transport network.

14.4.4 Liaison will take place with highway officers at NCC, NH, LCC and SYCC as appropriate.

14.4.5 In summary, with reference to the IEMA guidance, it will consider the forecast impacts of the Proposed Development on the following throughout the construction, operational/ maintenance and decommissioning phases of the Proposed Development:

i. Severance;
ii. Driver delay;
iii. Pedestrian delay (incorporating delay to all non-motorised users);
iv. Non-motorised user amenity;
v. Fear and intimidation;
vi. Road safety;
vii. Road safety audits; and
viii. Hazardous loads/ large loads.

14.4.6 In the context of each criterion, the baseline conditions and estimation of conditions for the appropriate year of assessment will consider the physical level of the impact and estimation of the number of people exposed to the change and their relative sensitivity.

14.4.7 The residual impacts of the Proposed Development, taking into account any proposed mitigation would then be assessed and confirmed.

14.4.8 It is anticipated that other impacts including noise, air quality and vibration will be considered by other disciplines throughout the EIA, whom the transport team will work with.

14.5 Cumulative Effects

14.5.1 Given the proposed use, the Proposed Development's traffic impact will be greatest during construction therefore cumulative effects on the road network could result if another substantial development were to be constructed at the same time and using the same construction route(s), or part of. This will be limited to consideration of the local highway network only once the construction route(s) is finalised.

14.5.2 Where information is available for the cumulative sites identified and this overlaps with the Proposed Development timescales and routing, a cumulative assessment of the effects combining the traffic increase as a result of the developments will be assessed.

14.5.3 Section 6 sets out an initial list of cumulative sites for consideration which will be discussed with the LHA(s)/ NH in the context of the Proposed Development. At this stage, the most pertinent sites are anticipated to be 20/00117/FUL and Tarmac Quarry which are immediately adjacent to the Site boundary.

14.5.4 Planning application 20/00117/FUL is for “Installation and Operation of a Solar Farm Comprising an Array of Ground Mounted Solar PV Panels with Associated Infrastructure Including Housing for Inverters a Substation Compound, Point of Connection Mast, Fencing, Security Cameras, Cabling, Access Tracks and a Temporary Construction Compound. Land North West And South Of Field Farm Wood Lane Sturton Le Steeple Nottinghamshire”. Access is proposed from Wheatley Road via Wood Lane with the agreed construction route to be via A1 Junction 34 routing through Bawtry, east along the A621 approaching the Site from Sturton Road and Station Road. The cumulative solar site could therefore utilise a similar

construction route, and possible point of access as the Proposed Development, therefore this site will be further considered within the cumulative assessment.

14.5.5 Tarmac quarry is located adjacent to the northeastern boundary of the Site. Permission for the quarry was originally consented under reference 1/46/06/00014 for a new sand and gravel quarry with access directly off Gainsborough Road. This point of access coincides with a proposed access point for the Proposed Development and therefore this site will be further considered within the cumulative assessment.

14.6 Preliminary Discussions of Potential Mitigation and Enhancement Measures

14.6.1 With regards to the Proposed Development, mitigation measures will be embedded into the design of the scheme, for example construction traffic management measures. If further likely significant effects are determined, where possible, mitigation measures will be proposed so that residual effects are not significant, in terms of transport, traffic, highways and movement.

15. Air Quality

15.1 Introduction

15.1.1 An Air Quality Assessment will be undertaken by Hoare Lea to determine the potential air quality effects as a result of the Proposed Development and assess their significance. The proposed method of assessment for identifying potential significant environmental effects associated with construction, operation and decommissioning phases of the Proposed Development is described in this chapter. The Air Quality Assessment will address impacts from the Site as a whole. The results of the assessment and relevant mitigation measures to address any adverse effects to nearby receptors will be presented in the ES.

15.2 Preliminary Baseline Conditions

Local Air Quality Monitoring

15.2.1 The Site is not located within an Air Quality Management Area (AQMA) and is approximately 18.6 km north west from the nearest AQMA, named 'Lincoln NO_2 AQMA', which is located in City of Lincoln Council's (CoLC's) administrative area. This AQMA has been declared for exceedances of the annual mean nitrogen dioxide (NO2) Air Quality Objective (AQO) only.

15.2.2 The Site is located within Bassetlaw District Council's (BDC's) administrative area. The Site is also located in close proximity to the administrative area of West Lindsey District Council (WLDC).

15.2.3 There is currently no automatic monitoring of NO_2, PM_{10} or $PM_{2.5}$ undertaken by BDC or WLDC.

15.2.4 The BDC and the WLDC utilise passive diffusion tube monitoring locations to record annual mean NO_2 concentrations within their respective administrative areas. Monitoring data from passive diffusion tube monitoring locations within the BDC and WLDC administrative area has been provided by the most recent BDC Annual Status Report 2023[57] and WLDC Annual Progress Report (APR) 2023[58].

[57] Bassetlaw District Council (2023) 2023 Air Quality Annual Status Report (ASR) – [online] (Last accessed: 04/03/2024)
[58] West Lindsey District Council (2023) Annual Progress Report 2023 – [online] (Last accessed: 04/03/2024), Available at: https://www.west-lindsey.gov.uk/sites/default/files/2024-02/Air%20Quality%20Report%202023.pdf

15.2.5 The pollutant concentrations recorded in 2020 and 2021 are not considered to be representative of "normal" air quality conditions. Whilst it is expected that as a result of the COVID-19 pandemic behaviours will change in the future, the impact of this on air quality long-term is currently unknown and therefore the use of 2020 and 2021 data will be omitted from any analysis, but has been included for information. Monitoring data for 2022 is available for use as the latest year of representative monitoring data and as such will be considered as the baseline year, 2019 monitoring data will be presented within this section for comparison.

15.2.6 There are no passive diffusion tube monitoring locations in the immediate vicinity of the Site, however there are ten passive diffusion tube monitoring locations positioned within 6 km of the Site. Three passive diffusion tube monitoring locations are situated in BDC's administrative area whereas seven passive diffusion tube monitoring locations are placed within the WLDC area of administration. **Table 15.1** provides the recorded annual mean NO_2 concentrations at the nearest passive diffusion tube monitoring locations to the Site from the years 2018 to 2022. The locations of the passive diffusion tube monitoring locations are illustrated in **Figure 15.1**.

Table 15.1: Passive Diffusion Tube Monitoring Location Results (2018-2022)

Site ID	Site Type	Site Name	Local Authority	Distance from Site (km)	Annual Mean NO2 Concentration (µg/m³)				
					2018	2019	2020	2021	2022
WL1	Roadside	3 Lea Road, Gainsborough	WLDC	4.6	24.6	22.8	16.3	20.6	-
WL2	Roadside	58 Etherington Street, Gainsborough	WLDC	5.3	18.6	19.0	14.4	15.0	14.1
WL4	Roadside	Heaton Street	WLDC	5.3	21.4	20.7	15.2	16.7	15.3
27	Roadside	Arlington Way / Grove Street, Retford 27	BDC	5.4	28.3	28.7	22.6	23.2	22.8
WL3	Roadside	19 Spring Gardens, Gainsborough	WLDC	5.4	20.6	17.3	14.2	13.8	14.1

Site ID	Site Type	Site Name	Local Authority	Distance from Site (km)	Annual Mean NO2 Concentration (µg/m³)				
					2018	2019	2020	2021	2022
25	Roadside	London Road, Junction, Retford 25	BDC	5.5	25.7	24.7	21.7	21.3	20.8
WL10	Roadside	Marshall Way, Gainsborough	WLDC	5.6	16.8	15.0	12.0	11.7	12.3
WL5, WL6, WL7	Industrial	Gainsborough Cemetery, Gainsborough	WLDC	5.6	11.5	11.3	9.1	8.7	9.1
WL8	Kerbside	Cherry Tree Road, Gainsborough	WLDC	5.7	15.0	14.7	11.9	11.3	10.6
26	Roadside	Hospital Road, Retford 26	BDC	6.0	31.1	30.1	23.8	26.1	25.2

15.2.7 As noted above, monitoring data for 2020 and 2021 has been included for information purposes only. There have been no exceedances of the annual mean NO_2 Air Quality Objective (AQO) of 40 µg/m³ at any of the passive diffusion tube monitoring locations within 6 km of the Application Site in 2022, the most recent year of available monitoring data. The passive diffusion tube monitoring location with the highest concentration in 2022 was Site ID: 26, recording an annual mean NO_2 concentration of 25.2 µg/m³ or 63% of the annual mean AQO. As such it is considered likely that no exceedances of the annual mean AQO will be experienced in the vicinity of the Site.

15.2.8 The 1-hour mean AQO for NO_2 is 200 µg/m³ and should not be exceeded more than 18 times within a year. In line with Local Air Quality Management Technical Guidance (LAQM.TG(22)[59]), an annual mean NO_2 concentration of 60 µg/m³ or above is often used to indicate a possible exceedance of the 1-hour mean NO_2 AQO. There has been no recorded exceedance of the 60 µg/m³ threshold at any of the passive

[59] Defra (2022) Local Air Quality Management Technical Guidance (TG22) – [online] (Last accessed: 04/03/2024), Available at: https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf

diffusion tube monitoring locations within 6 km of the Site in the baseline year 2022. As such, no exceedance of the 1-hour mean NO_2 AQO is expected.

Defra Predicted Background Concentrations

15.2.9 The Defra predicted background concentrations[60] have been obtained from the national maps published by Defra. These estimated concentrations are produced on a 1km by 1km grid basis for the whole of the UK. The Site falls into 22 grid squares. The minimum and maximum Defra predicted background concentrations for the Site for pollutants NO_2, PM_{10} and $PM_{2.5}$ are provided in **Table 15.2** for 2022, the most recent year of available monitoring data.

15.2.10 As shown in **Table 15.2**, Defra predicted background concentrations are below the relevant AQOs for all pollutants in 2022, the baseline year.

Table 15.2: Minimum and Maximum Defra Predicted Background Concentrations for 2022 in µg/m³

Year	Minimum and Maximum Annual Mean NO_2 Concentration (µg/m³)		
	NO_2	PM_{10}	$PM_{2.5}$
2022	6.7 – 7.1	14.7 – 15.4	8.1 – 8.4

15.3 Likely Significant Effects

Construction and Decommissioning Phase Emissions

15.3.1 During the construction and decommissioning phases of the Proposed Development, there is the potential for air quality impacts associated with road traffic emissions from construction vehicles.

15.3.2 The impacts of the decommissioning phase are often similar to, or of a lesser magnitude than the air quality impacts associated with road traffic emissions generated during the construction phase. Therefore, decommissioning will not be assessed separately.

Operational Phase Emissions

15.3.3 Limited effects may occur in the operational phase of the Proposed Development from the movement of vehicles over the Site for maintenance purposes.

[60] Defra (2020) Background Pollution Maps – 2018 – [online], (Last accessed: 04/03/2024), Available at: uk-air.defra.gov.uk/data/laqm-background-maps?year=2018

Issues Proposed to be Scoped Out

15.3.4 The following aspects are proposed to be scoped out of the air quality ES Chapter as they are expected to have no likely significant effects:

- Impacts to air quality at sensitive human and ecological receptors due to fugitive dust emissions during the construction phase as appropriate mitigation measures will be implemented. A construction dust risk assessment will be undertaken to inform appropriate mitigation and appended to the outline Construction Environmental Management Plan (oCEMP) as detailed below;
- Impacts to air quality at sensitive human and ecological receptors from non-road mobile machinery (NRMM) since emissions of NO_X and PM_{10} will be required to adhere to emissions standards. Therefore, the effects of NRMM on local air quality would be insignificant; and
- Impacts to air quality at sensitive human and ecological receptors from the operational phase of the Proposed Development as road traffic flows are expected to be minimal and no combustion plant will be present on Site.

15.4 Assessment Methodology

15.4.1 The Air Quality Assessment will be undertaken in line with the following legislation and guidance documents:

- National Policy Statement (NPS) EN-1 (2023);
- National Policy Statement (NPS) EN-3 (2023);
- The National Planning Policy Framework (NPPF);
- National Planning Practice Guidance (NPPG);
- Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction[61];
- Environmental Protection UK (EPUK), and IAQM Land-Use Planning & Development Control: Planning for Air Quality[62];

[61] Institute of Air Quality Management (2024) Guidance on the assessment of dust from demolition and construction v2.2 – [online], (Last accessed: 04/03/2024), Available at: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf
[62] Environmental Protection UK and Institute of Air Quality Management (2017), Land-Use Planning & Development Control: Planning For Air Quality v1.2 – [online] (Last accessed: 04/03/2024), Available at: iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

- Defra Local Air Quality Management Technical Guidance (LAQM.TG(22))[63] ; and
- Bassetlaw District Council Core Strategy & Development Management Policies DP[64] .

Study Area

15.4.2 The study area will cover a wide zone of influence (i.e. 6 km from the Site). The detailed dispersion modelling that are proposed to be undertaken for the construction phase, if required, will be included within this zone.

Potential Sensitive Receptors

15.4.3 IAQM construction guidance advises the need for a construction dust assessment if there are human receptors within 250m of the boundary of the site or within 50m of the routes used by construction vehicles up to 250m from the Site boundary, and if there are ecological receptors within 50m of the Site boundary or within 50m of the routes used by construction vehicles up to 250m from the Site boundary.

15.4.4 There are sensitive human receptors within 50m of the Site boundary and within 50m of the potential construction vehicle routes up to 250m from the Site boundary, however, there are no ecological sites within the 50m distance of the Site or trackout routes.

15.4.5 The impacts from road emissions during the construction phase at sensitive human receptors along construction routes will be considered where the change in traffic flows exceed the relevant EPUK/IAQM criteria within the EPUK and IAQM planning guidance. At this stage it is not considered likely that there will be any sensitive ecological receptors within 50m of any roads affected by construction traffic. This will be confirmed with Transport Consultants and Ecologists for the Proposed Development.

15.4.6 The sensitive receptors that will be considered in the Air Quality Assessment include:

[63] Defra (2022) Local Air Quality Management Technical Guidance (TG22) – [online] (Last accessed: 04/03/2024), Available at: https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf
[64] Bassetlaw District Council (2011) Bassetlaw District Council Core Strategy & Development Management Policies DPD – [online] (Last accessed: 05/03/2024), Available at: https://www.bassetlaw.gov.uk/media/1543/cs1adoptedcorestrategy.pdf

- Existing sensitive receptors in the vicinity of the Site and potential construction routes, including residential properties, hospitals and schools. The village of Sturton le Steeple is centrally located to the Site but outwith the Site boundary.

Potential Effects

Construction and Decommissioning Dust

15.4.7 The works being undertaken during the construction phase include earthworks, construction and trackout. It is anticipated that dust and particulate matter emissions produced during construction phase activities would be inherently controlled through the implementation of an outline Construction Environmental Management Plan (oCEMP). The type of mitigation measures required to control the fugitive dust emission during the construction phase will be assessed within an air quality assessment and included in the oCEMP.

15.4.8 Therefore, the effects of dust and particulate matter emissions released during the construction phase of the Proposed Development from on-site activities are unlikely to be considered significant and have been scoped out of the ES.

Construction and Decommissioning Traffic

15.4.9 Construction traffic generation is unknown at this time but, subject to traffic generation, this may require modelling in order to assess the air quality impacts from road emissions produced by construction vehicles. Consideration of whether such modelling would be required would be based on the principles set out in the EPUK and IAQM planning guidance document 'Land Use Planning and Development Control: Planning for Air Quality' (January 2017), i.e. if the change in flow exceeds greater than 500 Light Duty Vehicles (LDVs) and/or 100 Heavy Duty Vehicles (HDVs) as an annual average daily traffic (AADT) (outside of an AQMA), then the impact of the traffic on existing receptors will be assessed quantitatively.

15.4.10 If required, dispersion modelling will be used to predict concentrations of NO2, PM_{10} and $PM_{2.5}$ at sensitive receptors adjacent to roads affected by the Proposed Development. Modelling will be carried out following Government guidance and using an appropriate model (ADMS-roads). Dispersion modelling calculations will be verified using data gathered in the baseline air quality survey and Local Authority monitoring stations, where appropriate.

15.4.11 Predicted concentrations of NO_2, PM_{10} and $PM_{2.5}$ at sensitive receptors from dispersion modelling calculations would be compared to the current statutory standards and objectives. The air quality impacts at existing sensitive human and ecological receptors will be described using terms outlined in the EPUK and IAQM planning guidance. These terms are derived from the percentage change in concentration relative to the air quality assessment level and with the total long-term average concentration during the construction of the Proposed Development. The EPUK and IAQM planning guidance impact descriptors are Substantial, Moderate, Slight and Negligible.

15.4.12 Appointed transport consultants for the Proposed Development will provide construction traffic data. If construction traffic flows do not exceed the above criteria, impacts will be scoped out of the assessment, however this will be determined when data becomes available and agreed with the Environmental Health Officer at BDC.

Significance Criteria

Construction and Decommissioning Phases

15.4.13 The significance of effects at sensitive receptors will be described as Major, Moderate, Minor or Negligible. The EPUK/IAQM impact descriptor of 'substantial' corresponds to a 'major' effect, a 'moderate' impact corresponds to a 'moderate' effect, a 'slight' impact corresponds to a 'minor' effect and a 'negligible' impact corresponds to a 'negligible' effect.

15.4.14 The assessment of likely significant effects to sensitive receptors will consider the sensitivity of the receptor and the magnitude of change to determine its significance, on a scale of large or high, medium, small or low and negligible. Professional judgement is used throughout this process.

15.5 Cumulative Effects

15.5.1 Discussions are in the early stages with the Local Planning Authorities Environmental Health teams to determine what sites they wish to see in any cumulative assessment for air quality impacts due to construction traffic, if dispersion modelling is required. It is also acknowledged that immediately adjacent to the Site there is the consented quarry (ref 1/46/11/00002/R) and the potential need for a cumulative dust assessment will be considered and if necessary included as part of the cumulative assessment.

15.6 Preliminary Discussions of Potential Mitigation and Enhancement Measures

15.6.1 It is expected that the required mitigation and enhancement measures will be contained within the oCEMP and in line with the EPUK and IAQM planning guidance document.

16. Land Use and Agriculture

16.1 Introduction

16.1.1 This Section considers the potential effects of the Proposed Development on agricultural land and business. In particular this will consider the agricultural land quality of the Site and the extent to which land quality and soil resources will be affected.

16.2 Preliminary Baseline Conditions

16.2.1 The land within the Site is currently in agricultural use mainly in arable use which some areas of pastoral farming.

16.2.2 Agricultural land can be graded according to its inherent limitations for agricultural use. Grade 1 is excellent quality and Grade 5 is very poor quality. Grade 3 is divided into subgrades 3a “good” and 3b “moderate” quality land. Grades 1, 2 and 3a are defined as the “best and most versatile” (BMV) in the NPPF[65] .

16.2.3 According to Natural England’s Provisional Agricultural Land Classification (ALC) Map[66] the majority of the Site is located within Grade 3 agricultural land with the eastern boundary of the Site located within Grade 4 agricultural land, as shown on **Figure 16.1 Agricultural Land Classification**. Within the wider surrounding area around the Site to the north the land is classed Grade 2 land and to the west, south and east the land is classed Grade 3 land. Natural England’s mapping tool does not provide a break down into the subgrades for Grade 3 land and therefore at this point it is not known if the Site falls into the Grade 3a category which is considered BMV or if it is within Grade 3b which is not considered BMV.

16.2.4 In order to inform the assessment an ALC survey will be undertaken which will provide an accurate classification of agricultural land quality across the whole Site, including a breakdown of subgrade for the Grade 3 land.

16.3 Likely Significant Effects

16.3.1 The Proposed Development has the potential to affect the agricultural land quality of the Site. This could result in the temporary loss of the arable use of the

[65] Department for Levelling Up, Housing & Communities (2024) National Planning Policy Framework (NPPF)
[66] Natural England (2019) Provisional Agricultural Land Classification (ALC) (England). Available online: https://naturalengland-defra.opendata.arcgis.com/datasets/5d2477d8d04b41d4bbc9a8742f858f4d_0/about

agricultural land across the Site. Once operational the Site will remain in agricultural use and sheep grazing is proposed within the Site.

16.3.2 Any potential effect on soil quality could be mitigated by careful construction methodologies, including during the decommissioning stage. This will be considered within the assessment.

16.3.3 The Proposed Development offers the opportunity, once renewable energy generation has ceased, to return the land to agricultural use. With the land having a period of time to rest following intensive agricultural activity it is considered the soil health of the Site will generally improve over the lifetime of the development.

16.4 Assessment Methodology

Relevant Legislation, Policy and Guidance

16.4.1 The following relevant legislation, policy and guidance will be considered:

- The National Planning Policy Framework (2023);
- National Policy Statement for Renewable Energy Infrastructure (EN-3) (2023 updated in 2024);
- The Town and Country Planning (Development Management Procedure) (England) Order 2015;
- Guide to assessing development proposals on agricultural land (2021);
- Emerging Bassetlaw Local Plan 2020-2037 (2022); and
- Institute of Environmental Management & Assessment (IEMA) Guidance (2022), A New perspective on Land and Soil in Environmental Impact Assessment.

Methodology

16.4.2 The assessment will consider the agricultural land quality of the Site, and the extent to which the Proposed Development will affect the inherent land quality. It will consider the method of construction and the impact this would have on soil qualities. It will consider the potential for removal of the panels and therefore the reversibility of the impact, and it will consider the extent to which agricultural use can continue during the life of the Proposed Development.

Significance Criteria

16.4.3 Land of "best and most versatile" (BMV) quality is considered to be a receptor of high sensitivity. Whilst Natural England estimate that BMV land accounts for 42% of farmland in England[67], such that this is not a rare resource, it is nevertheless identified as a resource worthy of protection. Land of subgrade 3b, 4 and 5 is considered to be a resource of moderate/ medium sensitivity.

16.4.4 In terms of magnitude of impacts, for this assessment it is proposed that the loss of more than 50 ha of BMV land will be considered to be a large/major magnitude, losses of 20-50 ha are of moderate/medium magnitude and losses of less than 20 ha to be of low magnitude. This magnitude criteria is set by Natural England advice that within the Local Authority planning system they only seek to be consulted on planning application where 20+ha of agricultural land is to be lost through a change of use. Below 20ha (even if the land in BMV) Natural England is not required to be consulted.

16.5 Cumulative Effects

16.5.1 Consideration will be given to the cumulative sites that are identified in Section 6 of this Scoping Report and any additional ground mounted solar sites, with a 5km area that have entered the planning system by the time this application is submitted. Consideration will be given to other forms of development that may be removing 20ha or more of BMV agricultural land for their development.

16.5.2 Sites which come forward which are smaller than 20ha will not be included within the cumulative assessment as a development of this size would not normally be considered for its impact for loss of agricultural land within the UK planning system as Natural England is not required to be consulted on areas of agricultural land less than 20ha (regardless of agricultural grade).

16.6 Preliminary Discussions of Potential Mitigation and Enhancement Measures

16.6.1 Further information will be provided within the ES chapter on mitigation and enhancement measures, however likely measures would include a Soil Management Plan which will include detailed methods of soil handling, identification of resources and reduction of compaction damage.

[67] Natural England (2012) Technical Information Note 049: Agricultural Land Classification: Protecting the best and most versatile agricultural land.

17. Glint and Glare

17.1 Introduction

17.1.1 This chapter has been prepared by Pager Power considers the potential effects of the Proposed Development on Glint and Glare.

17.2 Preliminary Baseline Conditions

17.2.1 The baseline context is presented with respect to possible glint and glare effects only.

17.2.2 The location of the Proposed Development is semi-rural and surrounded by roads, dwellings, railway infrastructure and aerodromes.

Ground-Based Receptors

17.2.3 Based on industry experience, a 1km assessment area is considered when identifying ground-based receptors surrounding the Proposed Development.

17.2.4 The following ground-based receptors have been identified within 1km of the Proposed Development:

- Residential dwellings;
- Local roads;
- Regional roads (A156/Gainsborough Road).

Railway Receptors

17.2.5 Based on previous consultation with Network Rail, a 500m assessment area is considered when identifying railway receptors. This assessment area size is deemed appropriate when identifying railway receptors and infrastructure.

17.2.6 The following receptors have been identified within 500m of the Proposed Development:

- Network Rail Eastern Region – North and East Route;
- Network Rail Assets and Railway Signals.

Aviation Receptors

17.2.7 There is no formal buffer distance within which aviation effects must be modelled. However, in practice, concerns are most often raised for developments within 10km of a licensed aerodrome. Requests for assessments at ranges of 10-20km are far less

common. Assessment of aviation effects for developments over 20km from a licensed aerodrome is not a usual requirement.

17.2.8 The following aerodromes have been identified within 10km of the Proposed Development:

- Carr Farm Airfield;
- Darlton Gliding Club;
- Forwood Farm Airfield;
- Grove Farm Airfield;
- Headon Airfield;
- Retford Gamson Airport;
- Stow Airfield;
- Sturgate Airfield;
- West Burton Airfield; and
- Willow Farm Airfield.

17.3 Likely Significant Effects

17.3.1 Potential effects towards the identified receptors include:

- Glint – a momentary flash of bright light (typically experienced by moving receptors); and
- Glare – a continuous source of bright light (typically experienced by static receptors).

17.3.2 The term 'solar reflection' is used in this report to refer to both reflection types i.e. glint and glare.

17.3.3 The impact significance will be determined considering the visibility of the solar reflections including the level of screening (existing or proposed), the sensitivity of the receptor, location of origin of the solar glare, time and duration of any reflections and location of the Sun at the time a solar reflection is possible.

17.4 Assessment Methodology

17.4.1 A 'Solar Photovoltaic Glint and Glare Assessment' will accompany the application, considering the effects of the solar panel areas upon identified receptors. The

assessment will include the detailed modelling of the solar panels relative to the surrounding ground-based receptors (roads and dwellings) with potential views of the Proposed Development and identified aerodromes.

17.4.2 There is no formal guidance with regard to the maximum distance at which glint and glare should be assessed. From a technical perspective, there is no maximum distance for potential reflections. However, the significance of a solar reflection decreases with distance. This is because the proportion of an observer's field of vision that is taken up by the reflecting area diminishes as the separation distance increases. In most instances, terrain and shielding by vegetation are also more likely to obstruct an observer's view at greater distances.

17.4.3 The above parameters and extensive experience over a significant number of glint and glare assessments undertaken show that a 1km buffer is considered appropriate for glint and glare effects on local dwellings and road users, 500m for railway infrastructure and 10km for aviation activity. In most cases, the assessed distance is much less than this. Potential receptors within 1km distance are identified based on mapping and aerial photography of the region.

17.4.4 The initial judgement is made based on high-level consideration of aerial photography and mapping i.e. receptors are excluded if it is clear from the outset that no visibility would be possible. A more detailed assessment is made if the modelling reveals a reflection would be geometrically possible.

Assessment Process

17.4.5 The glint and glare assessment methodology for ground level glint and glare assessments is as follows:

- Identify the key receptors in the area surrounding the Proposed Development;
- Consider direct solar reflections from the Proposed Development towards the identified receptors by undertaking geometric calculations;
- Consider the visibility of the panels from the receptor's location. If the panels are not visible from the receptor then no reflection can occur;
- Based on the results of the geometric calculations, determine whether a reflection can occur, and if so, at what time it will occur;
- For aviation receptors consider the solar reflection intensity;

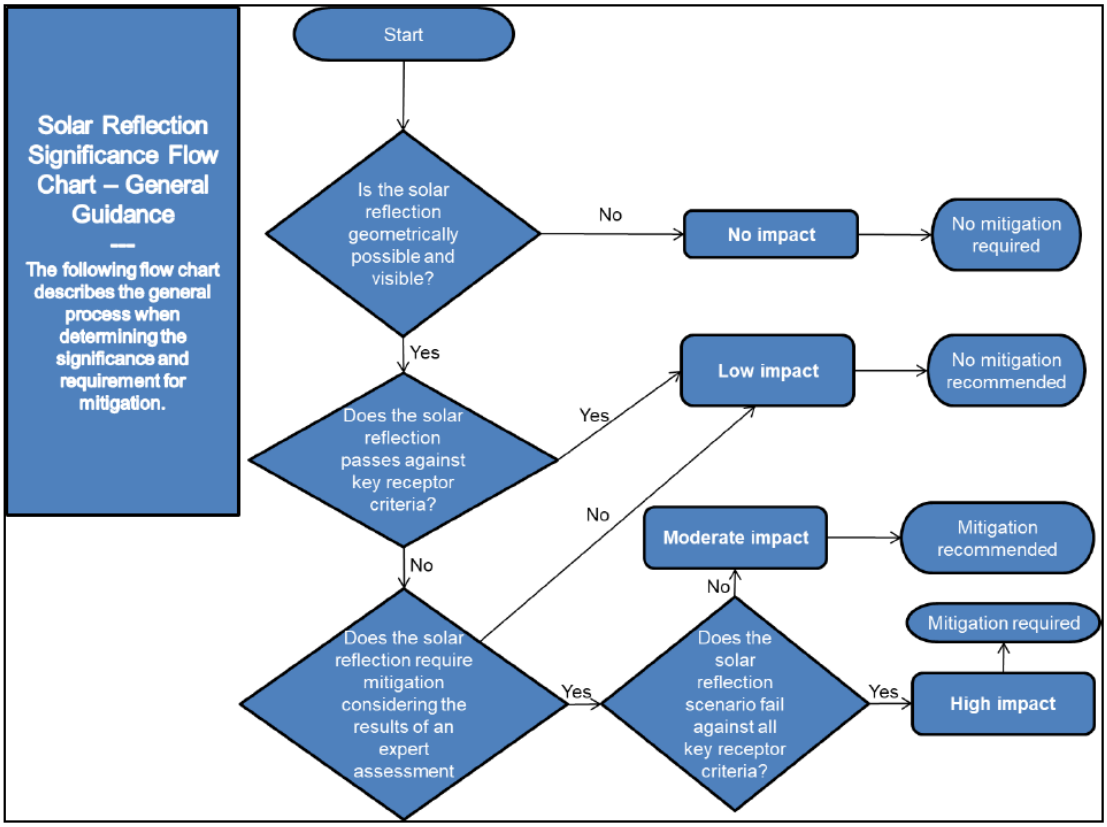
- Consider the intensity of the solar reflection from the Proposed Development in relation to aviation activity;
- Consider both the solar reflection from the Proposed Development and the location of the direct sunlight with respect to the receptor's position;
- Consider the solar reflection with respect to the published studies and guidance - including intensity calculations where appropriate; and
- Determine whether a significant detrimental impact is expected in line Pager Power's standard process and recommended methodology. **Table 17.1** below present the recommended definition of impact significance on glint and glare terms and the requirement for mitigation under each. **Plate 17.1** provides the general process for determining the significance of glint and glare.

Table 17.1 Impact significance definition

Impact Significance	Definition	Mitigation Requirement
No Impact	A solar reflection is not geometrically possible or will not be visible from the assessed receptor.	No mitigation required.
Low	A solar reflection is geometrically possible however any impact is considered to be small such that mitigation is not required e.g. intervening screening will limit the view of the reflecting solar panels significantly.	No mitigation recommended.
Moderate	A solar reflection is geometrically possible and visible however it occurs under conditions that do not	Mitigation recommended.

Impact Significance	Definition	Mitigation Requirement
	represent a worst-case given individual receptor criteria.	
High	A solar reflection is geometrically possible and visible under worst-case conditions that will produce a significant impact given individual receptor criteria	Mitigation will be required if the proposed development is to proceed.

Plate 17.1 General process for determining the significance of glint and glare



17.5 Cumulative Effects

17.5.1 No existing solar developments are understood to be within 1km of the Proposed Development, and therefore cumulative impacts with the Proposed Development are not predicted.

17.5.2 Within 1km of the Site there is an approved solar farm (application ref 20/00117/FUL) located adjacent to the western boundary of the Site. The application was approved in 2020 and construction has not yet started. Due to its location in close proximity to the Proposed Development this site will be considered as part of the cumulative assessment.

17.6 Preliminary Discussions of Potential Mitigation and Enhancement Measures

17.6.1 Potential impacts upon train drivers along a section of railway and residential dwellings suggest mitigation will be recommended – the most common mitigation strategy being the provision of screening at the perimeter to obstruct views of potentially reflecting panels. Where views of reflecting panels for the remaining receptors are obstructed, no effects can be experienced. Other solutions such as layout modification can be considered but are rarely required in practice.

17.6.2 Considering the distance between Grove Farm Airfield and West Burton Airfield, and the Proposed Development, the glare intensity may require further consideration of the glare scenario in context with the aerodrome's operations, where mitigation may be recommended. The most common mitigation strategy, layout modifications, may be required.

18. Miscellaneous Issues

18.1 Introduction

18.1.1 This chapter will consider minor topics that can be grouped into a single chapter to ensure that they are considered in the EIA process, but at this time their effects are expected to not be significant, or they can be resolved with a technical design mitigation so as to not result in a significant residual effect. The topics that are to be included within the chapter are:

- Electric, Magnetic and Electromagnetic Fields, Telecommunications and Utilities; and
- Waste

18.2 Preliminary Baseline Conditions

Electric, Magnetic and Electromagnetic Fields, Telecommunications and Utilities

18.2.1 Power frequency electric, magnetic and electromagnetic fields (EMFs) arise from generation, transmission, distribution and the use of electricity. They occur around power lines and electricity cables and around domestic, office or industrial equipment that uses electricity. Electric fields are the result of voltages applied to electrical conductors and equipment. Fences, scrub and buildings can block electric fields. Magnetic fields are produced by the flow of current, however, most materials do not readily block magnetic fields. The intensity of both electric fields and magnetic fields diminishes with increasing distance from the source.

18.2.2 Electric fields depend on the operating voltage of the equipment. Magnetic fields depend on the electrical currents flowing and are not significantly limited by most common materials. Typically, ground level magnetic fields from underground cables fall much more rapidly with distance that those from a corresponding overhead line but can be higher at small distances from the cable.

18.2.3 Solar farms have the potential to affect the existing utility infrastructure below ground. To identify any existing infrastructure constraints, both consultation and desk-based studies will be undertaken. Consultation with the relevant telecommunication and utility providers is a routine part of the development and

consultees will include water, gas and electricity utilities providers and telecommunications providers as appropriate.

18.2.4 For the Proposed Development the most significant EMF sources are likely to be the cable routes and associated infrastructure that connect the development to the National Grid infrastructure at West Burton Power Station. The Constraints Plan included as **Figure 2.1** identifies two underground fuel pipelines which are located in the eastern section of the Site. There are also currently existing within the Site four overhead lines running through the eastern section of the Site in a general north-southeast direction from West Burton Power Station. There are a further three overhead lines located in the western area, and one located in the southern section of the Site all located in a general east to west alignment.

Waste

18.2.5 At this stage the exact quantities and types of waste likely to be generated during the construction and decommissioning stages are not known. However, it is expected that the waste streams during construction will include:

- Welfare facility waste;
- Waste chemicals, fuels and oil;
- Waste metal;
- Wastewater from dewatering and excavations and from cleaning activities (e.g. wheel wash); and
- Packaging and general construction waste (e.g. paper, cardboard wood etc).

18.2.6 The PV modules, racks, inverters and other supporting equipment will be manufactured off-site to the specified sizes, and wastage during installation is expected to be minimal.

18.2.7 Large-scale earthworks are not expected, and therefore either a surplus or shortfall of fill material requiring either export or import is not anticipated.

18.3 Likely Significant Effects

Electric, Magnetic and Electromagnetic Fields, Telecommunications and Utilities

18.3.1 The Department of Energy & Climate Change[68] (now known as the Department for Energy Security and Net Zero (DESNZ)) guidance states that *'overhead power lines at voltage up to and including 132kV, underground cables at voltages up to and including 132kV and substations at and beyond the publicly accessible perimeter'* are not capable of exceeding the International Commission on Non-Ionizing Radiation Protection (ICNIRP) exposure guidelines and therefore no assessment is required for these and other type of infrastructure listed on the Energy Networks Association website .

18.3.2 Therefore, the scope of the assessment of EMFs in the ES will be limited to the operational impact/consideration of any cables associated with the development which exceed 132kV. The only part of the Proposed Development likely to exceed this voltage is the underground export cables between the onsite substation and the existing West Burton substation which will likely be an underground 400kV cable.

18.3.3 Due to the nature of the piled foundations of the solar farm there is the potential to effect below ground utilities during the construction of the solar farm if the mapping of underground utilities is not correct or not known. Once this information is known through consultation and the appropriate mapping of these constraints for any layout design, the risk of a significant effect will be removed.

18.3.4 Where existing known fuel pipes and overhead and underground electricity cables are located within the Site appropriate buffers and easements will be applied to ensure they are not affected as a result of the proposals.

Waste

18.3.5 During the construction period all waste produced on Site would be managed in accordance with relevant regulations and guidance following the waste hierarchy. Waste will be transported by waste hauliers to an appropriate waste management site which holds the necessary permits and authorisation for those wastes consigned to them. Once operational waste produced on Site would be minimal.

[68] Department of Energy & Climate Change (2012) Power Lines: Demonstrating compliance with EMF public exposure guidelines. A Voluntary Code of Practice.

18.3.6 The Transport and Access Chapter of the ES will consider the transport movements of the waste created by the Proposed Development.

18.3.7 Given that the operators receiving the waste materials resulting from the proposals will be subject to their own regulating procedures, and it expected a Site Waste Management Plan (SWMP) will be prepared. In this context it expected there would be no significant effects associated with waste however it is proposed to be considered within the ES for robustness.

18.3.8 At the end of the Proposed Developments operational life time, which is anticipated to be 40 years, the Site will be decommissioned and all infrastructure removed from the Site.

18.4 Assessment Methodology

Electric, Magnetic and Electromagnetic Fields, Telecommunications and Utilities

18.4.1 There is no direct statutory provision in the planning system relating to protection from EMFs. Guidance published in 2012 by the then Department for Energy and Climate Change (DECC) (which became part of the Department for Business, Energy & Industrial Strategy in July 2016 and then later the Department for Energy Security and Net Zero in 2023) suggests that guidelines for both public and occupational exposure published by the ICNIRP in 1998 should be taken into account.

18.4.2 Consultation will be made with the relevant utility companies to determine the infrastructure that crosses the site. This information will be used to inform the layout design, with relevant easements and buffers applied.

Waste

18.4.3 A SWMP will be created before the scheme is constructed and then decommissioned. It is anticipated that this detail will be secured via DCO requirement and would not be included within the ES due to the parameter outline of the EIA process rather than an assessment against a detailed design.

18.4.4 An Outline Decommissioning Environmental Management Plan (ODEMP) will be prepared as part of the EIA, that will set out the general principles to be followed in the Detailed Decommissioning Plan that will be prepared prior to decommissioning occurring.

18.4.5 In the context of the above, it is considered that significant waste impacts are not expected during either construction, operation or decommissioning.

18.5 Cumulative Effects

18.5.1 It is not expected that there will be any cumulative effects for any of the Miscellaneous topics discussed within this chapter. However, the cumulative sites included in Section 6 of this Scoping Report will be considered as well as any more that have entered the planning system before planning submission and are deemed necessary for inclusion. Further detail on the cumulative assessment will be provided within the Miscellaneous ES Chapter.

18.6 Preliminary Discussions of Potential Mitigation and Enhancement Measures

18.6.1 Mitigation and enhancement measures will be described in further detail in the ES and are likely to comprise a Site Waste Management Plan (SWMP) and Outline Decommissioning Environmental Management Plan (ODEMP) for the control of waste on Site during both the construction and decommissioning phases of the development.

18.6.2 Appropriate offsets and easements will be applied from existing electrical and gas infrastructure located within the Site as part of the design of the development.

19. Summary and Conclusions

19.1.1 A summary chapter will be included at the end of the ES, providing a synopsis of the findings of the EIA. This will include, as discussed with PINS in the pre-planning consultation, a summary of the cumulative impacts from this Development.

19.1.2 A statement outlining the relevant experience and competence of the experts who have undertaken the assessment and prepared the technical chapters within the ES will also be included.

19.1.3 A non-technical summary of the findings will also be prepared, as required by the EIA Regulations.

19.1.4 This Scoping Report accompanies a separate notification under Regulation 8(1)(b) of the EIA Regulations that the applicant will undertake an EIA in respect of the Scheme and produce an ES to report the findings of the EIA.

19.1.5 It also represents a formal application to PINS under Regulation 10 of the EIA Regulations for a 'Scoping Opinion' as to the information to be provided within the ES that will form part of the DCO application. The report has identified the environmental effects that are considered to have the potential to be significant and proposes the approach to be used in assessment that will be undertaken for the EIA to characterise and understand the significance of these effects. The prescribed consultees are invited to consider the contents of this report and comment accordingly with the statutory 42 day time period.

19.1.6 For clarification, Table 19.1 presents a summary of the proposed scope of the technical topics as well as which elements of these topics that are proposed to be scoped out and the rationale behind this decision.

Table 19.1 Scope of Technical Topics and Elements to be Scoped Out

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out of Assessment	Rationale for Scoping Out
Landscape and Visual	Assessment of likely effects on landscape features and elements, landscape character and views and visual amenity during construction, operation and decommissioning.	None	N/A
Ecology & Biodiversity	The Ecology and Biodiversity Chapter of the ES will consider the likely effects of the development on relevant ecological features including statutory and non-statutory designated sites for biological / nature conservation interest at local, national and international levels, National and local priority habitats and species and also protected species during	Dormouse survey and assessment.	No records of dormouse were returned during the desk study. Habitat at the Site are considered to be sub-optimal for dormouse due to a lack of suitable woodland habitats, and the unfavourable management of hedgerows. Furthermore the Site has poor habitat connectivity to know dormouse populations.

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out of Assessment	Rationale for Scoping Out
	construction, operation an decommissioning.		
Hydrology, Hydrogeology, Flood Risk & Drainage	The hydrology, hydrogeology, flood risk and drainage chapter of the ES will considered the likely significant effects of the proposed development during construction, operation and decommissioning on: • Hydrology including Main Rivers and Ordinary Watercourses; • Surface water and groundwater quality, including consideration of the Water Framework Directive (WFD); • Hydrogeology, including impacts on groundwater	Impacts on surface water resources due to abstraction during construction. Impact of hydrology impacts during construction on Clarborough Tunnell SSSI Impact of pollutant release to groundwater during construction. Impacts on groundwater resources due to abstraction during construction. Impact of construction works on groundwater flow. Impact of the development on surface water resources during the operational phase.	No significant surface water use demand is anticipated during the construction phase. Impacts on the SSSI are considered unlikely due to the location of the SSSI topographically up-gradient of the Site and above an area of low permeability mudstone geology which further limits the potential for mobilization of any pollutants. It is considered that the potential for release of pollutants can be adequately controlled though a CEMP. No significant groundwater use demand is anticipated.

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out of Assessment	Rationale for Scoping Out
	abstractions and Groundwater Dependent Terrestrial Ecosystems (GWDTEs); • Water resources with regard to water usage; and • Flood risk from all sources.	Impact on groundwater quality during the operational phase. Impact of the development on ground water resources during the operational phase. Impact of subsurface structure on groundwater flow.	Given the nature of the underlying geology (low permeability mudstone), significant disruption to subsurface water flow routes during excavation works is considered unlikely. The development will require minimal water resource during the operation phase. Risk primarily relates to the use of cooling chemicals and the potential for release of firefighting runoff in the BESS area and it is noted this area is of limited sensitivity. The drainage strategy of the BESS area will include provision for the retention of any contained fire fighting run off and

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out of Assessment	Rationale for Scoping Out
			the BESS systems have a leak detection system and alarm. The development will require minimal water recourse during the operational phase. Given the nature of the underlying geology, significant long-term disruption to subsurface water flow routes associated with foundations, piles or underground pipes is considered unlikely.
Cultural Heritage	A consideration of all aspects of the historic environment, comprising archaeology, built heritage and the historic landscape, both designated and non-designated.	Assessment of designated heritage assets (comprising scheduled monuments, listed buildings, conservation areas, registered parks and gardens, registered battlefields and World Heritage Sites), beyond 3km from the Site.	Given the scale and height of the Proposed Development's solar arrays, at a height of approximately 3.6m above existing ground levels, it is considered that a radius of 3km from the Site boundary is proportionate and provides a

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out of Assessment	Rationale for Scoping Out
			sufficient extent to identify any designated assets for which the Site might form part of the setting of, and therefore contribute to the significance of, either through visual aspects, or historic association.
Socio Economics	Assessment of construction and decommissioning phase employment, economic contribution and accommodation demand. Assessment of operational employment, economic contribution and business rates.	Consideration of potential effects on housing supply.	The Applicant is intending to accommodate any construction or decommissioning workers who reside from outside of the local area in Serviced and/or Non-Services Accommodation as opposed to residential dwellings (rental or otherwise).
Noise & Vibration	Baseline noise monitoring data and a noise survey will be undertaken at locations	None	N/A

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out of Assessment	Rationale for Scoping Out
	representative of surrounding noise sensitive receptors. The assessment will include the potential effects resulting from the proposals in relation to noise and vibration emissions during construction and operation.		
Climate Change	Assessment will consider the effects arising as a result of the Proposed Development in relation to greenhouse gas emissions, in-combination climate change impact (ICCI) assessment and climate change resilience review.	Alterations in air quality conditions as a consequence of climate change. Increases in noise from cooling equipment due to higher temperatures. Increases in rainfall which could lead to a flooding episodes on the Development Site which in turn effect delivery options.	Rainfall may increase in winter and decrease in summer. However, it is not expected that air quality condition will fail to meet relevant objectives. Unlikely that an increase in the operating hours or intensity of any cooling equipment would lead to a significant effect on overall noise conditions, this would also be considered within the Noise and Vibration Chapter.

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out of Assessment	Rationale for Scoping Out
		Airborne particulates from soil increasing through changes in climate factors. Effects of higher temperatures in summer months on the construction teams and the need for climate change adaptation.	Flooding implications of the development are to be assessed in the Hydrology, Hydrogeology, Flood Risk and Drainage section of the ES. The effects on Human Health are already to be assessed in Air Quality and Noise Chapters of the ES and there is no evidence of existing soil contamination that could affect health through becoming airborne. Temperatures may become higher in the summer months for construction works but appropriate guidelines for the protection of the workers on the Development Site would remove any significant effect.

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out of Assessment	Rationale for Scoping Out
Transport & Access	Construction and operational vehicle movements associated with the Proposed Development will be established and assessed in terms of impact on the local highway network. This will include an assessment of the impact on driver severance, driver delay, pedestrian delay, non-motorised users amenity, fear and intimidation, road safety, road safety audits and hazardous loads / large loads. Criteria/requirements for the above assessment will be considered and discussed with the Local Highway Authority, National Highways and any identified relevant stakeholders.	Impact on Strategic Road Network (SRN).	Engagement with National Highways will be undertaken for completeness, it is anticipated that the development impact, compared to the existing flows on the SRN will be negligible. Therefore, anticipated these links will be scoped out of any further assessment.

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out of Assessment	Rationale for Scoping Out
Air Quality	Assessment of potential air quality impacts associated with road traffic emissions from construction vehicles and rom the movement of vehicles over the Site once operational.	Impacts to air quality at sensitive human and ecological receptors due to fugitive dust emissions during the construction phase. Impacts to air quality at sensitive human and ecological receptors from non-road mobile machinery (NRMM). Impacts to air quality at sensitive human and ecological receptors from the operational phase of the Proposed Development.	Appropriate mitigation measures will be implemented and a construction dust risk assessment will be undertaken to inform appropriate mitigation and appended to the oCEMP. Emissions of NO_X and PM_{10} will be required to adhere to the relevant emissions standards. Therefore, the effects of NRMM on local air quality would be insignificant. Road traffic flows are expected to be minimal and no combustion plan will be present on Site.
Land Use & Agriculture	An Agricultural Land Classification Survey of the Site is proposed.	None	N/A
Glint & Glare	An assessment will be undertaken to identify the potential for solar reflections to impact on sensitive	None	N/A

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out of Assessment	Rationale for Scoping Out
	receptors including ground-based receptors, railway receptors and aviation receptors.		
Waste	Description of the potential streams of waste of construction and decommissioning phases and estimated volumes.	No consideration of the waste from the site once it has been passed to waste operators.	Waste operators are subject to their own regulating procedures.
Telecommunications	To identify any existing telecoms infrastructure constraints, operators will be consulted, and a desk-based assessment will be completed.	Operational and decommissioning phases	Once these services have been correctly mapped any pilled foundations would avoid breaking any underground infrastructure, therefore operational and decommissioning phases would not have this risk attached to them.
Electric, Magnetic & Electromagnetic	Survey to determine the electric fields of new cables laid with an operating voltage of 132kV or above.	No cables less than 132kV during construction and decommissioning.	Effects are no found for lower voltage cables and would not be present when the cables are not operating.

19.1.7 There are further environmental topics that are proposed to be scoped out of the ES. Some of these topics have been defined by the possible factors outlined in Schedule 4 (4) of the EIA Regulations. They are summarised below in Table 19.2.

Table 19.2 Reasoning for Scoping Out of Other Environmental Topics

Environmental Topic	Rationale for 'Scoping Out' of the ES
Major Accidents and Disasters	As the design of the Proposed Development evolves in preparation for the DCO application, it will become clear that there are no real risks or serious possibilities of a Major Accident or Disaster event interacting with the Proposed Development. There are various health and safety considerations particularly for workers during construction and decommissioning of the Proposed Development. Workers are in the closest proximity to the Proposed Development and as a result are considered to be the most at-risk group. Comprehensive health and safety assessments are an essential part of the construction process and would be carried out prior to construction by the contractor in accordance with legislation. The construction of the Proposed Development would be managed in accordance with the Health and Safety at Work Act 1974 and would comply with all other relevant Health and Safety Regulations, including: • The Construction (Health, Safety and Welfare) Regulations 1996: • Construction (Design and Management) Regulations 2015; and • Electricity Safety, Quality and Continuity Regulations 2002. The Proposed Development would operate to Health and Safety Executive 'Health and safety in the new energy economy: Meeting the challenge of major change" published in August 2010.

Environmental Topic	Rationale for 'Scoping Out' of the ES
	The risk of a major accident from surface water flooding will also be mitigated through design and appropriate management strategies for the Site during construction, operation and decommissioning. The proposed battery technology for the development is anticipated to be lithium iron phosphate (LFP). LFP has better thermal stability and enters thermal runaway at higher temperatures compared to some other battery chemistries. This is demonstrated by the UL 9540A test results of RES' preferred battery system which show that, at a unit level following deliberate initiation of thermal runaway: • No flaming outside the initiating battery rack was observed. • Surface temperatures of modules within the target battery rack adjacent to the initiating battery rack do not exceed the temperature at which thermally initiated cell venting occurs. • Wall surface temperature rise does not exceed 97°C above ambient. • Explosion hazards were not observed during the test. Data from UL9540A testing can also be used to inform detailed design of the site and safety systems. Fire detection and suppression features would be installed to detect (e.g., multi-spectrum infrared flame detectors) and suppress fire to minimise the effect of any fire. The Proposed Development design will include adequate separation between battery stations to ensure that an isolated fire would not become widespread and lead to a major incident.

Environmental Topic	Rationale for 'Scoping Out' of the ES
	The risk of fire is small and therefore not likely to lead to any major accidents or disasters as this has been mitigated by the design of the equipment and the design of the Site. Once the system is commissioned, regardless of the technology used, the whole installation will report and be monitored continuously by a central hub (Operations and Maintenance Centre) where engineers and technology experts will ensure that it is operating optimally and safely 24 hours a day, 7 days a week. A Fire Risk Statement would be submitted as part of the application, and therefore the matter of fire prevention and safety would be covered outside of the ES. It is therefore proposed that this will be scoped out of the ES.
Soil	There is no history of soil contamination on the Site nor have activities taken place that would be a high risk to unknown soil contamination as the Site has always been in agricultural land use. Therefore, there is no reason to expect any form of land contamination of the Site. The land grade and soil structure of the Site will be considered and contained within the Land Use and Agricultural Chapter of the ES.
Material Assets	It is not considered that there are any further 'material assets' to those already addressed within the other EIA topics.
Human Health	The possible effect on human health will be considered within the ES but not within its own standalone chapter. It will be considered within the Noise and Air Quality Assessments and

Environmental Topic	Rationale for 'Scoping Out' of the ES
	therefore the scope of effects on Human Health have been shaped by their assessment criteria and scope of works.

20. Glossary

AADT	Annual Average Daily Traffic
AC	alternating current
ALC	Agricultural Land Classification
AOD	above ordnance datum
APR	Annual Progress Report
AQMA	Air Quality Management Area
AQO	Air quality objective
ASNW	Ancient Semi-Natural Woodland
ATC	Automatic Traffic Count
BDC	Bassetlaw District Council
BEIS	The Department of Business, Energy and Industrial Strategy
BESS	Battery Energy Storage System
BGS	British Geological Survey
BMV	Best and Most Versatile
BNG	Biodiversity Net Gain
CCTV	close circuit television
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CIfA	Chartered Institute for Archaeologists
CNP	Critical National Priority
CO2	Carbon dioxide
CTMP	Construction Traffic Management Plan
DBA	Desk-Based Assessment
DC	direct current
DCO	Development Consent Order
DECC	Department for Energy and Climate Change
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EMF	electromagnetic fields
EN1	Overarching National Policy Statement for Energy
EN3	National Policy Statement for Renewable Energy
EN5	National Policy Statement for Electricity Networks Infrastructure
EPUK	Environmental Protection UK
ES	Environmental Statement
FRA	Flood Risk Assessment
GHG	greenhouse gases
GIS	Geographic Information System

GLVIA	Guidelines for Landscape and Visual Assessment
GVA	Gross Value Added
GWDTE	Groundwater Dependant Terrestrial Ecosystems
Ha	hectare
HDV	Heavy Duty Vehicles
HER	Historic Environment Record
HGV	Heavy Goods Vehicles
HSI	Habitat Suitability Index
IAQM	Institute of Air Quality Management
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IDB	Internal Drainage Board
IEMA	Institute of Environmental Management and Assessment
IRZ	Impact Risk Zone
LCA	Landscape Character Area
LCC	Lincolnshire County Council
LEMP	Landscape and Ecological Management Plan
LERC	Lincolnshire Environmental Records Centre
LGV	Light Goods Vehicle
LHA	Local Highway Authority
LFP	Lithium-Ion Phosphate
LLFA	Lead Local Flood Authority
LOAEL	Lowest Observed Adverse Effect Level
LPA	Local Planning Authority
LSOA	Lower Super Output Area
LWS	Local Wildlife Site
LVIA	Landscape and Visual Impact Assessment
MoRPh	Modular River Physical
MW	Mega Watt
N2O	nitrous oxide
NCA	National Character Area
NCC	Nottinghamshire County Council
NERC	Natural Environment and Rural Communities Act
NGET	National Grid Electricity Transmission
NH	National Highways
NHLE	National Heritage List for England
NOx	nitrogen oxide
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NPS	National Policy Statement
NRMM	non-road mobile machinery
NSIP	Nationally Significant Infrastructure Project
oCEMP	Outline Construction Environmental Management Plan

ONS	Office of National Statistics
OS	Ordnance Survey
PAWS	Plantations on Ancient Woodland Sites
PM	particulate matter
PRoW	Public right of way
PV	Photovoltaic
RVAA	Residential Visual Amenity Assessment
SAC	Special Area of Conservation
SINC	Site of Importance for Nature Conservation
SOAEL	Significant Observed Adverse Effect Level
SPA	Special Protection Area
SPI	Species of Principal Importance
SPZ	Source Protection Zones
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
SYCC	South Yorkshire County Council
SWMP	Site Waste Management Plan
SZTV	Screened Zone of Theoretical Influence
TEMPro	Trip End Model Presentation Program
UKCP18	UK Climate Projections 2018
W	watts
WCA	Wildlife and Countryside Act
WLDC	West Lindsey Council
WFD	Water Framework Directive
ZoI	Zone of Influence
ZTV	Zone of Theoretical Influence
µm	mircometre