

# Fosse Green Energy

Environmental Impact Assessment Scoping Report

Fosse Green Energy Limited

## Quality Information

<u>Prepared by</u>	<u>Checked by</u>	<u>Verified by</u>	<u>Approved by</u>
Various	KF Senior Environmental Consultant	RW Principal Environmental Consultant	Neil Titley Technical Director

### Prepared for:

Fosse Green Energy Limited

### Prepared by: AECOM

AECOM Limited  
2 City Walk  
Holbeck  
Leeds  
LS11 9AR

T: +44(0)1619 278200  
aecom.com

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# 1. Introduction

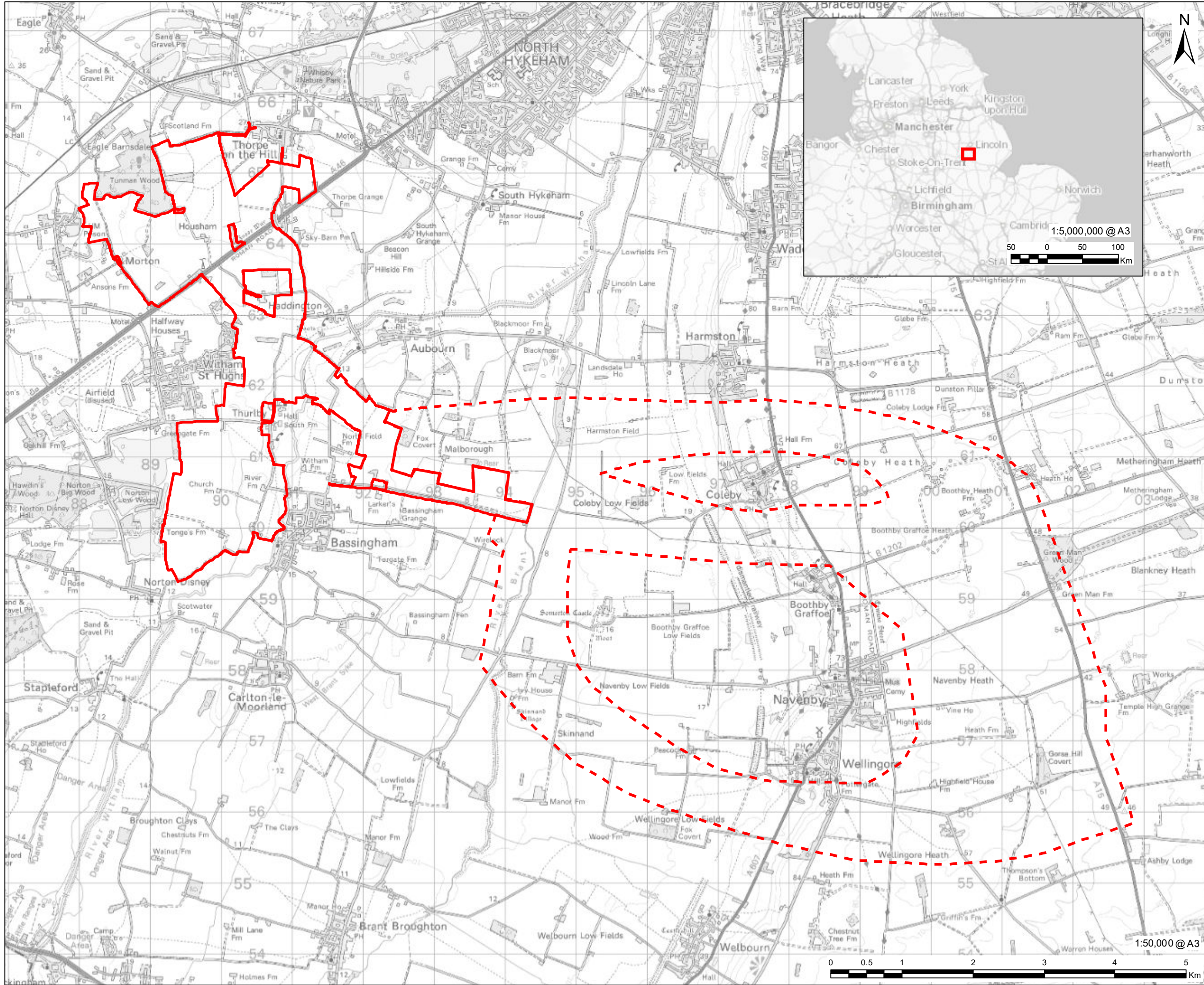
## 1.1 Overview

- 1.1.1 This Environmental Impact Assessment (EIA) Scoping Report has been prepared by AECOM Limited on behalf of Fosse Green Energy Limited (the Applicant), to formally request an EIA Scoping Opinion for the installation of solar photovoltaic (PV) generating panels and on-site Battery Energy Storage System (BESS) and associated infrastructure. This would allow for electrical generation capacity of an anticipated 320 to 350 megawatts (MW) with storage capacity anticipated at 480 megawatt hours (MWh) (the 'Proposed Development') at land approximately 9 kilometres (km) south-west of Lincoln (the 'Site').
- 1.1.2 The Site is denoted by the solid red line on **Figure 1-1** and **Figure 1-2**. This is comprised of land for the solar PV, BESS and associated infrastructure (referred to as the 'Solar and Energy Storage Park') and land for three grid connection route options (referred to as 'Grid Connection Corridor Options') to connect the Solar and Energy Storage Park to a proposed National Grid substation. These two parts of the Site are illustrated on **Figure 1-2**. The Site is described further in **Chapter 2: Site Description and Context**.
- 1.1.3 As the Proposed Development will allow for the generation, storage and export of over 50MW, it is defined as a Nationally Significant Infrastructure Project (NSIP) under Sections 14(1)(a) and 15(2) of the Planning Act 2008 (Ref. 2), and therefore requires a Development Consent Order (DCO).
- 1.1.4 This Scoping Report has been prepared in accordance with Regulation 10(1) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, as amended, hereafter referred to as the 'EIA Regulations' (Ref. 1). In line with the requirements of Regulation 10(3) of the EIA Regulations, this report contains the following information:
- A plan sufficient to identify the land (see **Figure 1-1** and **Figure 1-2**);
  - A description of the proposed development, including its location and technical capacity (Chapters 2 and 3 of this Scoping Report);
  - An explanation of the likely significant effects of the development on the environment (Chapters 7 to 15 of this Scoping Report); and
  - Such other information or representations as the person making the request may wish to provide or make.
- 1.1.5 This Scoping Report has been prepared to provide an overview of the likely significant environmental effects that have been considered in scoping the EIA for the Proposed Development. It sets out the intended scope and the methodologies for assessments of the likely significant environmental effects to be reported in the Environmental Statement (ES) which will accompany the application for development consent. It also provides the justification and

rationale for scoping out environmental topics or receptors where it is considered that significant effects are unlikely to arise as a result of the Proposed Development.

- 1.1.6 The EIA Scoping Report has been prepared with reference to PINS Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, which contains guidance on EIA Scoping (Ref. 9).







**PROJECT**  
Fosse Green Energy

**CLIENT**  
Fosse Green Energy Ltd

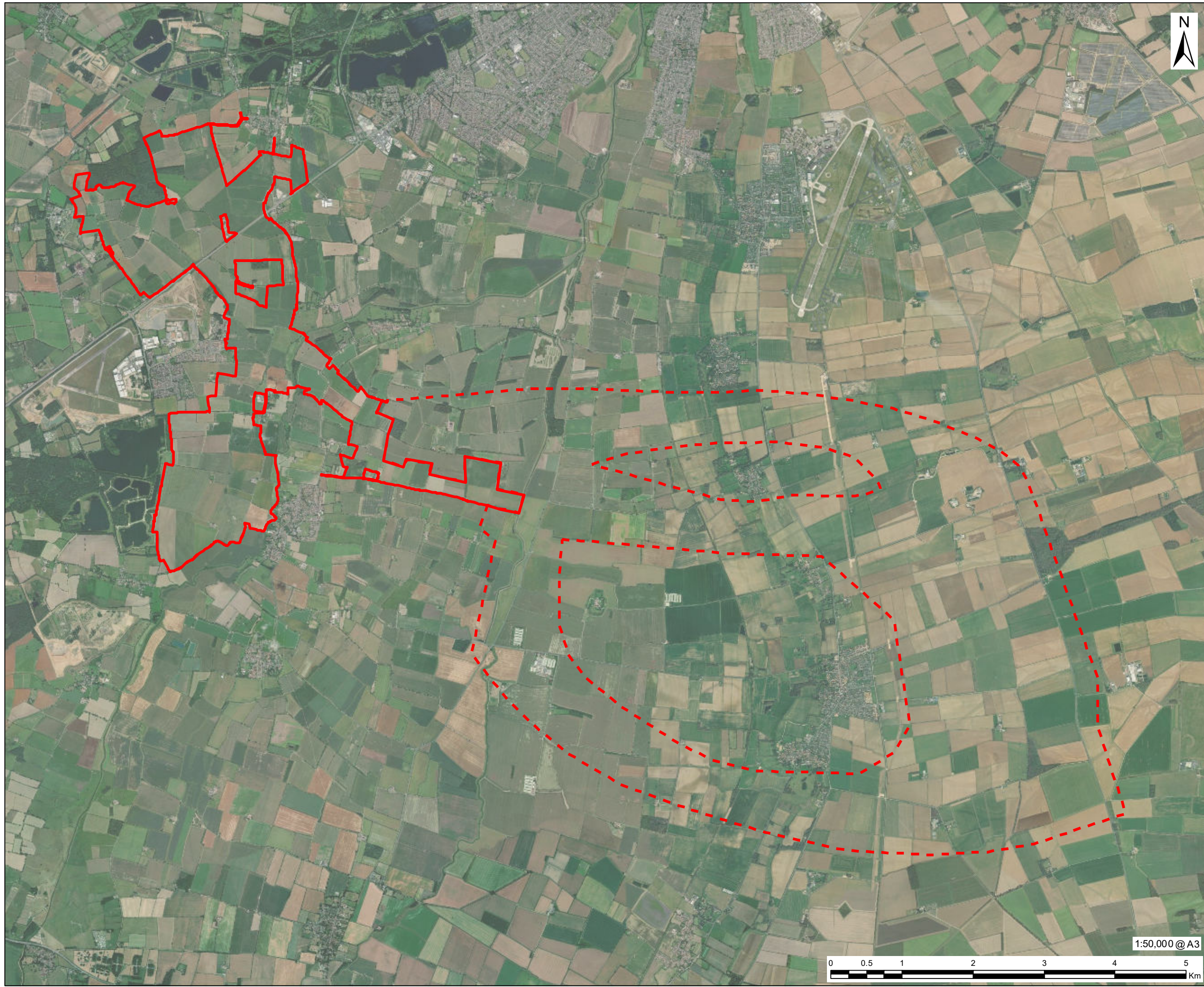
**CONSULTANT**  
AECOM Limited  
2 City Walk  
Holbeck, Leeds  
LS11 9AR  
www.aecom.com

**LEGEND**  
 Solar and Energy Storage Park  
 Grid Connection Corridor Options

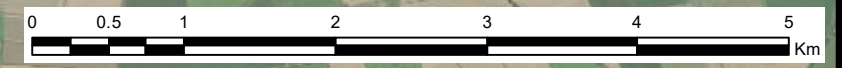
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**ISSUE PURPOSE**  
EIA Scoping Report  
**PROJECT NUMBER**  
60700987  
**FIGURE TITLE**  
Site Location  
**FIGURE NUMBER**  
Figure 1-1

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## 1.2 The Applicant

- 1.2.1 Fosse Green Energy Limited is a subsidiary of Windel Energy Limited and Canadian Solar Inc.
- 1.2.2 Windel Energy Limited, founded in 2018, is a privately held company that specialises in the development and asset management of renewable energy projects and low carbon, including solar, battery energy storage systems (BESS), onshore wind and green hydrogen technologies with projects ranging from 10MW to 440MW output across England and Wales. Windel Energy Limited work closely with landowners, giving them the opportunity to diversify their income stream by leasing their land for renewable energy developments.
- 1.2.3 Canadian Solar Inc. was founded in 2001 in Canada and is one of the world's largest solar technology and renewable energy companies. It is a leading manufacturer of solar photovoltaic modules, provider of solar energy and battery storage solutions, and developer of utility-scale solar power and battery storage projects with a geographically diversified pipeline in various stages of development. Over the past 22 years, Canadian Solar Inc. has delivered around 88 GW of premium-quality solar photovoltaic modules around the world. Likewise, Canadian Solar Inc. has developed, built and connected around 8.8 GWp in over 20 countries, with approximately 574 MWp of projects in operation, 6.7 GWp of projects under construction or in backlog (late-stage), and an additional 18 GWp of projects in the pipeline. Canadian Solar Inc. is one of the most bankable companies in the solar and renewable energy industry, having been publicly listed on the NASDAQ since 2006, with a mission to foster sustainable development and create a better, cleaner earth for future generations by generating electricity from the sun.
- 1.2.4 Canadian Solar Inc. has a strong track record having developed and built dozens of projects in the United Kingdom including Christchurch Solar Farm (Dorset), Bobbing Solar Farm (Kent) and Ballygarvey Solar Farm (Co. Antrim).

## 1.3 Legislative Context and Need for Environmental Impact Assessment

- 1.3.1 The Proposed Development is defined as a NSIP under Sections 14(1)(a) and 15(2) of the Planning Act 2008 (Ref. 2) as an onshore generating station in England, exceeding 50MW. At this stage, the grid connection infrastructure (as part of the Grid Connection Corridor Options) could comprise of either underground cables or overhead lines. If overhead lines are chosen for the Proposed Development, then these will also likely constitute an NSIP under Sections 14(1)(b) and 16 of the Planning Act 2008 (Ref. 2).
- 1.3.2 The requirement to undertake an EIA for NSIP developments is transposed into UK law through the EIA Regulations (Ref. 1). The EIA Regulations specify which developments are required to undergo EIA and Proposed Developments relevant to the NSIP planning process are listed under either 'Schedule 1' or 'Schedule 2'. Developments listed in Schedule 1 must be

subject to EIA, while developments listed in ‘Schedule 2’ must only be subjected to EIA if they are considered “*likely to have significant effects on the environment by virtue of factors such as its nature, size or location*”. The criteria on which this judgement must be made are set out in Schedule 3.

1.3.3 The Proposed Development is a ‘Schedule 2’ development under:

- Paragraph 3(a) of Schedule 2 of the EIA Regulations (Ref. 1) as it constitutes “*Industrial installations for the production of electricity, steam and hot water*”, the Proposed Development boundary also exceeds 0.5 hectares (ha); and
- Paragraph 3(b) of Schedule 2 of the EIA Regulations (Ref. 1) as it may also constitute “*industrial installations for carrying gas, steam and hot water; transmission of electrical energy by overhead cables*”, the area of works for the Grid Connection Corridor will exceed 1 ha.

1.3.4 It is considered that due to the Proposed Development’s nature, size or location, it has the potential to have significant effects on the environment. The Applicant therefore wishes to confirm under Regulation 8(1)(b) of the EIA Regulations that an ES will be provided in respect of the application for development consent, as it is considered there is the potential for the Proposed Development to meet the criteria set out in Schedule 3 of the EIA Regulations (Ref. 1).

1.3.5 Following the completion of the surveys, assessments, and consultation processes outlined in this Scoping Report, an application for a DCO will be made to the Secretary of State (SoS) for determination in accordance with the Planning Act 2008 (Ref. 2). The DCO application will be accompanied by an ES, in accordance with Regulation 5(2)(a) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (‘APFP Regulations’) (Ref. 3). The ES will set out the methods and findings of a comprehensive EIA undertaken in line with the EIA Regulations (Ref. 1).

1.3.6 The Localism Act 2011 (Ref. 4) appointed the Planning Inspectorate as the agency responsible for operating the DCO process for NSIPs. The SoS will appoint an Examining Authority from the Planning Inspectorate, who will examine the application and make a recommendation to the SoS, who will make the decision on whether to grant or to refuse the DCO.

1.3.7 In accordance with Section 104(2) of the Planning Act 2008 (Ref. 2), the SoS is required to have regard to the relevant National Policy Statement (NPS), amongst other matters, when deciding whether or not to grant a DCO. Solar PV and battery storage are not currently covered by an NPS and therefore those elements of the application will be determined under Section 105 of the Planning Act 2008 (Ref. 2). Should the DCO application include overhead lines that meet the tests in Section 16 of the Planning Act 2008, then that element of the application would be determined under Section 104, as overhead lines are covered by NPS EN-5 (Electricity Networks Infrastructure) (Ref. 5).

- 1.3.8 At the time of writing, the Department for Energy Security and Net Zero (DESNZ) is consulting on a suite of draft national policy statements for new energy infrastructure which includes a revised EN-3 which has specific policies relating to solar PV and battery storage, however these remain in draft and are not yet adopted policy. It is considered likely that the revised NPS documents will be adopted prior to compilation of any subsequent ES. In lieu of an adopted technology specific NPS for solar PV and battery storage, this Scoping Report has been prepared taking account of the following NPS, which is important and relevant to the Proposed Development: Overarching NPS for Energy (EN-1) (Ref. 6). The EIA approach adopted takes account of both NPS EN-1 and NPS EN-5. A summary of the relevant considerations for each technical assessment is provided for each environmental topic (**Chapters 7 to 15** of this Scoping Report).
- 1.3.9 The SoS will also consider other important and relevant matters, including national and local planning policy. For example, the revised National Planning Policy Framework (NPPF) published in July 2021 (Ref. 7) is considered relevant national planning policy.
- 1.3.10 Whilst the NPSs are the primary consideration in deciding applications for NSIPs, the local Development Plan is also an important and relevant matter. The Local Development Plan for the land in which the Proposed Development is located includes the following:
- Central Lincolnshire Local Plan, adopted 13 April 2023 (Ref. 195);
  - Lincolnshire Minerals and Waste Local Plan including the Core Strategy & Development Management Policies Plan adopted in June 2006 and the Site Locations Plan adopted in December 2017 (Ref. 8);
  - Thorpe on the Hill Neighbourhood Plan, made March 2018 (Ref. 84);
  - Eagle and Swipethorpe Neighbourhood Plan, preparing draft plan (Ref. 85);
  - Basingham Neighbourhood Plan, made November 2017 (Ref. 86);
  - Swinderby Neighbourhood Plan, preparing draft plan (Ref. 87).
- 1.3.11 The purpose of considering the NPSs and other relevant national and local planning policy referred to above at the scoping stage of the EIA is twofold:
- To identify policy that could influence the sensitivity of receptors (and therefore the significance of effects) and any requirements for mitigation; and
  - To identify planning policy that could influence the methodology of the EIA. For example, a planning policy may require the assessment of a particular impact or the use of a particular methodology.
- 1.3.12 A summary of national and local planning policy relevant to each technical assessment is provided for each environmental topic (refer to **Chapters 7 to 15** of this Scoping Report).

## 1.4 Structure of the Scoping Report

1.4.1 **Table 1-1** lists the suggested requirements identified in Advice Note 7 (Ref. 9) and details where they are presented in this Scoping Report. The requirements of the EIA Regulations (Ref. 1) regarding the content of the ES are also covered within **Table 1-1**.

**Table 1-1: Contents for the Scoping Report based on Advice Note 7 (Ref. 9)**

Suggested Scoping Report Contents	Location in this Scoping Report
<b>Transboundary Screening Matrix</b>	<b>Appendix A</b>
The Proposed Development	
An explanation of the approach to addressing uncertainty where it remains in relation to elements of the Proposed Development e.g.: design parameters; and	Chapter 3 (The Proposed Development)
Referenced plans presented at an appropriate scale to convey clearly the information and all known features associated with the Proposed Development.	<b>Figure 1-1</b> (Proposed Development Location) <b>Figure 1-2</b> (Site Boundary) <b>Figure 2-1 and 2-1b</b> (Environmental Constraints)
<b>EIA Approach and Topic Areas</b>	
An outline of the reasonable alternatives considered and the reasons for selecting the preferred option;	Chapter 4 (Alternatives Considered)
A summary table depicting each of the aspects and matters that are requested to be scoped out allowing for quick identification of issues;	Chapter 17 (Summary and Conclusions)
A detailed description of the aspects and matters proposed to be scoped out of further assessment with justification provided;	Chapters 7 to 15 (Technical Topics)
Results of desktop and baseline studies where available and where relevant to the decision to scope in or out aspects or matters;	Chapters 7 to 15 (Technical Topics)
Aspects and matters to be scoped in, the report should include details of the methods to be used to assess impacts and to determine significance of effect e.g.: criteria for determining sensitivity and magnitude;	Chapters 7 to 15 (Technical Topics)
Any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects;	Chapters 7 to 15 (Technical Topics)
<b>Information Sources</b>	
References to any guidance and best practice to be relied upon;	Chapters 7 to 15 (Technical Topics)
Evidence of agreements reached with consultation bodies (for example the statutory nature conservation bodies or local authorities); and	Chapters 7 to 15 (Technical Topics)
An outline of the structure of the proposed ES.	Chapter 16 (Structure of the ES)

1.4.2 A glossary and abbreviation list are presented at the back of this Scoping Report.

## 1.5 IEMA Quality Mark

- 1.5.1 AECOM is an IEMA Registered Impact Assessor and also holds the IEMA EIA Quality Mark as recognition of the quality of our 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.



## 2. Site Description and Context

### 2.1 Site Location

- 2.1.1 The Proposed Development consists of an area for solar and energy storage (herein referred to as 'Solar and Energy Storage Park') and then areas considered for a grid connection (herein referred to as 'Grid Connection Corridor Options'), as shown on **Figure 1-2**.
- 2.1.2 The Solar and Energy Storage Park encompasses land required for the generation and storage of electricity through solar PV, BESS and related infrastructure. The OS grid reference for the approximate centre of the Solar and Energy Storage Park is SK 90388 62514. The Solar and Energy Storage Park area comprises the area that is being considered for solar arrays, an onsite substation, battery storage infrastructure and areas for landscape and biodiversity mitigation and enhancement. Further details are provided below. The Solar and Energy Storage Park equates to approximately 1003 ha in total.
- 2.1.3 The Grid Connection Corridor Options show the areas under consideration for the export of electricity via a 400kV connection to a newly proposed National Grid substation in the Navenby area. The connection would be via either overhead line or underground cable (refer to **Chapter 3**). The three route corridors under consideration are:
- A Northern Grid Connection Corridor, approximately 13km in length, which extends between the villages of Harmston and Coleby, and will join the National Grid substation location from the north.
  - A Middle Grid Connection Corridor, approximately 11.5km in length, which extends 2km north of Navenby, and will join the National Grid substation from the west.
  - A Southern Grid Connection Corridor, approximately 12km in length, and extends approximately 1.8km south of Navenby, and will join the National Grid substation location from the south.
- 2.1.4 Subject to further assessment and consultation, these options and the respective connection routes will be refined to determine a narrower single grid connection corridor that meets the objective of minimising environmental and social impact.

### 2.2 Site Description and Surrounding Area

#### Solar and Energy Storage Park

- 2.2.1 A number of environmental receptors have been identified within the vicinity of the Solar and Energy Storage Park, each of these are detailed below and shown by **Figure 2-1a** and **Figure 2-1b**.



## **Landscape**

- 2.2.2 The landscape features within the Site consist of agricultural fields interspersed with individual trees along field boundaries, hedgerows, linear tree belts, farm access tracks, and local transport roads. The Agricultural Land Classification (ALC) mapping published by Natural England indicates that the Solar and Energy Storage Park comprises of predominantly Grade 3 agricultural land, with some Grade 2 agricultural land. The arable fields are predominantly large and generally of regular shape. Areas of woodland are located adjacent to the Solar and Energy Storage Park boundaries - predominantly along the north-east and north-west boundaries, including an area of Ancient Woodland. Artificial angling ponds are located immediately west of the southern extent of the Site.
- 2.2.3 The landscape features immediately surrounding the Solar and Energy Storage Park comprise several small rural villages and housing estates, including Witham St Hughes and Morton Hall bordering to the west, Thorpe on the Hill bordering a potential access route to the north-east, Thurlby bordering the centre of the Solar and Energy Storage Park. Bassingham is located approximately 300m south-east and south-west of the southern extent of the Solar and Energy Storage Park.

## **Ecology**

- 2.2.4 Neither the Site nor the immediate surrounding area is covered by any statutory landscape designations, i.e. National Parks, or Areas of Outstanding Natural Beauty.
- 2.2.5 There are no Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Local Wildlife Sites (LWS), scheduled monuments or listed buildings within the Site.
- 2.2.6 Within a 10km radius of the Site, there are a number of statutory designated nature conservation sites, including nine SSSI's. Three of these are within 5km of the Site, including Metheringham Heath Quarry located approximately 3.7km east; High Dyke located approximately 4km south; and Swanholme Lakes, approximately 4km north-east. There are three Local Nature Reserves (LNRs) located within 10km of the Site. The closest of which is Whisby Nature Park, located approximately 0.37km north, and Swanholme Lakes further to the north-east.

## **Cultural Heritage**

- 2.2.7 There are seven Scheduled Monuments within 3km of the Site. The closest of which include: Hall Close: a medieval and post-medieval hall complex south of Dovecote Lane, with dovecote, gardens, fishponds, churchyard and cultivation remains, located less than 50m from to the central section of the Solar and Energy Storage Park.
- 2.2.8 There are a number of listed buildings within 3km of the Site, the closest of which (grade II listed River Farmhouse) sits within the Solar and Energy Storage Park. Other listed buildings are largely grouped in the settlements of

Bassingham, Haddington, Thorpe on the Hill, Swinderby, Norton Disney, Waddington, Harmston, Coleby, Navenby, Weillingore and Welbourn.

### **Hydrology and Flood Risk**

- 2.2.9 The Solar and Energy Storage Park is located predominantly within Flood Zone 1, with areas of Flood Zone 2 and 3 to the south-east of the Solar and Energy Storage Park and central sections, associated with the River Brent and River Witham, respectively.

### **Traffic and Transport**

- 2.2.10 The northern part of the Solar and Energy Storage Park intersects the A46. The Solar and Energy Storage Park crosses several Public Right of Ways (PRoW), comprising bridleways, footpaths and a byway. The PRoWs are located primarily in proximity to Thorpe on the Hill and along the River Witham.

## **Grid Connection Corridor Options**

### **Landscape**

- 2.2.11 The landscape features within the Grid Connection Corridors are similar to those of the Solar and Energy Storage Park, comprising agricultural fields interspersed with individual trees along field boundaries, hedgerows, linear tree belts, farm access tracks and local transport roads.

### **Cultural Heritage**

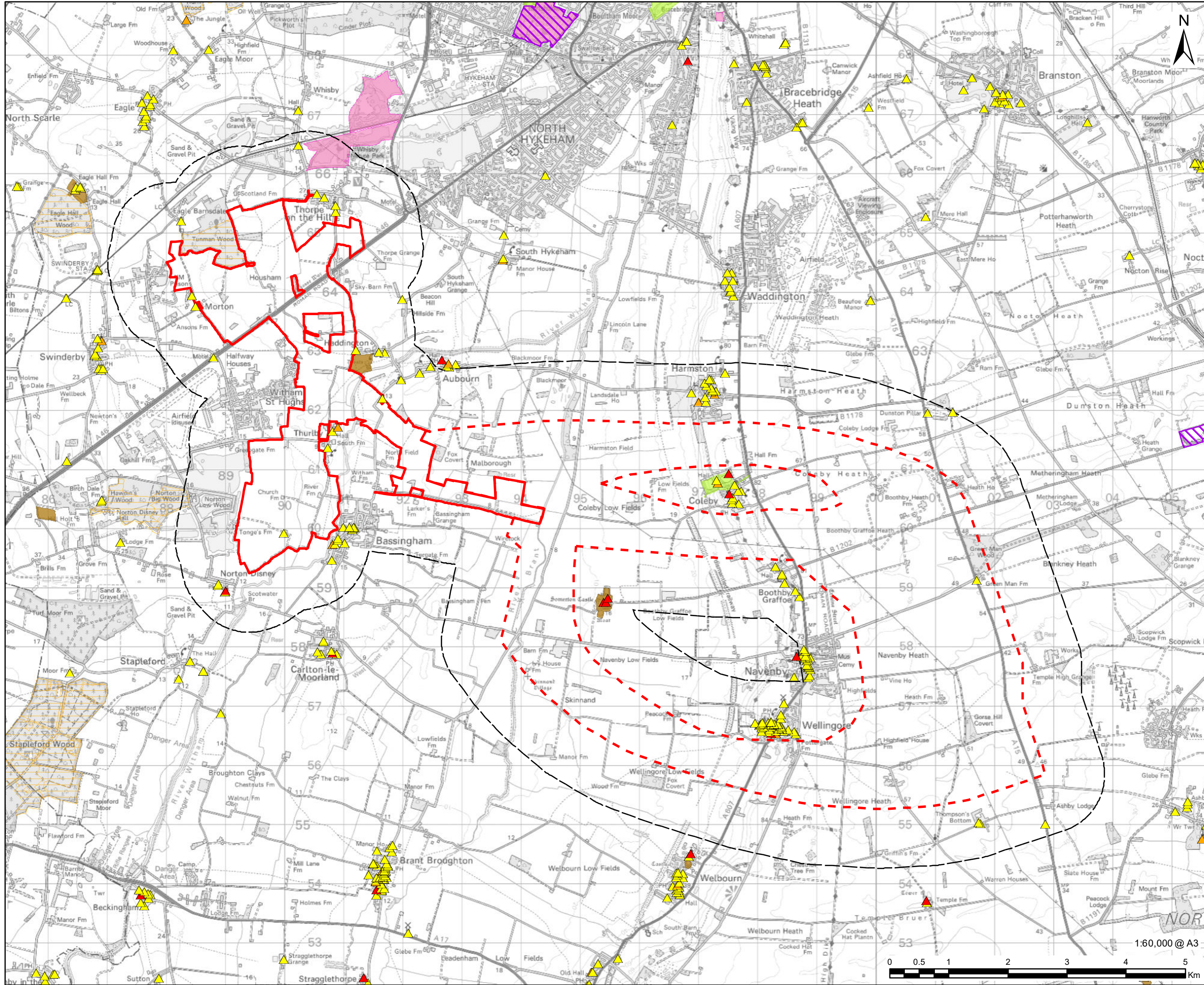
- 2.2.12 There are ten Scheduled Monuments within 5km of the Grid Connection Corridors. The closest of which is Somerton Castle, straddled by the Southern and Middle Grid Connection Corridor within approximately 400m and 700m, respectively.

### **Hydrology and Flood risk**

- 2.2.13 The western extents of the Grid Connection Corridors are located within areas of Flood Zone 2 and 3, the remaining areas are located within Flood Zone 1.

### **Traffic and Transport.**

- 2.2.14 The Grid Connection Corridors intersect the A607 and the A15. The Grid Connection Corridors cross several PRoWs, comprising numerous footpaths. These largely originate from Harmston in the north, Coleby in the centre, and Wellingore in the south.



**CONSULTANT**

AECOM Limited  
2 City Walk  
Holbeck, Leeds  
LS11 9AR  
www.aecom.com

**LEGEND**

- Solar and Energy Storage Park
  - Grid Connection Corridor Options
  - 1km Study Area
  - Ancient Woodland
  - Scheduled Monument
  - Registered Park and Garden
  - Site of Special Scientific Interest (SSSI)
  - Local Nature Reserve
- Listed Buildings**
- ▲ Grade I
  - ▲ Grade II\*
  - ▲ Grade II

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**ISSUE PURPOSE**

EIA Scoping Report

**PROJECT NUMBER**

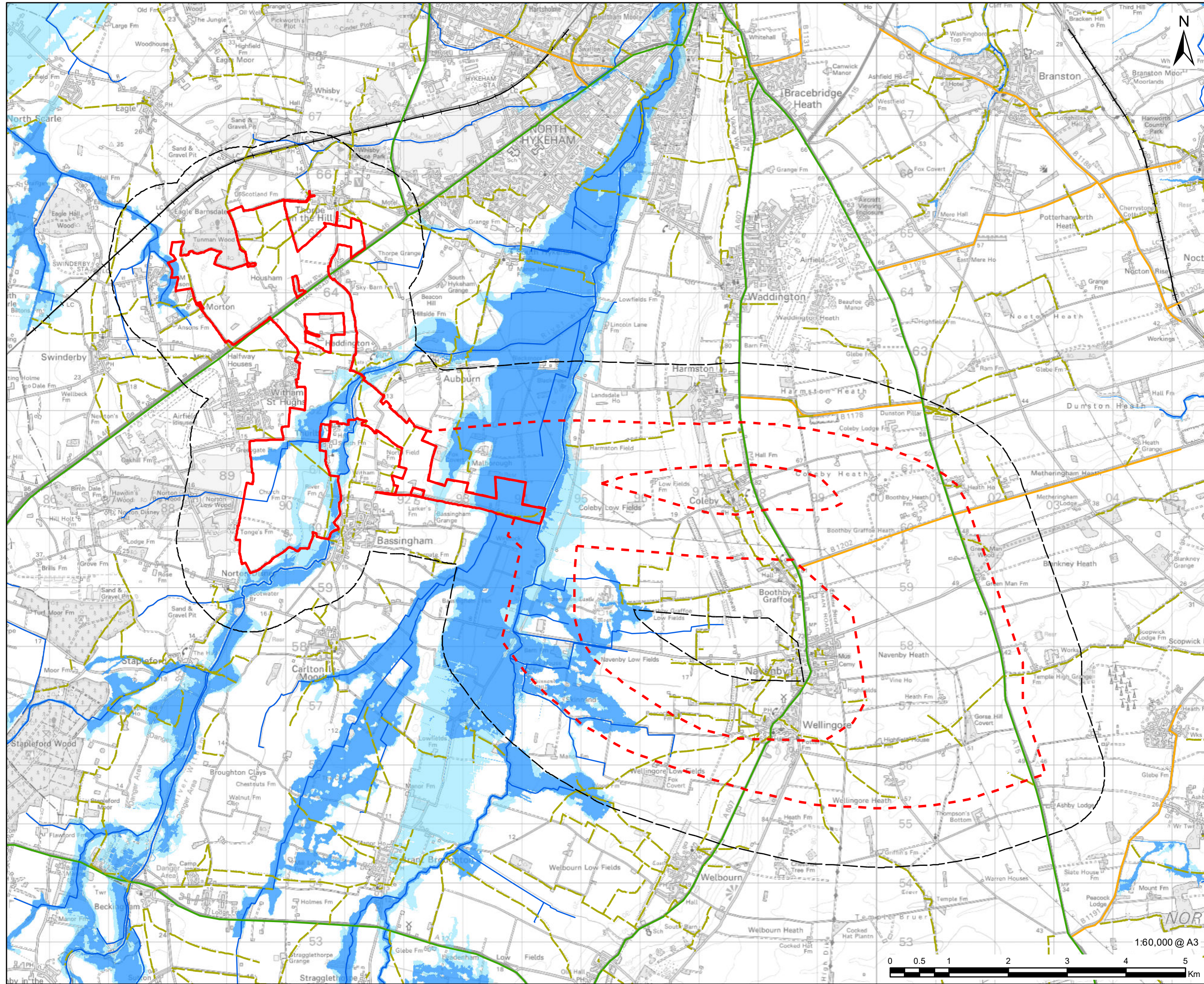
60700987

**FIGURE TITLE**

Environmental Constraints

**FIGURE NUMBER**

Figure 2-1a



**PROJECT**  
Fosse Green Energy

**CLIENT**  
Fosse Green Energy Ltd

**CONSULTANT**  
AECOM Limited  
2 City Walk  
Holbeck, Leeds  
LS11 9AR  
www.aecom.com

- LEGEND**
- Solar and Energy Storage Park
  - Grid Connection Corridor Options
  - 1km Study Area
  - A Road
  - B Road
  - Main River
  - Public Right of Way
  - Railway
  - Flood Zone 3
  - Flood Zone 2

**NOTES**

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**ISSUE PURPOSE**  
EIA Scoping Report

**PROJECT NUMBER**  
60700987

**FIGURE TITLE**  
Environmental Constraints

**FIGURE NUMBER**  
Figure 2-1b



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## 3. Description of the Proposed Development

### 3.1 Introduction

3.1.1 Solar PV and BESS technologies are rapidly evolving. As a result, the parameters of the DCO will maintain flexibility to allow the latest technology to be utilised at the time of construction. To inform the scope of the assessment studies, this Proposed Development description provides information on:

- Solar and battery energy storage infrastructure, grid connection, and other associated and ancillary equipment required to operate the solar and energy storage park;
- Construction programme and activities;
- Operational and maintenance activities; and
- Decommissioning.

### 3.2 Overview of Solar and Battery Energy Storage Infrastructure

3.2.1 The key components of the Proposed Development comprise:

- Solar PV modules;
- PV module mounting structures;
- Battery Energy Storage System (BESS);
- Inverters;
- Step-up transformers;
- Switchgear;
- An onsite substation and control buildings;
- Onsite cabling;
- Ancillary infrastructure (e.g. combiner boxes, weather stations);
- Electricity export via high-voltage cable route and connection to the National Electricity Transmission System;
- Fencing and security;
- Access tracks; and
- Landscaping and biodiversity enhancement areas.

- 3.2.2 During the construction phase a number of temporary construction compound(s) will be established as well as temporary roadways to facilitate access to all land within the Site.
- 3.2.3 In areas around the PV arrays and on other land within the Site, opportunities for landscaping, biodiversity enhancements and habitat management will be explored.
- 3.2.4 Further details for each of the key components are set out below.

### **Solar PV modules**

- 3.2.5 Solar PV modules convert sunlight into electrical current (as direct current, DC). Individual panels are typically up to 2.4m long and up to 1.4m wide and consist of a series of PV cells sandwiched between layers of toughened glass (as shown in Plates 3-1 and 3-2). PV technologies are developing rapidly and different generation capacity modules may be available at the time of construction. The module frame is typically built from anodised aluminium.
- 3.2.6 Each module would have a DC generating capacity of between 600 and 700 watts (W), or more depending on advances in technology at the time of construction (the latest technology under development is up to 690 W). The modules are fixed to a mounting structure in groups known as 'strings'. Various factors inform the number and arrangement of modules in each string, and it is likely some flexibility will be required to accommodate future technology developments.
- 3.2.7 There are currently two options for the mounting structures which will be considered and assessed, these are:
- Fixed South Facing Arrays; and
  - Single Axis Tracker Arrays.

#### *Fixed South Facing Arrays*

- 3.2.8 Indicative dimensions of modules will measure approximately 2.4m x 1.4m x 0.04m. Individual panels consist of a series of bifacial, mono-crystalline cells which make up an individual panel. These panels are then arranged into strings of 30 panels are fixed to the mounting system, each individual mounting structure will be approximately 0.8m up to 3.5m high above ground level. The mounting structures will be orientated east west and would be installed between 18 and 25 degrees to the horizontal facing south to optimise daylight absorption. An example is shown in Plate 3-1.



### Plate 3-1: Fixed South Facing Arrays

#### *Single-axis Tracker Arrays*

- 3.2.9 Indicative dimensions of the single-axis tracking modules will measure approximately 2.4m x 1.4m x 0.04m. Individual panels consist of a series of bifacial, mono-crystalline cells which make up an individual panel. These panels will be arranged into strings of 30 panels and fixed to the mounting structure, each mounting structure will have a height of 0.8m up to 3.5m. The mounting structures will be orientated north/south and would operate between 60 degrees from the horizontal (facing east in the morning) moving toward 0 degrees (horizontal) at midday, and to 60 degrees from the horizontal (facing west in the evening). The modules would track from east to west throughout the day and would return to their resting position 60 degrees (facing east) overnight.



**Plate 3-2: Single-axis Tracker Arrays**

- 3.2.10 Where relevant, the EIA scoping study considers the panel orientation which represents the worst-case scenario in terms of identifying potential environmental effects for that discipline. As the Proposed Development design develops, the panel orientation (if fixed) or the most favourable tracking technology will be determined based upon economic, environmental, and technical factors. A reasonable worst-case scenario will be assessed and presented in the ES.

#### **Module Height and Separation**

- 3.2.11 At the lower edge, modules would be approximately 0.8m from the ground and approximately up to 3.5m at the higher edge. The final elevations of the modules will be influenced by various design factors such as local topography, flood risk, selection of solar PV module type and configuration. The rows of solar panels would typically be spaced between 4m to 8m apart for fixed south facing and the tracker modules to minimise effects of overshadowing and to ensure optimal efficiency.
- 3.2.12 The total number and arrangement of PV modules will depend on the iterative layout design process and available technology at the time of construction.

#### **PV Module Mounting Structures**

- 3.2.13 The frames upon which the solar PV panels will be mounted will be pile driven or screw mounted into the ground to a typical depth of approximately 1.5m, subject to ground conditions. The option to install concrete blocks known as “shoes” may also be considered (where necessary to reduce archaeological impact), thereby avoiding the need for driven and screw anchored installation, in doing so minimising ground disturbance. The mounting frames would likely



be made of either anodised aluminium alloy or galvanised steel and would have a rough matt finish.

### **Inverters**

3.2.14 Inverters are required to convert the DC electricity collected by the PV modules into alternating current (AC) which allows the electricity generated to be exported to the National Grid. Inverters are sized to deal with the level of voltage and intensity, which is output from the strings of PV modules.

#### *Central Container Inverters*

3.2.15 Approximately 64 central container inverters. These will typically be housed within a container measuring approximately 6m x 2.5m and 3m in height. The containers are typically externally finished in keeping with the prevailing surrounding environment, often utilising a green painted finish. The containers would typically be mounted on adjustable legs on an area of hardstanding.

### **Transformers**

3.2.16 Transformers are required to step up the voltage of the electricity generated PV arrays before it reaches the substation. The transformers are typically housed indoors within a container and will be distributed throughout the Solar and Energy Storage Park. It is anticipated that there will be approximately 64 transformers.

3.2.17 The footprint of the transformers will typically be 12.5m x 2.5m and 3m in height. Transformer cabins (Plate 3-3) are typically externally finished in keeping with the prevailing surrounding environment, often utilising a green painted finish. The configuration of equipment will depend on the iterative design process and influenced by technical and environmental factors.

### **Switchgears**

3.2.18 Switchgears are the combination of electrical disconnect switches, fuses or circuit breakers used to control, protect and isolate electrical equipment. Switchgear is used both to de-energise equipment to allow work to be done and to clear faults downstream.

3.2.19 Switchgears are typically housed indoors within a container with a typical footprint of 6.5m x 2.5m and 3m in height. Switchgear containers will be located either adjacent to the transformer containers or contained within the central inverter container. It is anticipated that approximately 64 switchgears could be located within the Solar and Energy Storage Park.

3.2.20 The configuration and number of equipment will depend on the iterative design process as influenced by technical and environmental factors.



**Plate 3-3: Example of Electrical Infrastructure Containers Located Within a Solar Array Substations and Control Buildings**

3.2.21 There will be a single primary substation (33kV or 132kV/400kV) located within the Solar and Energy Storage Park. The substation will comprise electrical infrastructure such as the step-up transformers, switchgear, circuit breakers and metering equipment required to facilitate the export of electricity from the Proposed Development to the National Grid. The primary 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 indicative size of the substation compound is 100m x 100m, with an approximate height of 13m that allows for the substation and associated electrical control buildings & office/ storage buildings and welfare facilities. Up to two secondary substations may be considered to allow for an intermediate voltage level of 132kV to be used for some of the interconnection corridors, this will reduce the size and extent of interconnection cable routes.

### **Onsite Cabling**

3.2.22 Low voltage cabling between PV modules and the inverters will typically be located above ground level (along a row of racks), fixed to the mounting structure, and then underground (between racks and in the central inverter's and or transformer input). Cables are required between the transformers, switch gear and the onsite primary substation. The dimensions of trenching will vary subject to the underground cabling which will be based on the number of cables they contain. The trench will typically be up to 1m wide with a maximum depth of 1.2m and will be dependent on the method of installation, ground conditions and number of cables laid in parallel. Subject to engagement with utility providers there may be a requirement for horizontal

directional drilling within the Solar and Energy Storage Park to cross beneath existing buried utilities.

- 3.2.23 Data cables will be required throughout the Solar and Energy Storage Park to allow for the monitoring and control during operation, such as the collection of data on solar irradiance from pyranometers. The data cables would typically be installed within the same trench and alongside the electrical cables.
- 3.2.24 The existing above ground powerlines across the Solar and Energy Storage Park are not proposed to be altered by the Proposed Development.

### **Electricity Export and Point of Connection to the National Electricity Transmission System**

- 3.2.25 The electricity generated by the Proposed Development is expected to be exported via a 400kV connection between the onsite 33kV or 132kV/400kV primary substation and a new National Grid 400kV substation in the Navenby Area (not part of this DCO Application). The cabling will either be installed underground or overhead. Further feasibility studies and options appraisals are to be undertaken to determine the exact routing and installation method for the cable.
- 3.2.26 If the cable is underground, this is likely to be installed using an open trench method requiring a 30m to 40m working width, with trench widths approximately 3m wide and up to 3m deep. Where other specific techniques are required such as micro-tunnelling, boring, or horizontal directional drilling (HDD) this will be investigated.
- 3.2.27 If the cable is an overhead line this would be a maximum height of 50m and installed using metal towers or wood/composite poles.
- 3.2.28 There are a number of Grid Connection Corridor Options under consideration for the cable to connect the Site to the transmission network. Subject to further assessment and consultation, these options and the respective connection routes will be refined. The current Grid Connection Corridor Options are shown in **Figure 1-2**. Further studies and assessments will be undertaken to refine this corridor and to determine a narrower Grid Connection Corridor that meets the objective of minimising environmental and social impact. The alignment of the connection is also subject to the pending National Grid announcement that will confirm the location of their new substation, into which Fosse Green Energy will connect.

### **Fencing, Security & Ancillary Infrastructure**

- 3.2.29 A fence will enclose the operational area of the Proposed Development. The fence is likely to be a 'deer fence' (wooden with wire mesh) and approximately 2m in height. Pole mounted internal facing closed circuit television (CCTV) systems installed at a height of up to 3.5m are also likely to be deployed around the perimeter of the operational areas. Access gates will be of similar construction and height as the perimeter fencing. Clearances above ground, or the inclusion of mammal gates will be included to permit the passage of wildlife.

- 3.2.30 CCTV cameras would typically use night-vision technology with a 50m range, which would be monitored remotely and avoid the need for night-time lighting. No areas of the Proposed Development are proposed to be continuously lit. For security requirements, operational lighting would include Passive Infra-red Detector (PID) systems which would be installed around the perimeter of the Proposed Development.
- 3.2.31 The lighting of the primary substation would be in accordance with Health and Safety requirements, particularly around any emergency exits where there would be lighting, similar to Street Lighting that operates from dusk. Otherwise, there would be low level lighting on specific operational units that would again operate from dusk. All lighting would seek to limit any impact on sensitive receptors.
- 3.2.32 Lighting sensors for security purposes will be implemented around the onsite primary substation and other critical electrical infrastructure. No areas are proposed to be permanently lit.
- 3.2.33 If required, lighting columns will be located throughout the Solar and Energy Storage Park which will be up to 6m.



**Plate 3-4: Example of Security Fencing and Monitoring Cameras**

### **Site Access**

- 3.2.34 Access to the Site during the operational stage is expected to be similar to those accesses used during construction (as outlined in Section 3.2.45 below). This will be confirmed as the Proposed Development design progresses and in consultation with the relevant authorities.

### Access Tracks

- 3.2.35 It is anticipated that onsite access tracks will follow the alignment of the existing agricultural tracks, where possible. New internal access tracks will be up to 3.5m wide, passing bays will be provided along the internal access tracks. The main access will be up to 6m wide to facilitate two-way Heavy Goods Vehicle (HGV) traffic. The internal access tracks will likely be constructed of compacted stone with excavation kept to a minimum. Where drainage is required a ditch or a swale may be located downhill of the internal access track to control any potential for surface water run-off.

### Battery and Energy Storage System (BESS)

- 3.2.36 The Proposed Development will include an associated BESS. The battery-based electricity storage will allow the storage of energy generated by the solar panels at times of low demand and release to grid at times when demand is high or when solar irradiance is lower, known as load shifting. The BESS will also have the ability to import power from the grid directly to allow the BESS system to help support the grid through grid balancing mechanisms. The BESS facility being dc coupled is distributed throughout the solar PV arrays.
- 3.2.37 The precise number of individual battery storage containers will depend upon the duration of energy storage; however, it is expected that for 480MWh of BESS approximately 192 batteries would be distributed throughout the site.
- 3.2.38 The typical dimensions of the battery containers would measure approximately 6.5m x 2.5m and 3m in height. The containers would be located on areas of hard standing, with a minimum clearance of 0.1m beneath the container and the hardstanding. The containers are typically externally finished in keeping with the prevailing surrounding environment, often utilising a green painted finish.

### Green Infrastructure

- 3.2.39 The existing hedgerows, woodland, ditches, ponds and field margins will be retained within the layout of the solar arrays, with the exception of small breaks and/or crossings required for new access tracks, security fencing and connection routes. Any breaks or crossing will be designed to use existing agricultural gateways/tracks between the fields and the width of any new breaks will be kept to a minimum.
- 3.2.40 The minimum offsets/buffers from the solar arrays or security, as set out in **Table 3-1**, will be incorporated within the design, with the exception of where access tracks, security fencing and/or connection routes are required to cross an existing feature. These offsets/buffers will be used to deliver a combination of embedded mitigation in the form of hedgerow planting and/or grass / wildflower planting. The buffers/offsets are a minimum and for example may be increased to deliver further mitigation or enhancements and/or respond to root protection areas where required.

**Table 3-1 Minimum Offsets to Landscape and Ecological Features and Designations**

<b>Landscape / Ecological Feature &amp; Designation</b>	<b>Minimum offset to solar infrastructure*</b>
Site of Special Scientific Interest	20m
Local Wildlife Site	20m
Public Rights of Way	10m
Waterbodies (ponds)	10m
Watercourses (rivers/ditches)	10m
Ancient Woodland and Woodland	15m
Hedgerows	5m
Main badger setts	30m

\*with the exception of where access tracks, security fencing and/or connection routes are required to cross an existing feature; however, these will be kept to a minimum.

- 3.2.41 Areas for mitigation and enhancement will also provide opportunities for green infrastructure and will contribute to delivering a minimum 10% net gain in biodiversity.

## Project Parameters

- 3.2.42 The ES will set out the parameters that have been assessed as part of the EIA, including details on the size (footprint, width, and height relative to Above Ordnance Datum (AOD)), technology and locations of the different elements of the Proposed Development. The project description within the ES will be supported by drawings and elevations as required.

## Construction

### Construction Programme

- 3.2.43 The construction phase is anticipated to take 24 months or phased over 30 months and, subject to being granted consent construction is anticipated to start in 2031. The final programme will be dependent on the grid connection date, final layout design and potential environmental constraints on the timing of construction activities. The ES will provide further details of the construction activities, their anticipated duration and indicative programme of each phase of construction works.

### Construction Activities

- 3.2.44 The construction activities will comprise:
- Site preparation:
    - Delivery of construction materials, plant and equipment;
    - The establishment of the temporary construction compound(s);

- The upgrade of existing tracks and access roads and construction of new tracks required;
- The upgrade or construction of crossing points (bridges/culverts) over drainage ditches; and
- Marking out location of the infrastructure.
- Solar and Energy Storage Park construction:
  - Delivery of construction materials, PV modules, BESS, cabling, plant and equipment;
  - Erection of module mounting structures;
  - Mounting of modules;
  - Installation of electric cabling;
  - Installation of transformer containers;
  - Installation of battery storage units;
  - Construction of substation compound; and
  - Construction of onsite electrical infrastructure to facilitate the export of generated electricity.
- Testing and commissioning; and
- Reinstatement, landscaping and habitat creation.

### **Construction Access**

3.2.45 Ten initial options have been considered for construction traffic (HGVs) to access the Solar and Energy Storage Park from the Strategic Road Network and one for the Grid Connection Corridor works in the Navenby area. Further information on the accesses proposed is detailed within **Chapter 14: Traffic and Transport** of this scoping report. Further detail on proposed access points to the Site will be included within the Preliminary Environmental Information Report (PEIR) and the ES, which will be submitted with the DCO submission.

### **Temporary Construction Compound**

3.2.46 During the construction phase, a number of onsite construction compounds will be located at different locations throughout the Solar and Energy Storage Park, as well as temporary roadways, to facilitate access to all parts of the Solar and Energy Storage Park. The details of which (including location, scale and duration) will be set out and described within the ES.

### **Construction Reinstatement and Habitat Creation**

3.2.47 A programme of construction reinstatement and habitat creation will commence during the construction phase. It is anticipated that areas under the solar arrays, areas outside of the areas and within the landscape buffers will be planted with a combination of native grassland mix, wildflower mixes, hedgerows and woodland will be planted in strategic locations to provide

visual screening, ecological habitats in order to achieve a minimum 10% biodiversity net gain.

### **Construction Environmental Management**

- 3.2.48 An Outline Construction Environmental Management Plan (CEMP) will be prepared to support the application for development consent. The Outline CEMP will set out legislation, guidance, best practice guidance and the mitigation measures identified through the EIA to be employed during the construction phase, such as construction lighting avoiding ecological sensitive habitats. The Outline CEMP will form the framework for a detailed CEMP that will be agreed with the Local Planning Authorities prior to construction.

### **Construction Traffic Management**

- 3.2.49 An Outline Construction Traffic Management Plan (CTMP) including details on construction logistics and construction worker travel will be developed and will guide the delivery of materials, plant, equipment and staff during the construction phase.

## **Operation**

- 3.2.50 The operational life of the Proposed Development is not proposed to be specified in the application and the Applicant is not seeking a time limited consent. At the stage of preparing this Scoping Report there is nothing to suggest that there is any environmental reason why such a limit would be appropriate in planning terms. During the operational phase of the Proposed Development, onsite activities would include routine servicing, maintenance and replacement of plant and equipment as well as management of vegetation. The Proposed Development will be designed to be operational for 40 years, however, it is possible that this operational period could extend beyond 40 years if the solar PV panels are outperforming manufacturer estimates and continue to provide viable renewable energy to the grid.
- 3.2.51 At this stage of the project, it is anticipated that there would typically be approximately four permanent staff onsite during the operational phase of the Proposed Development, with additional staff attending when required for maintenance, replacement of solar infrastructure and cleaning, up to a total of 20 staff per day. The ES will confirm the likely operational traffic flows.
- 3.2.52 The land underneath and around the panels could be managed through a combination of sheep grazing and/or hay/silage production in order to maintain the field vegetation during the operational phase of the Proposed Development.

## **Decommissioning**

- 3.2.53 For the purposes of the environmental impact assessment the decommissioning assessment will be based on a 40-year operational life span for the solar infrastructure. The assessment does not assume that the operational phase will be limited to 40 years as the solar infrastructure may continue to be operating successfully and safely beyond this period.



- 3.2.54 It is proposed that the Applicant will commit to decommissioning the Proposed Development when it ceases being operational, however no time limit will be set for this. It is anticipated that all the solar infrastructure including PV modules, mounting structures, cabling, inverters, transformers, switchgear, batteries, fencing and ancillary infrastructure would be removed and recycled or disposed of in accordance with good practice and market conditions at that time of decommissioning. The future of the substation and control building would be agreed with the local planning authority and the National Grid prior to commencement of decommissioning. Any requirement to leave the internal access tracks would be discussed and agreed with the landowners at the time of decommissioning. If the Proposed Development were to be decommissioned the Solar and Energy Storage Park would be reinstated in agreement with the local planning authority. In advance of decommissioning commencing, a detailed Decommissioning Environmental Management Plan (DEMP), to include timescales and transportation methods, would be agreed in advance with the local planning authority. The detailed DEMP would be secured via a DCO requirement. The Solar and Energy Storage Park would be reinstated so far as possible to its original use and quality after decommissioning and habitats of biodiversity mitigation and enhancement (such as mature boundary vegetation) that have potential to contain protected species would be left in-situ, provided they do not act as a hinderance to future agricultural use, given they could contain protected species. If these were to be removed, appropriate surveys and licenses would be applied for at the time of decommissioning.
- 3.2.55 Decommissioning is anticipated to take approximately six to twelve months.
- 3.2.56 The effects of the decommissioning phase are often similar to, or of a lesser magnitude than the effects generated during the construction phase and will be considered in the relevant sections of the ES. However, there can be a high degree of uncertainty regarding decommissioning as engineering approaches and technologies evolve over the operational life of the Proposed Development, and assumptions will therefore be made, where appropriate.

## Rochdale Envelope and Design Principles

- 3.2.57 EIA is the iterative process in which the assessment of environmental impacts is undertaken in parallel with the design process of the Proposed Development. The design and layout of the Proposed Development will evolve in response to the identification of specific constraints and opportunities. The comments made in response to this Scoping Report and the informal and statutory consultation process will also influence the final design and layout of the Proposed Development.
- 3.2.58 Advice Note Nine 'Rochdale Envelope' was published by PINS in July 2018 (Ref. 104) to address the degree of flexibility that would be considered appropriate to deal with uncertainties associated with applications for development consent.
- 3.2.59 In order to maintain flexibility in the design and layout, the Proposed Development will adopt the Rochdale Envelope approach by specifying

parameter ranges which will be defined in the Project Description chapter of the ES. 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.

- 3.2.60 A series of Design Principles will be developed for the Proposed Development. The Design Principles for the Proposed Development will align with the core purposes and ambitions of the ‘Design Principles for National Infrastructure’ which are Climate, People, Places and Value. The purpose of the Design Principles is to set a framework that can be used by the Local Planning Authority to control the detailed design of the Proposed Development beyond the written and spatial parameters. The National Infrastructure Commission defined the role of principles as:

*“Principles should act as reminders to the delivery organisation, a steer in the right direction, and a means of restoring focus to the big picture...Design Principles should be a point of departure, setting out a common understanding [of] the issues to be addressed.”* (Developing Design Principles for National Infrastructure (Ref. 90)).

- 3.2.61 The principles for the Proposed Development, which will be set out within the Stage One informal Consultation are set out below:

**Climate:**

- Positively contribute to delivering the UK to net zero by 2050;
- Design for resilience to future climate change;
- Prioritise sustainable techniques and technologies in construction and operation; and
- Minimise carbon throughout the project lifecycle.

**People:**

- Engage openly and transparently with local communities, stakeholders and neighbours, making use of local knowledge to improve our project;
- Consider feedback carefully and engage and respond meaningfully;
- Behave as a considerate neighbour through both construction and operation; and
- Respect public amenity.

**Value:**

- Recognising the evolving and advancing nature of technology and seek to ensure we retain the ability to use the best and latest available to maximise efficiency;
- Learn from comparable projects using best practice to design and deliver our project;
- Provide wider economic and supply chain benefits, and a positive legacy for the communities in and around Fosse Green Energy;

- Deliver a successful project, free from Government subsidy, helping contribute affordable energy to the national supply;
- Respect the wider landscape and the intrinsic value of the countryside and natural environment; and
- Respect and respond to features of heritage value.

**Place:**

- Deliver project-wide biodiversity net gain;
- Maximise opportunities to create appropriate multifunctional spaces to achieve energy generation, continued agricultural use, biodiversity enhancements, water and flood management and green spaces;
- Reduce any environmental impact, sensitively designing Fosse Green Energy to fit into the landscape and explore reasonable opportunities to mitigate potential visual impacts;
- Respect the distinctive and unique character of the countryside; and
- Recognise and respect heritage value, understanding the direct and indirect impact on cultural heritage assets.

3.2.62 These principles will be refined in response to the ongoing EIA and stakeholder engagement and will be secured through the DCO.

## 4. Alternatives Considered

### 4.1 Introduction

- 4.1.1 In accordance with Paragraph 2 of Schedule 4 of the EIA Regulations (Ref. 1), the ES will include:

*"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."*

- 4.1.2 Regulation 14(2)(d) of the EIA Regulations also requires that the ES should include:

*"A description of the reasonable alternatives studies by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment..."*

- 4.1.3 The alternatives analysis is likely to focus on different Proposed Development layouts, sizing, technologies and design parameters, and site location.

- 4.1.4 A 'no development' alternative would not deliver the additional electricity generation capacity associated with the Proposed Development and has therefore not been considered further.

- 4.1.5 The ES will include a description of the alternatives relevant to the Proposed Development that have been considered, including their specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects. This will include alternative site layouts, which will be considered during the design process. A full detailed appraisal of the options considered will be presented as part of the ES, discussing the rationale for the final site layout and design selection, as well as explaining the flexibility sought within the consent in this regard.

### 4.2 Site Selection

- 4.2.1 The evaluation process for site selection explored a range of possible alternatives, considering key environmental, planning and access constraints, and including liaison with landowners. The reasons for selecting the site will be presented in the ES.

- 4.2.2 Further refinement will be undertaken as the Proposed Development design progresses to determine the DCO application boundaries and layout for the Site submitted with the DCO application.

## 5. Consultation

### 5.1 Overview

- 5.1.1 Effective stakeholder engagement and consultation is intrinsic to the Planning Act 2008 (Ref. 2) and fundamental to the success of the Proposed Development.
- 5.1.2 The process of consultation is critical to the development of a comprehensive and balanced ES. The views of statutory and non-statutory consultees serve to focus the environmental studies and to identify specific issues that require further investigation. Consultation is an ongoing process, which enables mitigation measures to be incorporated into the project design thereby limiting adverse effects and enhancing environmental benefits.
- 5.1.3 The Proposed Development has a wide range of stakeholders (including landowners, statutory consultees, local communities and specialist interest groups) with differing interests that will require varied levels of consultation. Specific communication activities therefore need to be focussed to meet the needs of particular individuals and groups. This requires an understanding of the stakeholders and their interests in the Proposed Development.
- 5.1.4 Stakeholder engagement for the Proposed Development is based on the following principles:
- Early and ongoing engagement to inform and influence the design process;
  - Seeking feedback in the iterative design process and taking this feedback into consideration;
  - Building of long-term relationships with key stakeholders throughout the different stages of the Proposed Development to help better understand their views;
  - Where possible and practicable ensuring concerns are addressed; and
  - Ensuring appropriate statutory consultation is undertaken in compliance with requirements of the Planning Act 2008 (Ref. 2), EIA Regulations (Ref. 1) and associated guidance.

### 5.2 DCO Consultation Requirements

- 5.2.1 The DCO process has a number of statutory requirements regarding consultation. These requirements stipulate that certain stakeholder groups and the community must be consulted as part of the pre-application process, as set out in Sections 42, 47 and 48 of the Planning Act 2008 (Ref. 2) and Regulation 13 of the EIA Regulations (Ref. 1). Further requirements set out how the Proposed Development must be publicised, and specific documents produced, including a Statement of Community Consultation (SoCC), PEIR and a Consultation Report.

## 5.3 Consultation to Date

5.3.1 A number of meetings with statutory consultees have already taken place to provide an introduction to the proposals, including:

- Lincolnshire County Council; and
- North Kesteven District Council.

5.3.2 In addition, a project website has been set up to provide up to date information on the project: <http://www.fossegreenenergy.co.uk> and information has been provided to local residents and local community groups in advance of the submission of this Scoping Report.

## 5.4 Scoping Consultation

5.4.1 The Planning Inspectorate (on behalf of the SoS) will consult on this Scoping Report under the EIA Regulations (Ref. 1). Views from consultees will be considered and used to inform the Scoping Opinion to be issued by the Planning Inspectorate (on behalf of the SoS).

5.4.2 Under Regulation 10(6) of the EIA Regulations (Ref. 1), the SoS must undertake consultation with statutory consultation bodies, including environmental bodies (such as Natural England, the Environment Agency and Historic England) and relevant planning authorities: North Kesteven District Council, Lincolnshire County Council before adopting a Scoping Opinion.

## 5.5 Public Statutory Consultation

5.5.1 In accordance with Section 47(1) of the Planning Act 2008 (Ref. 2) for an NSIP, the Applicant will prepare a SoCC. This will outline how the Applicant intends to consult with the local community about the Proposed Development, including, in accordance with Regulation 12 of the EIA Regulations (Ref. 1), and how it intends to publicise and consult on the PEIR. The Applicant is required to consult the host local authorities (i.e. those local authorities whose administrative area the Proposed Development is located within) on the draft SoCC and they will have a period of at least 28 days following receipt of the request to comment on a draft SoCC prior to its publication for inspection by the public.

5.5.2 A two-stage approach to consultation with the local community and wider public is planned, as follows:

- A first round of non-statutory events in Q3/Q4 2023 to introduce the Proposed Development and present a preliminary design and the options currently under consideration; and
- A second round of events in Q1 2024, being the statutory consultation pursuant to the Planning Act 2008 (Ref. 2) and EIA Regulations (Ref. 1), including consultation on the Preliminary Environmental Information. The PEIR will report the outcomes of the preliminary assessment of likely significant environmental effects.

- 5.5.3 The approach to public consultation is currently being finalised, but is likely to include (without being limited to):
- Exchanges of correspondence, meetings and workshops with local community groups and businesses (online or in person where possible); and
  - Public exhibitions at which members of the community can meet with members of the project team (where possible) and online.
- 5.5.4 Consultation will also be undertaken with prescribed consultation bodies as well as affected landowners, in accordance with Sections 42 and 48 of the Planning Act 2008 (Ref. 2) and Regulation 13 of the EIA Regulations (Ref. 1).
- 5.5.5 All responses received during consultation will be carefully considered and taken into account in the development of the Proposed Development in accordance with Section 49 of the Planning Act 2008 (Ref. 2). Details of any responses received during consultation and the account taken of those responses will be included in a Consultation Report. This Consultation Report will be submitted with the application for a DCO to the SoS and, if the application is accepted, will be available for public review.
- 5.5.6 The Consultation Report will demonstrate how the Applicant has complied with the consultation requirements of the Planning Act 2008 (Ref. 2) and EIA Regulations (Ref. 1) and will be considered by the SoS when determining whether to accept the application, and then in examining the application.
- 5.5.7 Consultation will be a continual process, however, as detailed above, there will be two specific stages of consultation prior to submission of the DCO application. These two stages will allow the Applicant to gain feedback on the proposals from statutory and non-statutory parties to identify and address specific concerns associated with the Proposed Development and to feed into the design process.

# 6. Environmental Impact Assessment Methodology

## 6.1 Introduction

6.1.1 The ES will be based on a number of related activities, as follows:

- Establishing existing baseline conditions;
- Consultation with statutory and non-statutory consultees throughout the DCO pre-application process;
- Consideration of relevant local, regional and national planning policies (including National Policy Statements), guidelines and legislation relevant to EIA;
- Consideration of technical standards for the development of significance criteria;
- Review of secondary information, previous environmental studies and publicly available information and databases;
- Desk-top studies;
- Physical surveys and data collection;
- Computer modelling (where required); and
- Expert opinion.

6.1.2 The ES will set out the process followed during the EIA including the methods used for the collection of data and for the identification and assessment of impacts. Assumptions made will be clearly identified.

6.1.3 The EIA process is designed to be capable of, and sensitive to, changes that occur as a result of design development, including any mitigation measures that are incorporated during the EIA. This will be particularly important for this EIA as the design and layout of the Proposed Development is still being refined, and the design is likely to evolve further following submission of this EIA Scoping Report. It is not, however, anticipated that the Proposed Development that is the subject of the EIA and DCO application will be materially different from the Proposed Development that is the subject of this Scoping Report, and it will be within the parameters/options set out in **Chapter 3: Description of the Proposed Development** of this Scoping Report.

6.1.4 Impacts will be considered on the basis of their magnitude, duration, and reversibility. Cumulative and combined effects will also be considered where appropriate. Significance will be evaluated on the basis of the scale of the impact and the importance or sensitivity of the receptors, in accordance with standard assessment methodologies.

6.1.5 Where potentially significant adverse environmental effects are identified in the assessment process, measures to mitigate, avoid or reduce these effects



will be put forward in the form of recommendations to be undertaken as part of the project development as far as practicable.

## 6.2 Determining the Baseline Conditions

6.2.1 In order to predict the potential environmental effects of the Proposed Development, it will be necessary to determine the environmental conditions that currently exist within the Site boundary and surrounding area, in the absence of the Proposed Development. These are known as 'baseline conditions'.

6.2.2 Detailed, environmental baseline information will be collected and the methodology for the collection process will be detailed within the ES. The baseline information will be gathered from various sources, including:

- Online/digital resources;
- Data searches, e.g. GroundSure, EnviroCheck, Historic Environment Record, etc;
- Baseline site surveys; and
- Environmental information submitted in support of other planning applications for developments in the vicinity.

6.2.3 Consideration will also be given to how the baseline conditions would evolve in the absence of the Proposed Development, known as the 'future baseline'.

## 6.3 Embedded Measures

6.3.1 Measures will be identified in order to avoid, reduce and, if possible, offset significant adverse effects identified during the EIA process. Where possible, these measures will be incorporated into the form or design of the Proposed Development.

6.3.2 Once these measures are incorporated into the design, they are termed 'embedded measures'. Embedded measures relevant to the construction phase will be described within an Outline CEMP, and within each technical ES chapter. For the operational phase, such embedded measures will be represented primarily in the design. Embedded measures are therefore either incorporated into the design from the outset or identified through the assessment process.

6.3.3 The ES assesses effects with embedded measures in place. Where significant adverse effects are identified after considering these embedded measures, 'additional mitigation measures' are proposed.

## 6.4 Timescales and Assessment Years

### Construction Phase Effects

6.4.1 For the construction assessment, these effects will be taken to be those for which the source begins and ends during the construction stage, and the

effects do not endure beyond the completion of the construction phase. This covers sources of effects such as construction traffic, noise and vibration from construction activities, dust generation, site runoff, mud on roads, risk of fuel/oil spillage, and the visual intrusion of plant and machinery on-site. Some aspects of construction related effects will last for longer than others, for example impacts related to earth moving are likely to be relatively short in duration in respect of the whole construction period, whereas the construction of energy infrastructure and landscaping activities are likely to persist throughout the entire construction period.

## Operational Phase Effects

6.4.2 For the operational assessment, these are the effects that, although they may start during construction, are either permanent, endure for a substantial period beyond construction or decommissioning, or represent an extended cumulative effect of construction or decommissioning activity. This includes the effects of the physical presence of the energy infrastructure, and its operation, use and maintenance. Timescales associated with these enduring effects are as follows:

- Short term – endures for up to 12 months after construction or decommissioning;
- Medium term – endures for 1-5 years;
- Long term – endures for more than 5 years;
- Reversible long term effects – long-term effects, which endure throughout the lifetime of the Proposed Development but which cease once the Proposed Development has been decommissioned (operational effects will all fall into this category); and
- Permanent effects – effects which cannot be reversed following decommissioning (e.g. where buried archaeology is permanently removed during construction).

## Decommissioning Period Effects

6.4.3 For the decommissioning assessment, these effects will be taken to be those for which the source begins and ends during the decommissioning stage, and the effects do not endure beyond the completion of the decommissioning phase. This covers sources of effects such as traffic, noise and vibration from decommissioning activities, dust generation, site runoff, mud on roads, risk of fuel/oil spillage, and the visual intrusion of plant and machinery on-site, for example. As with construction phase effects, some aspects of decommissioning will endure for longer than others.

## Assessment Years

6.4.4 In order to ensure the EIA is robust in considering the likely significant effects of the Proposed Development, appropriate assessment scenarios and years have been identified and are discussed below.

- 6.4.5 The peak construction year for the purpose of the EIA is anticipated to be 2032. This is based on the assumption of a continuous, quicker 2 year construction programme scenario, and the rapid build out of the nature of the development. A rapid construction period presents a worst case in terms of traffic generation due to increased trip numbers over a shorter duration. This would also therefore be seen as a worst case in terms of transport safety for drivers, pedestrians and cyclists, as well as traffic-related air quality and noise effects.
- 6.4.6 As described in Section 3, the phasing of the Proposed Development will be subject to a number of factors. Therefore, the peak construction assessment year will be reviewed as the anticipated construction programme is considered in more detail during design development. A full justification for the reasonable worst-case scenario that is assessed will be provided in the ES.
- 6.4.7 The proposed operational assessment year for the purpose of the EIA is 2033.
- 6.4.8 A future year of 2048 will also be considered for specific topics including landscape and visual amenity, in terms of the maturation of vegetation (i.e. 15 years after the operational assessment year).
- 6.4.9 The decommissioning assessment year for the purpose of the EIA is 2073, based on the 40-year design life of the Proposed Development, recognising that the operational life may extend beyond this date.

## 6.5 Effect Significance Criteria

- 6.5.1 The evaluation of the significance of an effect is important; it is the significance that determines the resources that should be deployed in avoiding or mitigating a significant adverse effect, or conversely, the actual value of a beneficial effect. The overall environmental acceptability of the Proposed Development is a matter for the SoS to determine, having taken into account, amongst other matters, the environmental information that is set out in the ES, including all likely beneficial and adverse environmental effects. Where it has not been possible to quantify effects, qualitative assessments will be undertaken, based on available knowledge and professional judgment. Where uncertainty exists, this will be noted in the relevant topic chapter.
- 6.5.2 The significance of residual effects will be determined by reference to criteria for each assessment topic. Specific effect significance criteria for each technical discipline will be developed, giving due regard to the following:
- Extent and magnitude of the impact (described as high, medium, low and very low);
  - Effect duration (see Paragraph 6.4.2), and whether effects are temporary, reversible or permanent;
  - Effect nature (whether direct or indirect, reversible or irreversible, beneficial or adverse);
  - Whether the effect occurs in isolation, is cumulative or interacts with other effects;

- Performance against any relevant environmental quality standards;
  - Sensitivity of the receptor (described as high, medium, low and very low); and
  - Compatibility with environmental policies.
- 6.5.3 The significance of residual effects will be evaluated with reference to available definitive standards, accepted criteria and legislation. For issues where definitive quality standards do not exist, significance will be based on the:
- Local, district, regional or national scale or value of the resource affected;
  - Number of receptors affected;
  - Sensitivity of these receptors; and
  - Duration of the effect.
- 6.5.4 In order to provide a consistent approach to expressing the outcomes of the various studies undertaken as part of the EIA, and thereby enable comparison between effects upon different environmental topics, the following terminology will be used in the ES to define residual effects:
- Adverse – detrimental or negative effects to an environmental/socio-economic resource or receptor; or
  - Negligible (also referred to as ‘neutral’ for some topics) – imperceptible effects to an environmental/socio-economic resource or receptor; or
  - Beneficial – advantageous or positive effect to an environmental/socio-economic resource or receptor.
- 6.5.5 Where adverse or beneficial effects are identified, these will be assessed against the following scale:
- Minor – slight, very short or highly localised effect of no significant consequence;
  - Moderate – limited effect (by extent, duration or magnitude) which may be considered significant; and
  - Major – considerable effect (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards; considered significant.
- 6.5.6 Each of the technical chapters provides the criteria, including sources and justifications, for quantifying the different categories of effect. Where possible, this will be based upon quantitative and accepted criteria (for example, noise assessment guidelines), together with the use of value judgment and expert interpretation to establish to what extent an effect is environmentally significant. **Table 6-1** illustrates an example of the classification of effects matrix.

**Table 6-1: Example matrix to classify environmental effects**

Sensitivity or value of resource/receptor	Magnitude of impact			
	High	Medium	Low	Very low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very low	Minor	Negligible	Negligible	Negligible

6.5.7 Following the classification of an effect, clear statements will be made within the topic chapters as to whether that effect is significant or not significant. As a general rule, major and moderate effects are considered to be significant (as shown by the shaded cells in **Table 6-1** above), whilst minor and negligible effects are considered to be not significant. However, professional judgement will be applied, including taking account of whether the effect is permanent or temporary, its duration/frequency, whether it is reversible, and/or its likelihood of occurrence. Generic definitions for the classification of effects are shown in **Table 6-2**.

**Table 6-2: Generic effect descriptions**

Effect	Generic description
Major	These effects may represent key factors in the decision making process. Potentially associated with sites and features of national importance or likely to be important considerations at a regional or district scale. Major effects may relate to resources or features which are unique and which, if lost, cannot be replaced or relocated.
Moderate	These effects, if adverse, are likely to be important at a local scale and on their own could have a material influence on decision making.
Minor	These effects may be raised as local issues and may be of relevance in the detailed design of the project, but are unlikely to be critical in the decision making process.
Negligible	Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error, these effects are unlikely to influence decision making, irrespective of other effects.

6.5.8 Where mitigation measures are identified to eliminate, mitigate or reduce adverse impacts, these have either been incorporated into the design of the Proposed Development; translated into construction commitments; or operational or managerial standards/procedures. The ES will highlight 'residual' effects, which remain following the implementation of suitable mitigation measures, and classify these in accordance with the effect classification terminology given above.

6.5.9 It should be noted that some technical disciplines may utilise different criteria when undertaking assessments due to differences in industry accepted guidelines and specifications. Where this is the case, the technical topic will

discuss how the assessment methodology or classification of effects differs for the general EIA methodology as described in this section and provide justification.

## Assessment of Construction and Decommissioning Effects

- 6.5.10 The identification of construction and decommissioning effects will be made on the basis of existing knowledge, techniques and equipment. A 'reasonable worst-case' scenario will be used with respect to the envisaged construction and decommissioning methods, location (proximity to sensitive receptors), phasing and timing of construction and decommissioning activities.
- 6.5.11 As described in Section 6.1, the assessment of construction and decommissioning effects will assume the implementation of standard good practice measures, for example the use of temporary noise barriers to reduce noise levels as appropriate and, where practicable, control of dust on haul roads, etc. The purpose of this is to focus on the Proposed Development specific effects, rather than generic construction effects that can be easily addressed using generic best practice mitigation measures. Construction and decommissioning assumptions, including what has been assumed in terms of good practice measures, will be set out within the ES, and the Outline CEMP. The ES will identify and assess construction and decommissioning effects that are likely to remain after these mitigation measures are in place.

## 6.6 Cumulative and Combined Effects

- 6.6.1 In accordance with the EIA Regulations (Ref. 1), 'cumulative effects' will be considered. By definition, these are effects that result from incremental changes caused by other past, present or reasonably foreseeable actions together (i.e. cumulatively) with the Proposed Development.
- 6.6.2 For the cumulative impact 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 (these will be referred to as 'effect interactions'); and
  - The combined effects of several proposed developments which may, on an individual basis be insignificant but, cumulatively with the Proposed Development, have a new or different likely significant effect.

### Effect Interactions

- 6.6.3 There is no established EIA methodology for assessing and quantifying effect interactions that lead to combined effects on sensitive receptors, however the European Commission (EC) has produced guidelines for assessing effect interactions "*which are not intended to be formal or prescriptive, but are designed to assist EIA practitioners in developing an approach which is appropriate to a project...*" (Ref. 10).

- 6.6.4 AECOM has reviewed these guidelines and has developed an approach which uses the defined residual effects of the Proposed Development to determine the potential for effect interactions that lead to combined effects.
- 6.6.5 The EIA will predict beneficial and adverse effects during construction, operation and decommissioning of the Proposed Development, which are classified as minor, moderate or major. Several effects on one receptor or receptor group could theoretically interact or combine to produce a combined significant overall effect.
- 6.6.6 An exercise which tabulates the effects on receptors or receptor groups will be undertaken to determine the potential for effect interactions and therefore any combined effects. Only adverse or beneficial residual effects classified as minor, moderate, or major will be considered in relation to potential effect interactions. Residual effects, which are classified as negligible will be excluded from the assessment of the effect interactions as, by virtue of their definition (see **Table 6-2**), they are considered to be imperceptible effects to an environmental / socio-economic resource or receptor.

## Cumulative Effects with Other Developments

- 6.6.7 The Planning Inspectorate's Advice Note 17 on the assessment of cumulative effects (Ref. 9) identifies a four-stage approach as outlined below. This approach will be adopted as part of the EIA.

### **Stage 1 – Establish the NSIP's ZOI and identify long list of 'other development'**

- 6.6.8 A review of other developments will be undertaken, initially encompassing a 'zone of influence' (ZOI) defined by the environmental topic specialists to prepare a long list of 'other development'. At this stage, it is anticipated that the long list will be based on up to a 5km area of search which aligns with the study area for landscape and visual amenity and the likely maximum range of any potential significant effects.
- 6.6.9 The long list of 'other development' to be included in the assessment of cumulative effects will be reviewed and developed in consultation with the local planning authorities, statutory consultees and other relevant organisations.
- 6.6.10 Development will be included in the initial long-list based on the following criteria:
- Development currently under construction;
  - Approved applications which have not yet been implemented (covering the past five years and taking account of those that received planning consent over three years ago and are still valid but have not yet been completed);
  - Submitted applications not yet determined;
  - Refused applications, subject to appeal procedures not yet determined;

- On the National Infrastructure Planning Programme of Projects;
- Development identified in the relevant Development Plan (and emerging Development Plans); and
- Development identified in other plans and programmes which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

6.6.11 Criteria will be developed and applied to filter development which may be excluded from the initial long list, having regard to the size and spatial influence of each development. These criteria will be documented and set out within the ES.

#### *Cumulative Developments*

6.6.12 An initial list of developments has already been developed of other developments surrounding the Proposed Development. Key schemes within 5km of Fosse Green Energy that are included within this list for inclusion within the cumulative effects assessment include:

- 20/1736/RESM – Erection of up to 1,100 dwellings and 150 care/retirement units, located to the south of the A46.
- 20/1659/RESM – Reserved matters application for the erection of 148 dwellings, located to the south of the A46.
- 22/1376/FUL - Erection of 132 dwellings with associated outbuildings/garages and landscaping/open space and affordable housing and including conversion of existing (retained) building to shop and offices, located approximately 1.4km west of the northern section of the Proposed Development, to the east of Swinderby.
- 21/1045/RESM – Reserved matters application for the erection of 144 no. dwellings and associated works, located approximately 900m north-east of the north-eastern extent of the Proposed Development.
- 23/0584/EIASCRC – a screening opinion for a battery energy storage system project, located approximately 9.5km to the east of the Solar and Energy Storage Park and within the Middle Grid Connection Corridor.

6.6.13 It is pertinent to mention Springwell Energy Farm, a NSIP solar and battery storage project at Scoping Stage, located approximately 17km south-east of the Solar and Energy Storage Park, and adjacent to the eastern extent of the Grid Connection Corridors. This project is also located within North Kesteven District Council.

#### **Stage 2 – Identify shortlist of ‘other development’ for Cumulative Effects Assessment**

6.6.14 At Stage 2, any developments of a nature or scale without the potential to result in cumulative impacts will be excluded, following discussion with the local planning authorities and consideration of the likely zone of influence for each environmental topic. The justification for including or excluding developments from the long list will be provided in a matrix, modelled on the



example given within Matrix 1 (Appendix 1) of the Planning Inspectorate's Advice Note 17 (Ref. 9).

### **Stage 3 – Information gathering**

6.6.15 Information relating to other developments will be collected from the appropriate source (which may include the local planning authorities, the Planning Inspectorate or directly from the applicant/developer) and will include, but not be limited to:

- Proposed design and location information;
- Proposed programme of demolition, construction, operation and/or decommissioning; and
- Environmental assessments that set out baseline data and effects arising from 'other development'.

### **Stage 4 – Assessment**

6.6.16 The assessment will include a list of those developments considered to have the potential to generate a cumulative effect together with the Proposed Development, and this will be documented in a matrix, in line with Matrix 2 (Appendix 2) of the Planning Inspectorate's Advice Note 17 (Ref. 9) which includes the following:

- A brief description of the development;
- An assessment of the cumulative effect with the Proposed Development;
- Proposed mitigation applicable to the Proposed Development including any apportionment; and
- The likely residual cumulative effect.

6.6.17 The criteria for determining the significance of any cumulative effect will be based upon:

- The duration of effect, i.e. will it be temporary or permanent;
- The extent of effect, e.g. the geographical area of an effect;
- The type of effect, e.g. whether additive or synergistic;
- The frequency of the effect;
- The 'value' and resilience of the receptor affected; and
- The likely success of mitigation.

## **6.7 Proposed topics to be included in the ES**

6.7.1 The following chapters present a discussion of the likely or potential significant environmental effects associated with the Proposed Development that it is proposed will be considered as part of the EIA. The methodology and assessment criteria that will be used to assess the identified effects are also outlined. These topics comprise:

- Climate Change (Chapter 7);
- Cultural Heritage (Chapter 8);
- Ecology and Biodiversity (Chapter 9);
- Water Environment (Chapter 10);
- Landscape and Visual Amenity (Chapter 11);
- Noise and Vibration (Chapter 12);
- Socio-Economics and Land Use (Chapter 13); and
- Traffic and Transport (Chapter 14).

6.7.2 Chapter 15 provides a summary of environmental topics which have been considered during the preparation of this Scoping Report, and for which standalone chapters are not anticipated to be required in the ES (due to the expected length of text needed to assess these topics). Technical appendices will be provided for these topics with a short summary provided in a single chapter within the ES. For clarity, these topics are not scoped out of the EIA. They are scoped in but the format of presentation within the ES will be different to the topics listed above. These topics comprise:

- Air Quality;
- Glint and Glare;
- Ground Conditions;
- Major Accidents or Disasters; and
- Waste.

6.7.3 Chapters 7 – 15 of this Scoping Report provide an outline of the proposed scope of works for the topics identified above.

## 7. Climate Change

### 7.1 Introduction

- 7.1.1 This chapter sets out the approach to the assessment of the impact of the Proposed Development on the climate and the impact of climate change on the Proposed Development. The purpose of the assessment will be to identify and characterise any relevant climate change factors, to consider the nature and scale of potential impacts arising from and on the Proposed Development, and to assess the significance of any likely effects.
- 7.1.2 To align with the requirements of the EIA Regulations (Ref. 1) and Institute of Environmental Management and Assessment (IEMA) Guidance for assessing climate mitigation (Ref. 146) and adaptation (Ref. 147) in EIAs, consideration has been given within this chapter to the following aspects of climate change assessment:
- **Lifecycle greenhouse gas (GHG) impact assessment:** the impact of GHG emissions arising from the Proposed Development on the climate over its lifetime;
  - **In-combination climate change impact (ICCI) assessment:** the combined impact of the Proposed Development and future climate change on the receiving environment<sup>1</sup>; and
  - **Climate change resilience review:** the resilience of the Proposed Development to climate change impacts.

### 7.2 Study Area

#### Lifecycle GHG Impact Assessment

- 7.2.1 The study area for the lifecycle GHG impact assessment covers all direct GHG emissions arising from activities undertaken within the Site boundary during the construction, operation and maintenance, and decommissioning. It also includes emissions arising outside the Site boundary, for example emissions embedded within the construction materials arising as a result of the energy used for their production, as well as emissions arising from the transportation of materials, waste and construction workers to and from site.
- 7.2.2 The study area also includes activities that may be avoided or displaced as a result of the Proposed Development such as other grid electricity generation activities.
- 7.2.3 The environmental impact associated with GHG emissions is a national and global issue. Consequently, the potential significance of the Proposed Development's lifecycle GHG emissions will be assessed by comparing the estimated GHG emissions from the Proposed Development against the

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<sup>1</sup> In line with IEMA guidance, this is the combined effect of the impacts of the Proposed Development and potential climate change impacts on the receiving environment are referred to as 'in-combination impacts' and 'in-combination effects'.

reduction targets defined in the Climate Change Act 2008 (2050 Target Amendment) Order 2019 (Ref. 144) and associated five year, legally binding carbon budgets. The Proposed Development's lifecycle GHG emissions will also be assessed by identifying whether the Proposed Development is aligned with the UK's trajectory to net zero, either directly or indirectly when compared to the baseline, as identified as best practice in IEMA Guidance.

## In-Combination Climate Change Impact Assessment

- 7.2.4 The study area for the in-combination climate change impact assessment will be defined in each discipline's assessment within the ES (Chapters 7 - 15), and includes all environmental receptors identified within the assessments undertaken by the environmental disciplines.

## Climate Change Resilience Assessment

- 7.2.5 The study area for the climate change resilience assessment is the land within the Site boundary, i.e., it covers the construction, operation and decommissioning of all assets and infrastructure which constitute the Proposed Development.

## 7.3 Relevant Legislation, Planning Policy Context and Guidance

- 7.3.1 The legislation, planning policy and guidance relating to climate change, and pertinent to the Proposed Development comprises:

### Legislation

- The Climate Change Act (2008) (Ref. 11) and Climate Change Act (2050 Target Amendment Order 2019) (Ref. 144). The Climate Change Act 2008 set a legally binding target for the UK to reduce its net GHG emissions from 1990 levels by at least 80% by 2050. This target is supported by a system of legally-binding five-year 'carbon budgets' and the Climate Change Committee (CCC), an independent body to advise on setting budgets and to monitor progress. The UK carbon budgets restrict the amount of GHG emissions the UK can legally emit in a defined five-year period. The Act was amended in 2019 to revise the existing 80% reduction target and legislate for Net Zero emissions by 2050 (through the Climate Change Act 2008 (2050 Target Amendment) Order 2019).
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (Ref. 39) with reference to Part 3 Assessment and technology-specific information, section 3.10 Solar Voltaic Generation.
- The Carbon Budgets Order 2009 (Ref. 12). This sets the carbon budget totals for the First (2008-2012), Second (2013-2017) and Third (2018-2022) Carbon Budget periods.

- Carbon Budget Order 2011 (Ref. 141). This Order sets the carbon budget total for the Fourth (2023-2027) Carbon Budget period.
- Carbon Budget Order 2016 (Ref. 142). This Order sets the carbon budget total for the Fifth (2028-2032) Carbon Budget period.
- The Carbon Budget Order 2021 (Ref. 143). This sets the carbon budget total for the Sixth (2033-2037) Carbon Budget period.
- Environment Act 2021 (Ref. 105). The UK's new framework of environmental protection and offers new powers to set new binding targets, including for air quality, water, biodiversity, and waste reduction.
- Energy Act 2016 (Ref. 246). This relates to UK enterprise law and energy in the UK.

## International Planning Policy

- The Paris Agreement (Ref. 140) is a legally-binding agreement within the United Nations Framework Convention on Climate Change (UNFCCC) dealing with GHG emissions mitigation, adaptation and finance starting in the year 2020. It requires all signatories to set a target, known as a nationally determined contribution (NDC) and to strengthen their climate change mitigation efforts to keep global warming to well below 2°C this century and to pursue efforts to limit global warming to 1.5°C. The agreement contains a 'ratchet' mechanism by which NDCs must be strengthened every five years. The UK updated its NDC in the first half of 2021. Under Article 7, the agreement requires all signatories to engage in adaptation planning and implementation.

## National Planning Policy

- National Planning Statement for Energy (NPS EN-1) (Ref. 6), with particular reference to paragraphs 2.2.9 and 4.8.2 in relation to climate impacts and adaptation; paragraphs 4.1.3 to 4.1.4 in relation to adverse effects and benefits; paragraphs 4.2.1, 4.2.3, 4.2.4, 4.2.8 to 4.2.10 and 5.1.2 in relation to EU Directive and ES requirements; paragraphs 4.5.3 and 4.8.1 to 4.8.12 in relation to adaptation measures in response to climate projections; and paragraphs 5.7.1 to 5.7.2 in relation to climate projections, flood risk and the importance of relevant mitigation. The draft overarching National Policy Statement for Energy (EN-1) (Ref. 92) includes guidance for the appraisal of sustainability in paragraph 1.7.4, climate change adaptation in paragraphs 4.9.1 to 4.9.14, net zero in paragraphs 2.2.1 to 2.2.5, and generic impacts on the climate in Part 5.3.
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (Ref. 5) – paragraph 2.4.1 regarding NPS EN-1 and the importance of climate change resilience, and paragraph 2.4.2 in relation to ES requirements regarding climate change resilience. The draft overarching National Policy Statement for Electricity Networks

Infrastructure (EN-5) (Ref. 156) includes considerations for climate change adaptation and resilience in paragraphs 2.6.1 and 2.6.2.

- NPPF (Ref. 7) – paragraphs 8, 20 and 149 in relation to adaptation, mitigation and climate change resilience; paragraphs 148 and 157 in relation to flood risk and damage to property and people; paragraphs 150 and 153 in relation to reduction of CO<sub>2</sub> emissions through design and reduced energy consumption; and paragraphs 155 to 165 in relation to climate projections, associated flood risk and adaptation.

7.3.2 It is noted that NPSs are undergoing a review, with draft updates available and undergoing consultation. Any updated versions, once finalised, will be considered within the ES.

## National Guidance

- Planning Practice Guidance, Climate Change (Ref. 13). This guidance describes how to identify suitable mitigation and climate adaptation measures to incorporate into the planning process, stating that: *“Effective spatial planning is an important part of a successful response to climate change as it can influence the emission of greenhouse gases... Planning can also help increase resilience to climate change impact through the location, mix and design of development.”*
- Net Zero Strategy (2021) (Ref. 145). This strategy sets out policies and proposals for decarbonising all sectors of the UK economy to meet a net zero target by 2050. One of the key policies is for the UK to be entirely powered by clean energy sources (predominantly solar and wind), by 2035.
- IEMA (2022) Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (Ref. 146)
- IEMA (2020) Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation (Ref. 147).

## Local Planning Policy

- Central Lincolnshire Local Plan (2023) (Ref. 195) with particular reference to Policy S11 (Embodied Carbon), Policy S17 (Carbon Sinks), S21 (Managing Water Resources and Flood Risk), S14 (Renewable Energy) and S59 (Green Infrastructure Network).

7.3.3 Where required, relevant Neighbourhood Plans and Supplementary Planning Documents (SPDs)/Guidance (SPGs) will be considered.

7.3.4 The national planning policies identify the requirement for consideration of climate change resilience. Climate projections should be analysed, and appropriate climate change adaptation measures considered throughout the design process. Specific climate change risks identified within these policies include flooding, drought, coastal change, rising temperatures and associated damage to property and people.

- 7.3.5 Local planning policies identify the need to consider and, where appropriate, mitigate GHG emissions associated with new development. New development should aim for reduced or zero carbon development by incorporating renewable or low carbon energy sources and maximising energy efficiency where practicable and should build in resilience to projected climate change impacts.

## 7.4 Baseline Conditions

### Lifecycle GHG impact assessment

- 7.4.1 For the GHG assessment, the baseline is a ‘no-development’ scenario whereby the Proposed Development is not implemented. The baseline comprises existing carbon stock and sources of GHG emissions resulting from the existing activities within the Site boundary, as well as 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 does not go ahead. A full assessment of the “no-development” baseline scenario will be undertaken within the PEIR and the ES.
- 7.4.2 The current land use within the Site boundary consists of arable land, interspersed with individual trees along field boundaries, hedgerows and linear tree belts. The abundance of vegetation within the Site suggests a relatively high carbon sink potential. Also, current land use within the Site has minor levels of associated GHG emissions as the land use is largely agricultural. Baseline agricultural GHG emissions are dependent on soil and vegetation types present.

### In-combination climate change impact assessment

- 7.4.3 The receptors for In-combination Climate Change Impacts (ICCI) are receptors within the surrounding environment that will be impacted by the Proposed Development in combination with future climatic conditions. Baseline conditions for the ICCI assessment are determined using the climate change projections data.
- 7.4.4 An initial review of UK Climate Projections 2018 (UKCP18) data (Ref. 148) for the 25km square within which the Proposed Development is located suggests that by the 2050s time period (2040-2069), the Region could experience an increase of around 2.6°C in summer mean air temperature at 1.5m and an increase of 1.6°C in winter mean air temperature at 1.5m, compared to a 1981-2010 baseline period. For the same time period, summer mean precipitation is expected to decrease by around 19%, whilst in winter it is expected to increase by 14%. This is based on 50% probability levels of the RCP8.5 scenario, which is considered to be the high-emissions global scenario with the greatest concentration of GHGs in the atmosphere.

## Climate change resilience review

- 7.4.5 The receptor for Climate Change Resilience (CCR) is the Proposed Development itself including its construction, operation and decommissioning. The CCR review will provide a description of how the Proposed Development will be designed to be more resilient to the climate change impacts identified during the review of the UKCP18 data (Ref. 148).
- 7.4.6 A more detailed assessment of climate change projections will be conducted for the land within the Site boundary as part of the ES.

## 7.5 Potential Effects and Mitigation

### GHG impact assessment

- 7.5.1 For the purposes of this assessment, it has been considered that any increases in GHG emissions compared to the baseline has the potential to have an impact, due to the high sensitivity of the receptor (global climate) to increases in GHG emissions. This is in line with the IEMA guidance (Ref. 146), which states that all GHG emissions have the potential to be significant. The application of the standard EIA significance criteria is not considered to be appropriate for climate change mitigation assessments. GHG impacts will be put into context in terms of their impact on the UK's five-year carbon budgets, which set legally-binding targets for GHG emissions. GHG impacts will also be put into context for the sub-sectoral budgets for energy generation. **Table 7-1** provides the lifecycle stages, related activities and primary emission sources to be considered for the GHG assessment.

**Table 7-1: Potential sources of GHG emissions**

Lifecycle stage	Activity	Primary emission sources
Product stage	Raw material extraction and manufacturing of products required to build the equipment for the Proposed Development. Due to the complexity of the equipment, this stage is expected to make a significant contribution to overall GHG emissions. Transportation of materials for manufacturing.	Embodied GHG emissions from energy use in extraction of materials and manufacture of components and equipment. Emissions of GHG from transportation of products and materials.
Construction process stage	On-site construction activity including emissions from construction compounds. Transportation of	Consumption of energy (electricity; other fuels) from plant, vehicles, generators and worker travel. Fuel consumption from transportation of materials to site,



Lifecycle stage	Activity	Primary emission sources
	construction materials (where these are not included in product-stage. Travel of construction workers.	where these are not included in product-stage embodied emissions. Due to the nature of the equipment, this could require shipment of certain aspects over significant distances.
	Disposal of waste materials generated by the construction process. Land use change. Water use.	GHG emissions from transportation and disposal of waste. GHG emissions from net loss of carbon sink. Provision of clean water, and treatment of wastewater.
Operation and maintenance stage	Operation and maintenance of the Proposed Development.	GHG emissions from energy consumption. These operational emissions are expected to be negligible in the context of the overall GHG impact. Leakage of potent GHGs, such as SF <sub>6</sub> , during operation. GHG emissions from material use and waste generation resulting from ongoing site maintenance. Emissions from routine maintenance are expected to be negligible, but the periodic replacement of components has the potential to have significant impacts given the complexity of the equipment involved.
Decommissioning stage	On-site decommissioning activity. Transportation and disposal of waste materials. Worker travel.	Consumption of energy (electricity and other fuels) from plant, vehicles and generators on site. Emissions from the disposal and transportation of waste. This has the potential to be significant given the complexity of the equipment. GHG emissions from transportation of workers to site.

7.5.2 GHG emissions from the Proposed Development will be put into context by comparing them with other likely alternative sources of electricity generation. The assessment will therefore measure any savings in emissions due to the generation of the electricity via solar PV as compared to other electricity generation methods such as natural gas.

7.5.3 Carbon sequestration as a result of the additional carbon capture by vegetation and soils as a result of land use change from arable to permanent grassland will also be discussed.

7.5.4 A CEMP will be prepared and implemented by the selected Principal Contractor to include a range of best practice construction measures, such as:

- Specification of alternative materials with lower embodied GHG emissions; and
- Low carbon design specifications such as energy-efficient lighting and durable construction materials to reduce maintenance and replacement cycles.

7.5.5 The final selection of any mitigation measures, if required, will be detailed as part of the lifecycle GHG impact assessment in the ES. This may include GHG emission mitigation measures concerning construction, operation and decommissioning of the Proposed Development.

### In-combination climate change impact assessment

7.5.6 ICCI assessment identifies how the resilience of various receptors in the surrounding environment is affected by a combination of future climate conditions and the Proposed Development. The climate parameters relevant to the Proposed Development are detailed in **Table 7-2** below together with the rationale for scoping. On the basis of the information presented in **Table 7-2**, an ICCI assessment is proposed to be scoped out.

**Table 7-2 Climate Parameters for the ICCI of the Proposed Development**

Parameter	Scoped In/Out	Rationale for Scoping Conclusion
Temperature change	Out	While impacts are expected as a result of projected temperature increases, these temperature increases in combination with the Proposed Development are not expected to have a significant impact upon receptors identified by other environmental disciplines. Similarly, it is not expected that projected temperature increases would have impacts on the panels themselves as solar PV schemes operate all over the world in climates which are already much warmer than the predicted climate of the UK.
Sea level rise	Out	The Proposed Development is not located in an area that is susceptible to sea level rise.
Precipitation change (frequency and magnitude of precipitation events and droughts)	Out	Climate change may lead to an increase in substantial precipitation events that could lead to flash flooding or changes to groundwater levels. However, no significant impacts on surface water or groundwater levels are expected as a result of precipitation changes, in combination with the Proposed Development, as the flow of precipitation to ground will not be significantly hindered and the conversion of agricultural land to grassland should increase infiltration and reduce runoff rates. The Proposed Development, in combination with projected changes in precipitation, is also not expected to have a

Parameter	Scoped In/Out	Rationale for Scoping Conclusion
		significant impact upon receptors identified by other environmental disciplines.
Wind	Out	The Proposed Development, in combination with projected changes in wind patterns, is not expected to have a significant impact upon receptors identified by other environmental disciplines.

## Climate change resilience review

7.5.7 Climate parameters relevant to the climate change resilience review are detailed in **Table 7-3** below.

**Table 7-3 Parameters scoped into the Climate Change Resilience Review**

Parameter	Scoped In/Out	Rationale for Scoping Conclusion
Extreme weather events	In	The Proposed Development may be vulnerable to extreme weather events such as storm damage to structures and assets.
Increased averaged temperatures and incidence of heatwaves	In	Extremes in temperatures may result in heat stress of materials and structures.
Increased frequency of heavy precipitation events	In	The Proposed Development may be vulnerable to changes in precipitation, for example, land subsidence and damage to structures and drainage systems during periods of heavy rainfall.
Increase in strong wind events	In	The Proposed Development may be vulnerable to changing wind patterns, for example, high winds and falling trees could damage structures and assets.
Sea level rise	Out	The Proposed Development is not located in an area that is susceptible to sea level rise.

7.5.8 The climate change resilience review will qualitatively assess the Proposed Development's resilience to climate change. This will be completed in liaison with the project design team and the other EIA technical disciplines by considering the climate change projections for the geographical location and timeframe of the Proposed Development.

7.5.9 A statement will be provided within the ES to describe how the Proposed Development will be adapted to improve its resilience to future climate conditions.

## 7.6 Assessment Methodology

### Lifecycle GHG impact assessment

- 7.6.1 The GHG assessment will follow a project lifecycle approach to calculate estimated GHG emissions arising from the construction, operation and decommissioning of the Proposed Development and to identify GHG 'hot spots' (i.e., emissions sources likely to generate the largest amount of GHG emissions). This will enable the identification of priority areas for mitigation in line with the principles set out in IEMA guidance (Ref. 146).
- 7.6.2 In line with the World Business Council for Sustainable Development and World Resources Institute GHG Protocol guidelines (Ref. 149), the GHG assessment will be reported as tonnes of carbon dioxide equivalent (tCO<sub>2e</sub>) and will consider the seven Kyoto Protocol gases:
- Carbon dioxide (CO<sub>2</sub>);
  - Methane (CH<sub>4</sub>);
  - Nitrous oxide (N<sub>2</sub>O);
  - Sulphur hexafluoride (SF<sub>6</sub>);
  - Hydrofluorocarbons (HFCs);
  - Perfluorocarbons (PFCs); and
  - Nitrogen trifluoride (NF<sub>3</sub>).
- 7.6.3 Expected GHG emissions arising from the construction activities, embodied carbon in materials and operational emissions of the Proposed Development, as well as baseline emissions, will be quantified using a calculation-based methodology as per the following equation, and aligned with the GHG Protocol:
- $$\text{Activity data} \times \text{GHG emissions factor} = \text{GHG emissions}$$
- 7.6.4 Department for Environment, Food and Rural Affairs (Defra) 2021 emissions factors (Ref. 41) and embodied carbon data from the University of Bath Inventory of Carbon and Energy (ICE) (Ref. 247) will be used as the source data for calculating GHG emissions.
- 7.6.5 The sensitivity of the receptor (global climate) to increases in GHG emissions is always defined as high as any additional GHG impacts could compromise the UK's ability to reduce its GHG emissions and therefore meet its future 5-year carbon budgets. Also, the extreme importance of limiting global warming to below 2°C this century is broadly asserted by the International Paris Agreement (Ref. 140) and the climate science community.
- 7.6.6 The UK carbon budgets (Ref. 143) are currently only available to 2037 (6th carbon budget). Where further carbon budgets are not available (7th, 8th and 9th Carbon Budget periods), these will be projected based on data published

by the CCC. Totals for these periods have not been approved or ratified and are not legally binding, but indicative figures can provide valuable context at this stage.

- 7.6.7 When evaluating significance of the GHG emissions, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should therefore be based on its net impact over its lifetime, which may be positive, negative or negligible. 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.
- 7.6.8 The following significance criteria in **Table 7-4** will be used to determine the Proposed Development's whole life GHG emissions and how these align with the UK's net zero compatible trajectory. Major or moderate adverse effects and beneficial effects are considered to be significant. Minor adverse and negligible effects are not considered to be significant.

**Table 7-4 Significance criteria**

Level of significance	Description
Major adverse	The Proposed Development's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.
Moderate adverse	The Proposed Development's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.
Minor adverse	The Proposed Development may be vulnerable to changes in precipitation, for example, land subsidence and damage to structures and drainage systems during periods of heavy rainfall.
Negligible	The Proposed Development's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.

Level of significance	Description
Beneficial	The Proposed Development's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

## Climate Change Resilience Review

- 7.6.9 The Proposed Development's resilience to climate change will be considered qualitatively. This will be completed in liaison with the project design team and the other environmental disciplines by considering the climate projections for the geographical location and timeframe of the Proposed Development.
- 7.6.10 In line with standard methodology, the significance of climate resilience will not be assessed. Instead, a statement will be provided to describe how the Proposed Development has been designed to be as resilient as is reasonably practicable to future climate change.

## 7.7 Summary of Elements Scoped in and Scoped Out

- 7.7.1 A summary of the elements scoped in and out of the assessment of climate change are presented in **Table 7-5**:

**Table 7-5 Elements scoped in and out of the assessment of climate change**

Element	Scoped in / Scoped Out
GHG Impact Assessment	Scoped in and will cover all aspects of the Proposed Development from raw products and manufacture of materials, through to construction, operation, and decommissioning.
In-Combination Climate Impact Assessment	Scoped out as changes in temperature, sea level, precipitation and wind patterns are not predicted to have a significant impact upon receptors identified by other environmental disciplines.
Climate Change Resilience Review	Scoped in. This will consider the vulnerability of the Proposed Development to extreme weather events and changes in temperature, precipitation, and wind patterns. Assessment of changes in sea level has been scoped out as the Proposed Development is not located in an area that is susceptible to sea level rise.

## 7.8 Assumptions, Limitations and Uncertainties

- 7.8.1 The Proposed Development's resilience to climate change will be completed in liaison with the project design team and the other environmental disciplines

by considering the climate projections for the geographical location and timeframe of the Proposed Development. Assessment will be undertaken in line with 2020 IEMA guidance on climate change resilience (Ref. 147). The significance of climate resilience will not be assessed.

- 7.8.2 The assessment will set out how the Proposed Development has been designed to be as resilient as is reasonably practicable to future climate change.
- 7.8.3 Where detailed information is not available regarding energy use, types and quantities of materials used, or the embodied carbon of key features of the assets, precautionary assumptions will be made based on industry approximations and professional best practice.
- 7.8.4 All assumptions and limitations, including any exclusions, together with assumptions for choices and criteria leading to exclusion of input and output data will be documented as part of the assessment.

## 8. Cultural Heritage

### 8.1 Introduction

8.1.1 This chapter sets out the approach to the assessment of the Proposed Development's impacts on Cultural Heritage, comprising archaeology, built heritage and the historic landscape. The purpose of the assessment is to identify and characterise any relevant cultural heritage resources, to consider the nature and scale of potential impacts arising from the Proposed Development, and to assess the significance of likely effects.

### 8.2 Study Area

8.2.1 The study area for non-designated assets will extend to a distance of 1km from the Site boundary and the study area for designated assets will extend to a distance of 3km from the Site boundary. This will allow for all cultural heritage assets to be set within their wider context and allow for the assessment of archaeological potential within the Site boundary.

8.2.2 A flexible approach will be taken to the identification of high-value assets on which there may be an impact upon setting, up to 5km from the Site boundary. Assets beyond this distance may also be considered, where identified by the technical team, Historic England or Lincolnshire County Council's Historic Environment Officer. This will be guided by the Proposed Development's Zone of Theoretical Visibility (ZTV) (to be prepared by as part of Chapter 11: Landscape and Visual Amenity of the PEIR) but will also consider physical and historical connectivity and relationships with other monuments and the wider landscape.

### 8.3 Planning Policy Context and Guidance

8.3.1 Legislation, planning policy and guidance relating to cultural heritage, and pertinent to the Proposed Development comprises:

#### Legislation

- Infrastructure Planning (Decisions) Regulations 2010 (Ref. 14);
- Planning (Listed Buildings and Conservation Areas) Act 1990 (Ref. 15); and
- Ancient Monuments and Archaeological Areas Act 1979 (Ref. 16) (amended by the National Heritage Act 1983 (Ref. 17) and 2002 (Ref. 18).

#### National Planning Policy

- NPS EN-1 (Ref. 6) with particular reference to Section 5.8 in relation to the significance, impact and recording of the historic environment;



- NPS EN-3 (Ref. 39) with reference to section 2.7 in relation to Appraisal of Sustainability and Habitats Regulation Assessment.
- NPS EN-5 (Ref. 5) with particular reference to Paragraph 2.8.9 in relation to the archaeological consequences of electricity line installation; and
- NPPF (Ref. 7) with particular reference to Section 16: Conserving and Enhancing the Historic Environment.

8.3.2 It should be noted that the draft NPS EN-1 (Ref. 92) specifically states that the applicant will be responsible for undertaking studies to assess the impacts of noise, vibration, light and indirect impacts on heritage assets. The draft EN-1 removes the presumption in favour of the conservation of designated assets. It also states that the Secretary of State should refuse consent unless it can be demonstrated that the substantial harm to or loss of significance is necessary to achieve substantial public benefits that outweigh that harm or loss, or all of the following apply:

- The nature of the heritage asset prevents all reasonable uses of the site;
- No viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation;
- Conservation by grant-funding or some form of not for profit, charitable or public ownership is demonstrably not possible; and
- The harm or loss is outweighed by the benefit of bringing the site back into use.

8.3.3 While the current EN-1 acknowledges that impacts to non-designated assets should be considered by the Infrastructure Planning Commission (IPC)<sup>2</sup>, the draft EN-1 explicitly states that the effect of an application on the significance of non-designated assets should be taken into account in determining the application. This baseline assessment will be undertaken in accordance with guidance set out by the Chartered Institute for Archaeologists (CIfA) and Historic England, in particular the Standard and Guidance for Historic Environment Desk-Based Assessment (Ref. 23) and the Code of Conduct (Ref. 24).

8.3.4 NPS EN-3 (Ref. 39) with particular reference to section 3.10 relating to renewable energy infrastructure. The draft NPS EN-3 makes specific reference to the assessment of, and mitigation for, heritage assets at section 2.53.

## National Guidance

- PPG, Section 16: Conserving and enhancing the historic environment (Ref. 19);
- Historic Environment Good Practice Advice in Planning Note 2. Managing Significance in Decision Taking in the Historic Environment. Historic England (Ref. 20);

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<sup>2</sup> The IPV has now been replaced by the Planning Inspectorate and Secretary of State.

- Historic Environment Good Practice Advice in Planning Note 3. The Setting of Heritage Assets. Historic England (2nd edition, 2017) (Ref. 21);
- Historic Environment Statement of Heritage Significance: Analysing Significance in Heritage Assets. Historic England Advice Note 12. Historic England (2019) (Ref. 22);
- Commercial Renewable Energy Development and the Historic Environment. Historic England Advice Note 15 (2021) (Ref. 88);
- ClfA Standard and Guidance for Historic Environment Desk-Based Assessment (Ref. 23);
- ClfA Code of Conduct (Ref. 24); and
- IEMA, the Institute of Historic Building Conservation (IHBC) and the ClfA, Principles of Cultural Heritage Impact Assessment in the UK (Ref. 25).

## Local Planning Policy

8.3.5 Adopted in April 2023, the Central Lincolnshire Local Plan (Ref. 195) contains planning policies to guide development across Central Lincolnshire. Policy S57 highlights the importance of the historic environment:

In instances where a development proposal would affect the significance of a heritage asset (whether designated or non-designated), including any contribution made by its setting, the applicant will be required to undertake the following, in a manner proportionate to the asset's significance:

- describe and assess the significance of the asset, including its setting, to determine its architectural, historical or archaeological interest; and
- identify the impact of the proposed works on the significance and special character of the asset, including its setting; and
- provide a clear justification for the works, especially if these would harm the significance of the asset, including its setting, so that the harm can be weighed against public benefits.

8.3.6 Development proposals will be supported where they:

- protect the significance of heritage assets (including where relevant their setting) by protecting and enhancing architectural and historic character, historical associations, landscape and townscape features and through consideration of scale, design, architectural detailing, materials, siting, layout, mass, use, and views and vistas both from and towards the asset;
- promote opportunities to better reveal significance of heritage assets, where possible;
- take into account the desirability of sustaining and enhancing non-designated heritage assets and their setting.

8.3.7 The Central Lincolnshire Local Plan highlights the importance of preserving archaeological remains where possible stating:

*“Development affecting archaeological remains, whether known or potential, designated or undesignated, should take every practical and reasonable step to protect and, where possible, enhance their significance. Planning applications for such development should be accompanied by an appropriate and proportionate assessment to understand the potential for and significance of remains, and the impact of development upon them.*

*If initial assessment does not provide sufficient information, developers will be required to undertake field evaluation in advance of determination of the application. This may include a range of techniques for both intrusive and non-intrusive evaluation, as appropriate to the site. Wherever possible and appropriate, mitigation strategies should ensure the preservation of archaeological remains in-situ. Where this is either not possible or not desirable, provision must be made for preservation by record according to an agreed written scheme of investigation submitted by the developer and approved by the planning authority”.*

8.3.8 The Bassingham Neighbourhood Plan (2016-2036) (Ref. 86) sets out its policies relating to the continuing development of the parish of Bassingham. Policy ES3 contains the key points relating to the built heritage and historic landscape:

- Heritage assets and their settings will be conserved and where appropriate, enhanced, to maintain the quality of Bassingham's built heritage and historic environment. Any development proposal affecting heritage assets or its setting will be required to contribute positively to conserving and enhancing the asset;
- The Design and Access Statement may be required to contain or be accompanied by a Heritage Statement, depending on the scale of the proposed development; and
- The Design and Access Statement will also be required to take into account the content of the latest Conservation Area Appraisal.

8.3.9 Coleby Parish Neighbourhood Plan (2018-2036) (Ref. 150) sets out Coleby Parish's commitment to protecting its local heritage. The Neighbourhood Plan highlights the need to preserve the historic character of the parish, whilst allowing for an appropriate level of development. Policy 1 highlights:

- Development proposals must demonstrate that they can be carried out without negatively impacting upon the setting of the village, the character and appearance of the Conservation Area, the character, extent, setting or usage of any heritage asset, and the landscape character.

8.3.10 Dunston Neighbourhood Plan (2016-2036) (Ref. 151), sets out Dunston Parish's commitment and policies for development within the parish. Policy 1 sets out the requirements for new developments to follow and highlights that any development must not detract from the setting and distinctive character of the village from the wider landscape, the character, extent, setting or use of any heritage asset or built environment.

- 8.3.11 The emerging Metheringham Neighbourhood Plan is currently being prepared, however no policy documentation has been drafted.

## 8.4 Baseline Conditions

- 8.4.1 To assist with the scoping assessment, data has been considered from the National Heritage List for England (NHLE) and the Lincolnshire Historic Environment Record (LHER), to gain a better understanding of the designated and non-designated heritage assets within the study area. All high value designated and archaeological non-designated heritage assets identified within the 5km study area are listed in a gazetteer (Appendix C) and illustrated on **Figure 8-1** and **Figure 8-2**. They are referred to in text by their unique National Heritage List entry number (e.g. NLHE 1021080) or Historic Environmental Record (HER) identification number in brackets (e.g., MLI00972).

### Designated Assets

- 8.4.2 There are no scheduled monuments within the limits of the Site. There are seven scheduled monuments within the 3km study area, the earliest of which dates to the medieval period. The closest is Hall Close (NHLE 1021080), located immediately adjacent to the central section of the Solar and Energy Storage Park.
- 8.4.3 Four scheduled monuments date to the medieval period, with Somerton Castle (NHLE 1005015) located approximately 370m east of the Site, dating to the 12<sup>th</sup> century. Castle Hill Ringwork (NHLE 1020436) is located approximately 1.4km south of the Site, also dating to the 12<sup>th</sup> century.
- 8.4.4 Also dating to the 12<sup>th</sup> century are the Remains of Preceptory Church, Temple Bruer (NHLE 1007686) are located approximately 1.5km north-west of the Site. Hall Close: a medieval and post-medieval hall complex south of Dovecote Lane, with dovecote, gardens, fishponds, churchyard and cultivation remains (NHLE 1021080) is located approximately 10m north of the Site.
- 8.4.5 Three medieval churchyard crosses are located within 3km of the Site, including Wellingore Village Cross (NHLE 1009214), located approximately 360m south of the Site, Churchyard cross, All Saints' churchyard (NHLE 1009215), located approximately 1.8km south-west of the Site, and Churchyard cross, St Germain's churchyard (NHLE 1013082), located approximately 100m south of the Site.
- 8.4.6 Within 5km of the Site a further three scheduled monuments are recorded, the earliest of which dates to the Roman period. A Roman villa, Roman Villa West of Hill Holt Farm (NHLE 1005018), is located approximately 3km west of the Site, with Brauncewell Medieval Village (NHLE 1018397) and Dunsby Medieval Village (NHLE 1018395), located approximately 3.7km and 4.5km south-east of the Site respectively.
- 8.4.7 There are three listed buildings inside the limits of the Site, all grade II.

- 8.4.8 There are 280 listed buildings within a 3km study area of the Site boundary with concentrations in the settlements of Wellingore, Navenby, Coleby, Boothby Graffoe, Bassingham, Norton Disney, Thorpe on the Hill, Haddington, Waddington, Ashby de la Launde, Welbourn, Carlton le Moorland and Swinderby. Eagle. Of these 11 are grade I listed and ten are grade II\* listed.
- 8.4.9 There is one registered park and garden within the 3km study area, the grade II Coleby Hall (NHLE 1000973). Within 5km of the Site a further two registered parks and gardens are recorded.
- 8.4.10 There are eight conservation areas within a 3km study area of the Site boundary.

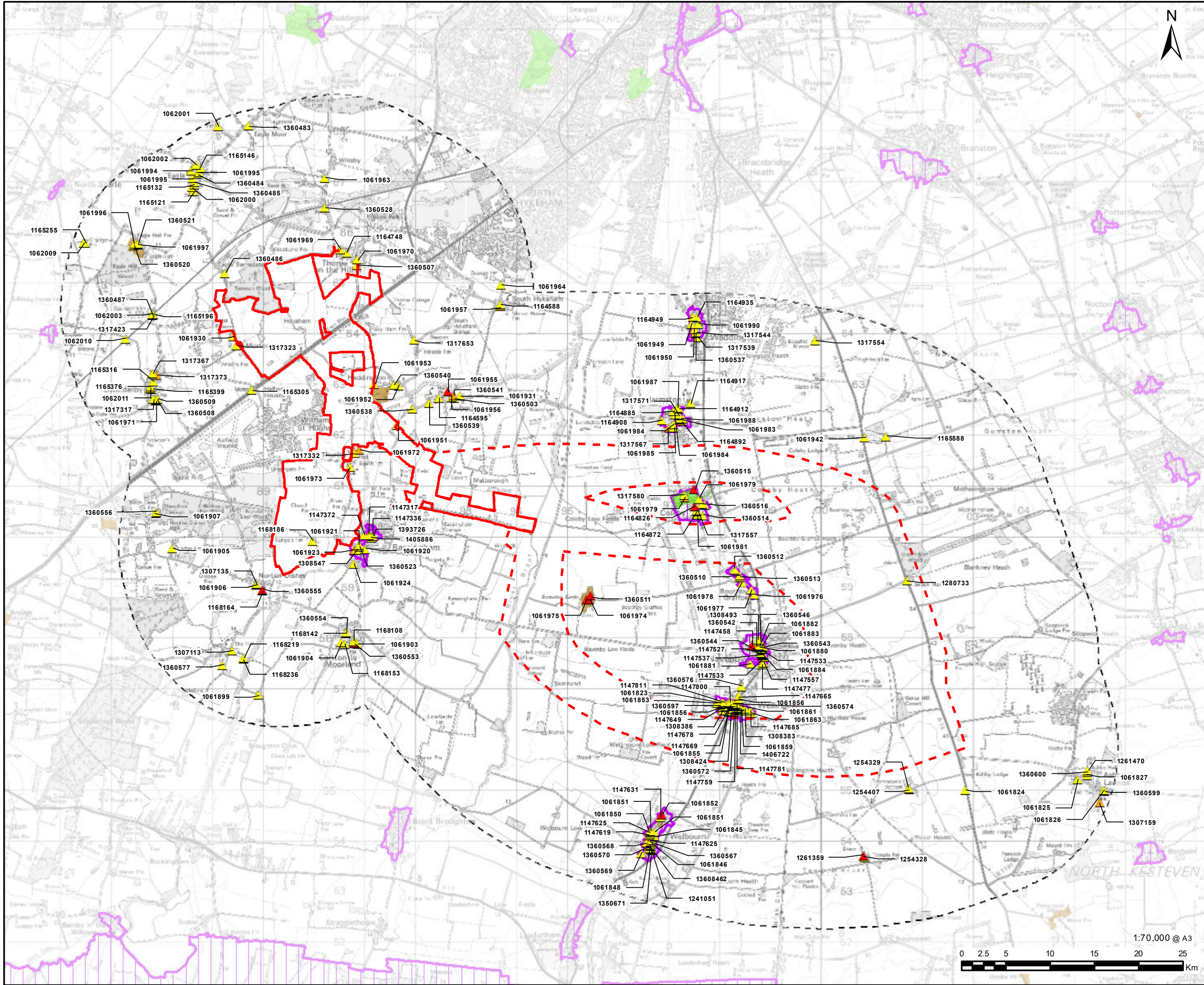
### Summary Baseline

- 8.4.11 Assets recorded in the HER range in date from the Neolithic period (400BC-2000 BC) to the modern period (1900-Present). Early prehistoric archaeological remains or finds are poorly represented within the study area with no archaeological remains dating to the Palaeolithic and Mesolithic periods recorded.
- 8.4.12 The earliest evidence recorded within the Site dates to the Neolithic period, and these comprise isolated find spots, such as a polished stone axe (MLI60759), several stone adze tools (MLI86692 and MLI82000), and flint arrowheads (MLI81990 and MLI86283). A potential Neolithic settlement has been recorded at Navenby approximately 450m west of the Site (MLI81672), comprising pits and occupation evidence such as enclosures.
- 8.4.13 There is an increase in activity within the study area moving into the Bronze Age, with find spots of weapons and tools recorded within the Site, including a palstaff (MLI86363), and a Middle Bronze Age socketed spearhead (MLI86690). Evidence of occupation and habitation have been recorded within the Site, with evidence of ditched enclosures (MLI82030) recorded at Harmston Heath, Boothby Graffoe (MLI91078 and MI91079) and Coleby (MLI91080). A single cremation dated to the Bronze Age was recorded at Chapel Lane, Navenby, approximately 570m west of the Site.
- 8.4.14 There is evidence of Romano-British settlement across the study area and within the Site boundary. Lincoln was known as *Lindum Colonia* and was originally founded as a Roman garrison between AD 58-68, before becoming a *colonia* sometime after AD 86. Two important arterial Roman roads cross through the Site on a north to south alignment, the Fosse Way (MLI60943) and Ermine Street (MLI60638) linking the north of England to the south and south-west. Several Roman settlements are located close to these roads, with a settlement at Coleby (MLI82135) located within the Site boundary, and a second settlement is known to have existed at Navenby (MLI60537) approximately 220m west of the Site. Archaeological investigations at Navenby have also identified a Romano-British cemetery (MLI60368).
- 8.4.15 A scheduled Roman villa, west of Hill Holt Farm (NHLE 1005018), is located approximately 3.2km west of the Site, indicating that Roman settlement was widespread in the area surrounding Lincoln.

- 8.4.16 A large number of Roman small finds have been located across the Site including a coin dating to the reign of Trajan (MLI86557), several coins located next to Ermine Street (MLI86500) and coins located close to Navenby Heath (MLI60916). Roman pottery has also been recorded across the Site, at Harmston Heath (81993), Harmston Low Fields (MLI81989) Wellingore (MLI60785).
- 8.4.17 No evidence of early Anglo-Saxon settlement has been previously recorded within the 1km study area. However, there is evidence of development of the rural landscape by the later Anglo-Saxon period of the 8<sup>th</sup> and 9<sup>th</sup> centuries, with a number of existing settlements within the study area originating at this time. Within the Site this includes the settlements of Harmston (MLI60777), Auborn (MLI82078), Coleby (MLI60776) and Thorpe-on-the-Hill (MLI83011). Anglo-Saxon inhumations (MLI80605) were recorded during archaeological investigations at Navenby, approximately 570m west of the Site.
- 8.4.18 Further evidence of early medieval activity within the Site has been identified, with an Anglo-Saxon sceat (MLI82005) was found at Harmston Heath, and a brooch (MLI83023) at Tunman Wood.
- 8.4.19 The transition into the medieval period appears to have led to further development of the landscape, with several more settlements forming during this period, including one at Skinnard (MLI60381) and Morton (MLI83041). More widely in the surrounding area, medieval settlement remains are recorded at Brauncewell Medieval Village (NHLE 1018397) and Dunsby Medieval Village (NHLE 1018395), within 5km of the Site.
- 8.4.20 Defensive sites were constructed shortly after the Norman Conquest to protect the new Norman rulers and to establish control across the country. These new defensive structures include Somerton Castle (NHLE 1005015) located approximately 370m east of the Site, and Castle Hill Ringwork (NHLE 1020436), which is located approximately 1.4km south of the Site. Both of these scheduled monuments date to the 12<sup>th</sup> century.
- 8.4.21 Several medieval manorial sites are recorded close to the Site, with a moated complex recorded at Haddington (MLI60267), located approximately 100m to the north and a second moated site at Boothby Graffoe (MLI60271), located approximately 550m south of the Site. In addition, a scheduled medieval hall (NHLE 1021080) and associated gardens and grounds is located approximately immediately north of the Site.
- 8.4.22 Evidence of medieval cultivation has been recorded within the Site and surrounding study area, with several distinct areas of ridge and furrow located within the Site boundary (MLI82027, MLI83030 and MLI86558). Further evidence of the medieval rural economy has also been recorded within the Site, with medieval fisheries located at Haddington (MLI82090) and Thurlby (MLI85878), and evidence of a water mill at Auborn (MLI82089).
- 8.4.23 There is distinct evidence for ecclesiastical activity within the area south of Lincoln, with the scheduled monument Remains of Preceptory Church, Temple Bruer (NHLE 1007686) located 1.5km north-west of the Site. A

medieval grange at Morton (MLI83164) and Temple High Grange (MLI60381), also indicate further ecclesiastical activity. The more substantially sized settlements south of Lincoln contained a church and associated burial grounds. The remains of several scheduled churchyard crosses have been recorded surrounding the Site, with one recorded at Wellingore Village (NHLE 1009214), located approximately 360m south of the Site, at All Saints' churchyard (NHLE 1009215), located approximately 1.8km south-west of the Site, and at St Germain's churchyard (NHLE 1013082), located approximately 100m south of the Site.

- 8.4.24 Archaeological evidence that dates to the post-medieval period within the Site is predominantly the remains of farmsteads that are completely or partially demolished. These can be seen widely across the landscape, for example, at Navenby (MLI120974 and MLI129084), Boothby Graffoe (MLI120964) and indicates that the area was used largely for agriculture.
- 8.4.25 Evidence of industrial expansion in the 18th and 19th centuries into Lincolnshire is evident, within the Site. This includes the remains of Harmston Railway station (MLI82021), and evidence for mineral extraction recorded as former quarries on historic mapping (MLI82782, MLI82450, and MLI82784).
- 8.4.26 Several areas of parkland are associated with some of the larger post-medieval manorial houses, including parkland associated with Wellingore Hall (MLI98380) and parkland associated with Harmston Hall (MLI98371).
- 8.4.27 Twentieth century archaeological assets are primarily associated with Royal Air Force (RAF) Coleby Grange Airfield (MLI60620), the airfield was active during World War II and as such there are remains of defensive structures located nearby, such as pillboxes (MLI125152 and MLI125153) and the crash sites of aeroplanes (MLI 98924).



- Solar and Energy Storage Park
- Grid Connection Corridor Options
- 3km Study Area
- Park and Garden
- Scheduled Monument
- Conservation Area

Listed

- ▲ Grade I
- ▲ Grade II\*
- ▲ Grade II

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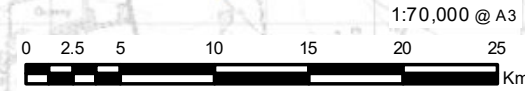
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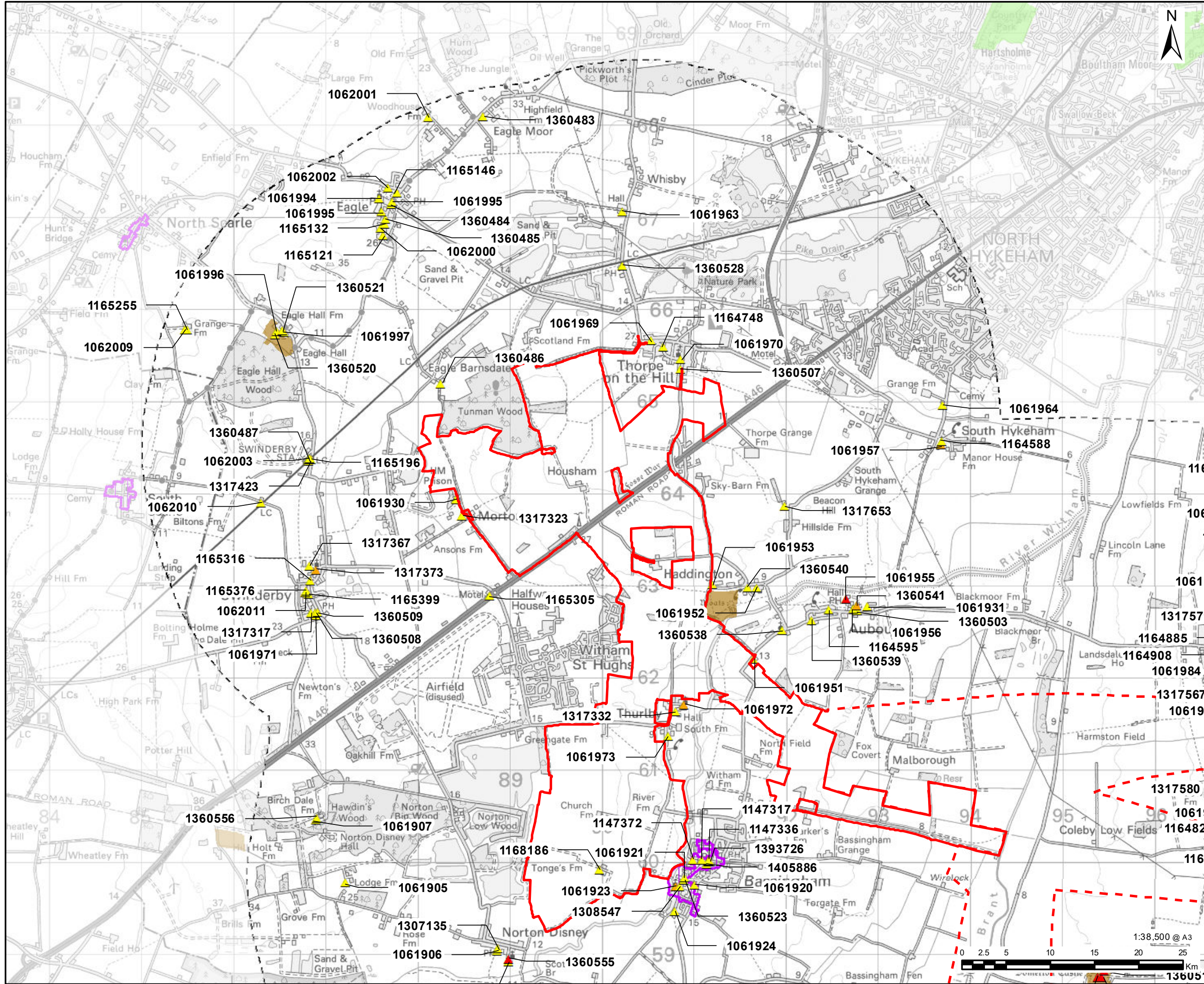
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**PROJECT**  
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**CLIENT**  
Fosse Green Energy Ltd

**CONSULTANT**  
AECOM Limited  
2 City Walk  
Holbeck, Leeds  
LS11 9AR  
www.aecom.com

**LEGEND**

- Solar and Energy Storage Park
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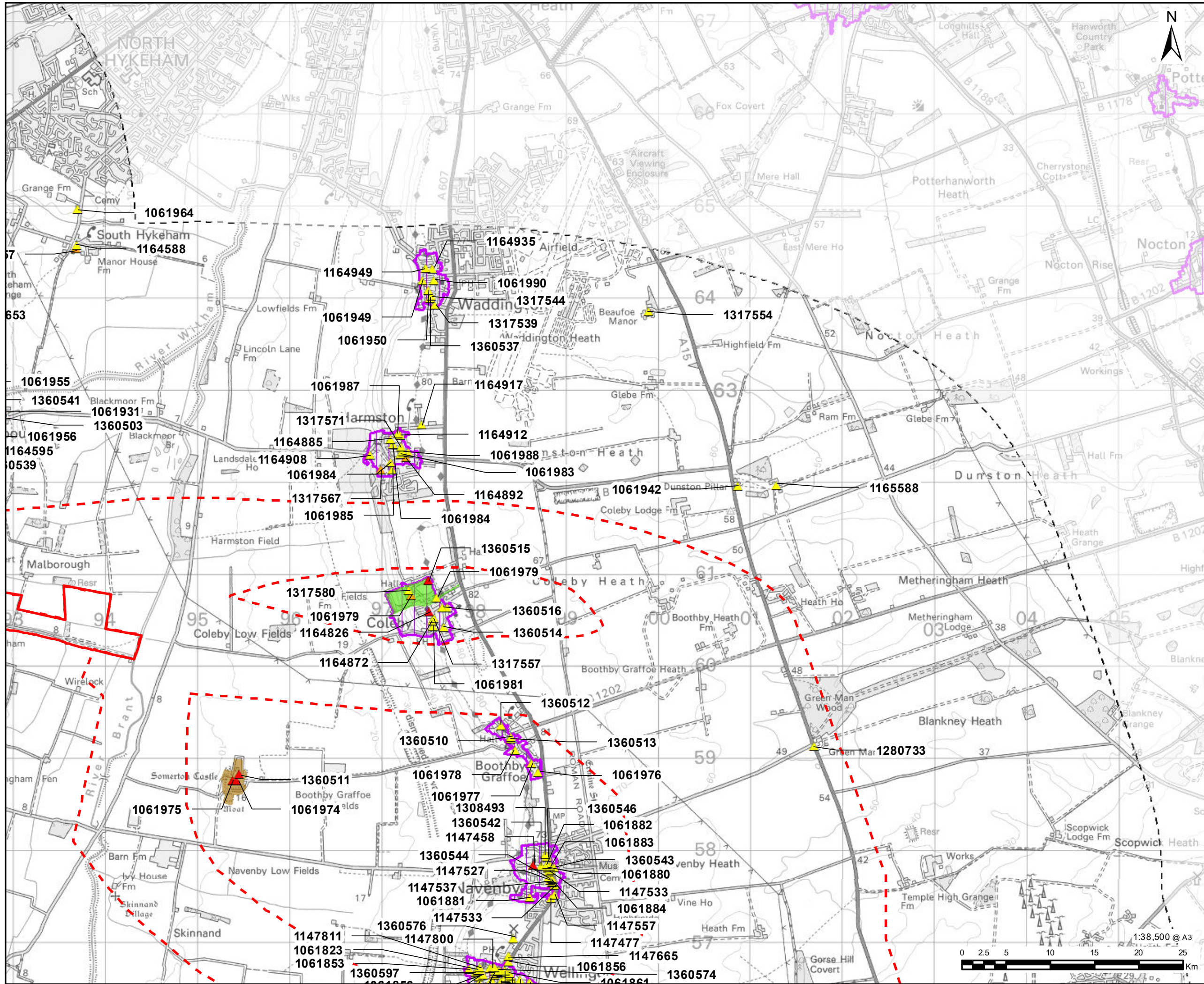
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**CONSULTANT**

AECOM Limited  
2 City Walk  
Holbeck, Leeds  
LS11 9AR  
www.aecom.com

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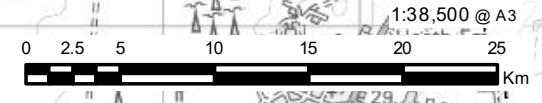
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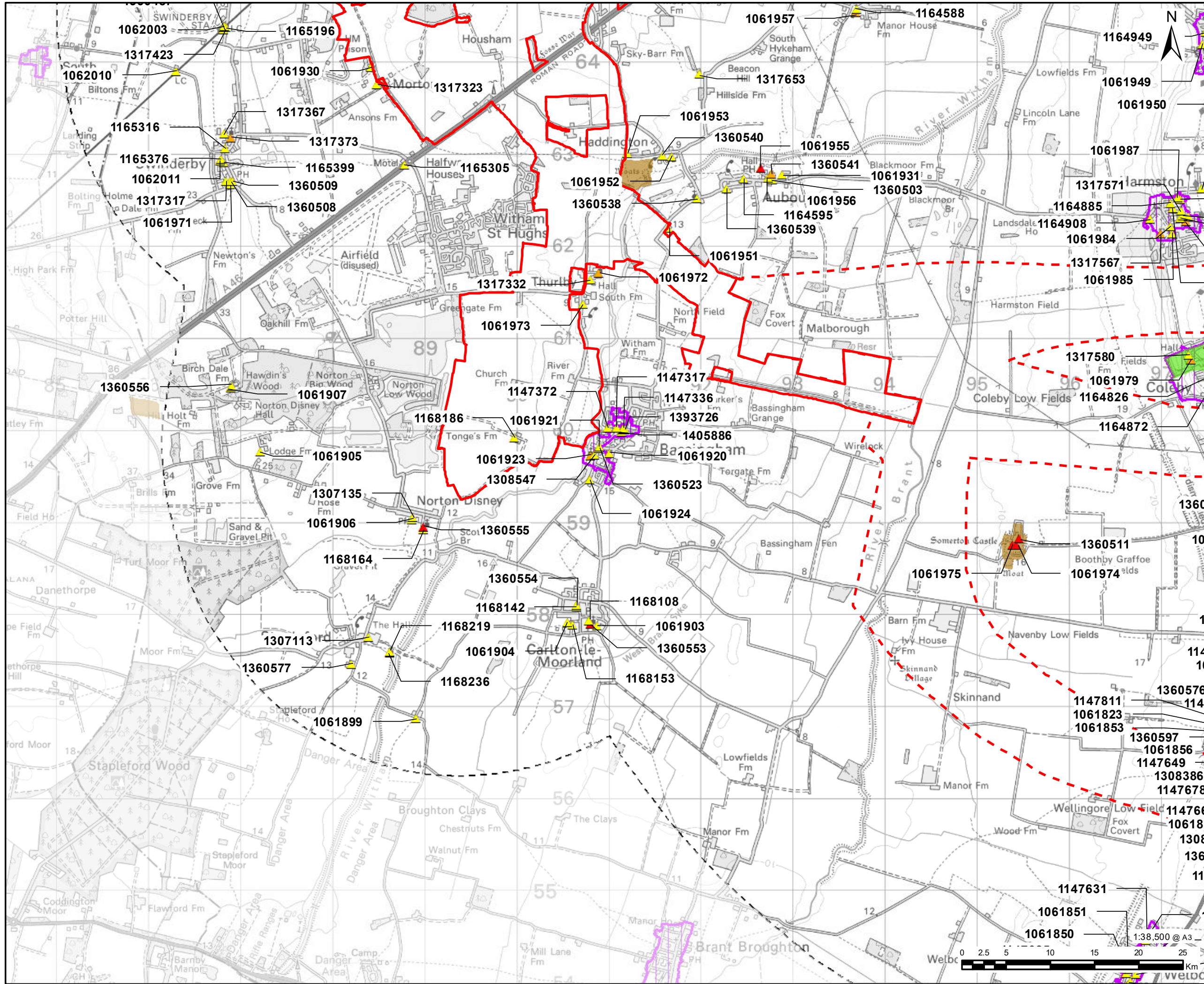
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AECOM Limited  
2 City Walk  
Holbeck, Leeds  
LS11 9AR  
www.aecom.com

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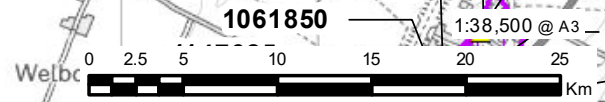
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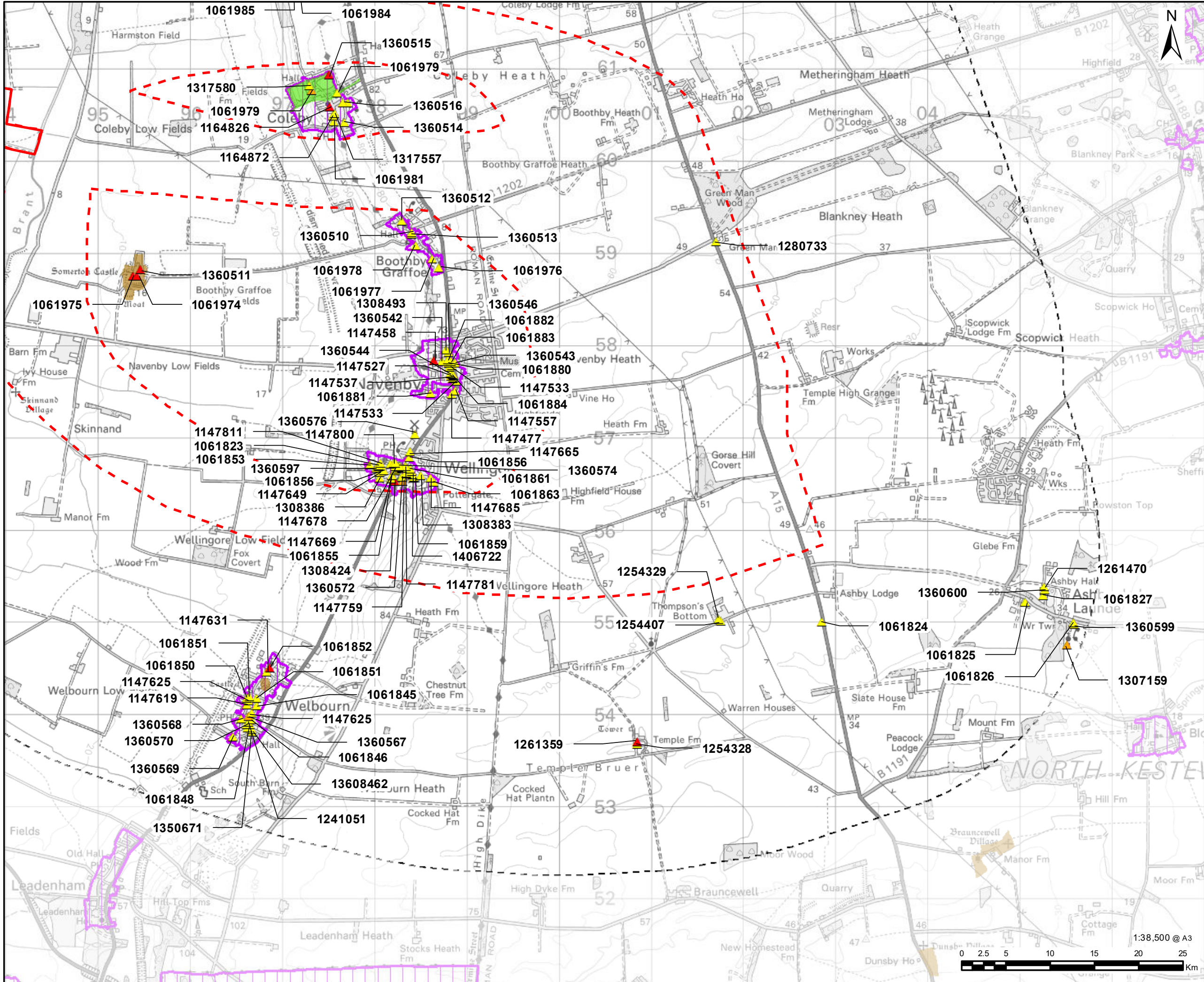
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2 City Walk  
Holbeck, Leeds  
LS11 9AR  
www.aecom.com

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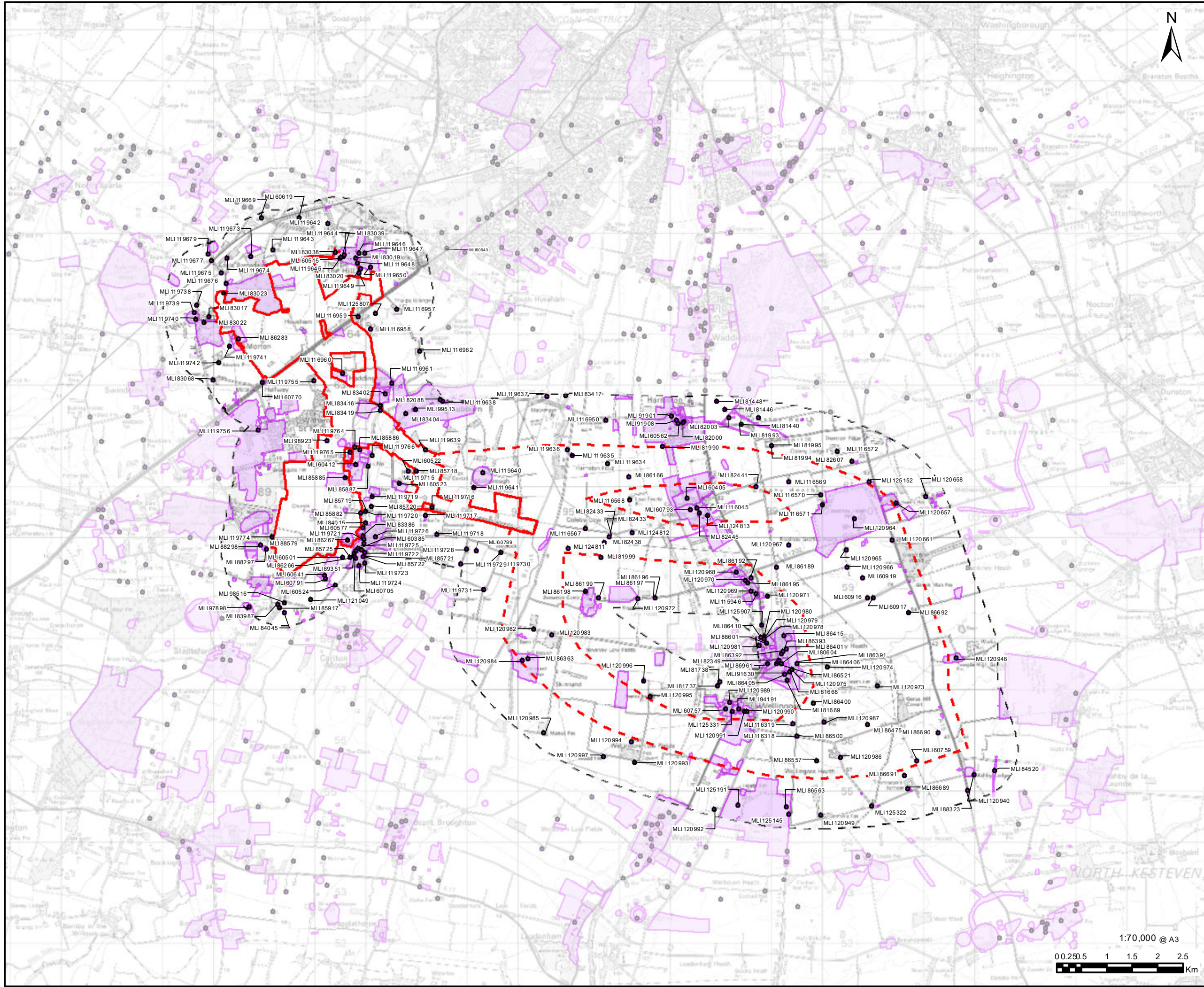
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CLIENT

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CONSULTANT

AECOM Limited  
 2 City Walk  
 Holbeck, Leeds  
 LS11 9AR  
 www.aecom.com

LEGEND

- Solar and Energy Storage Park
- Grid Connection Corridor Options
- 1km Study Area
- Non-Designated Heritage

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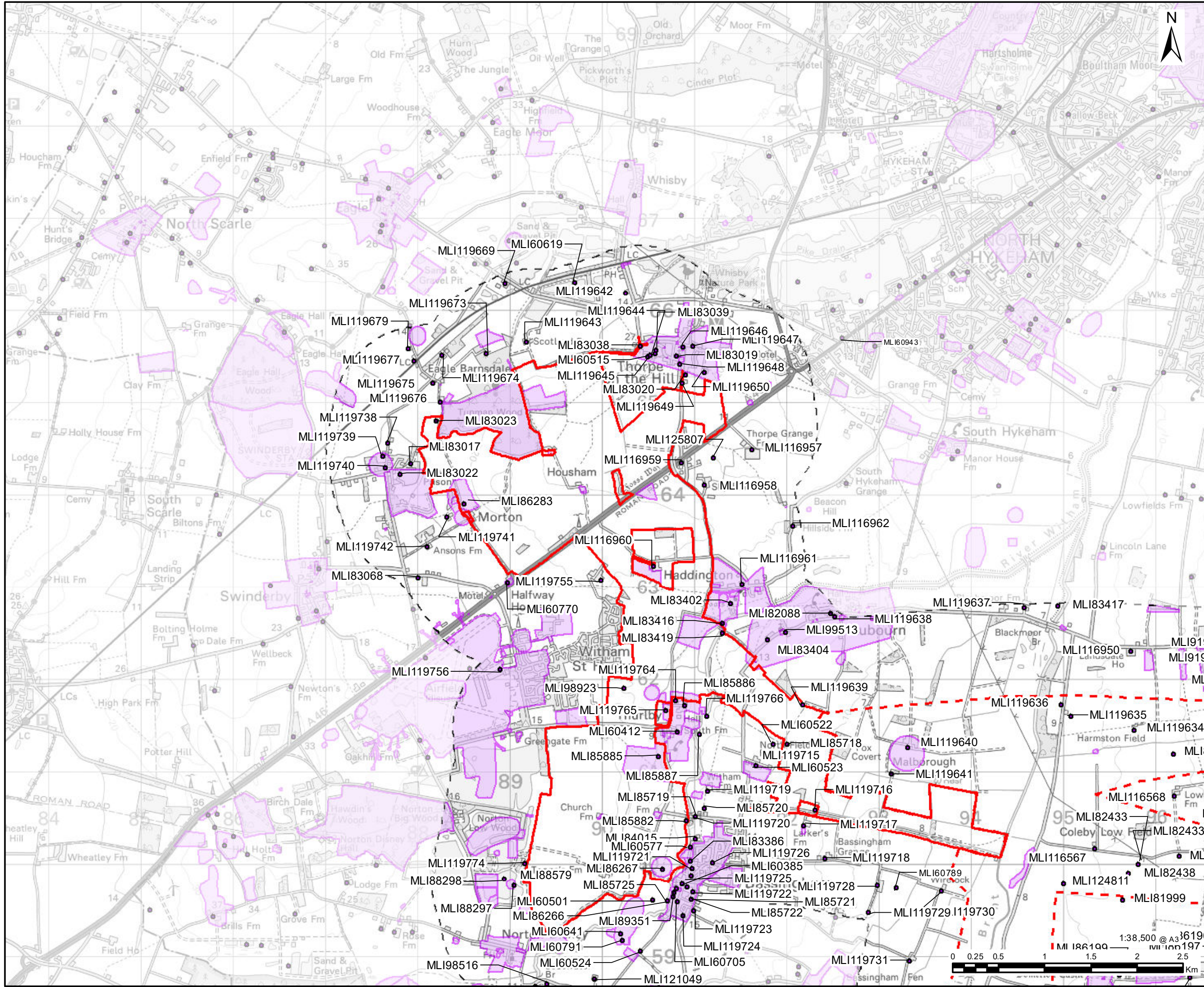
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FIGURE TITLE

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CONSULTANT

AECOM Limited  
 2 City Walk  
 Holbeck, Leeds  
 LS11 9AR  
 www.aecom.com

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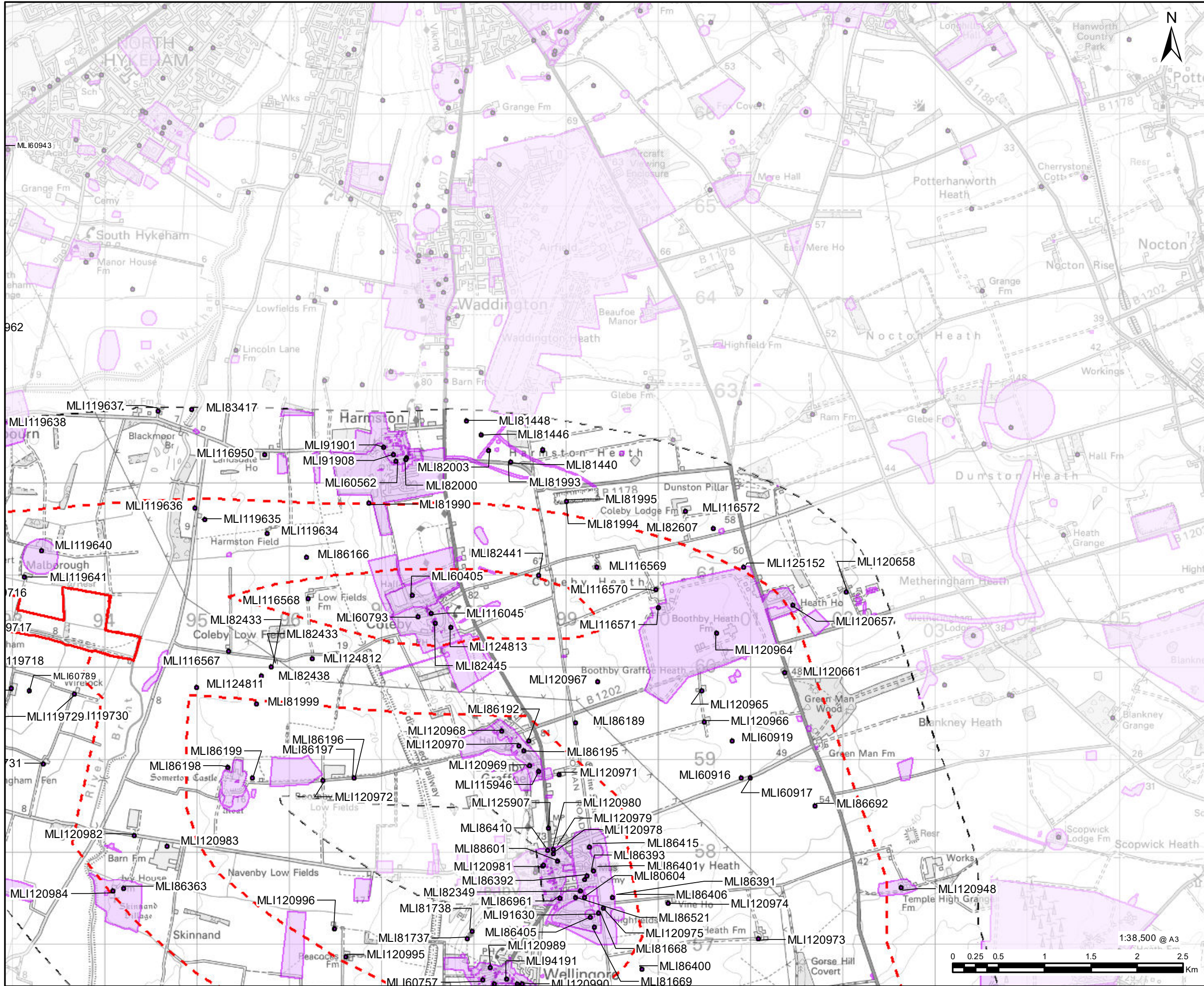
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FIGURE TITLE

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LS11 9AR  
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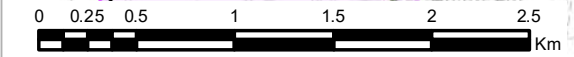
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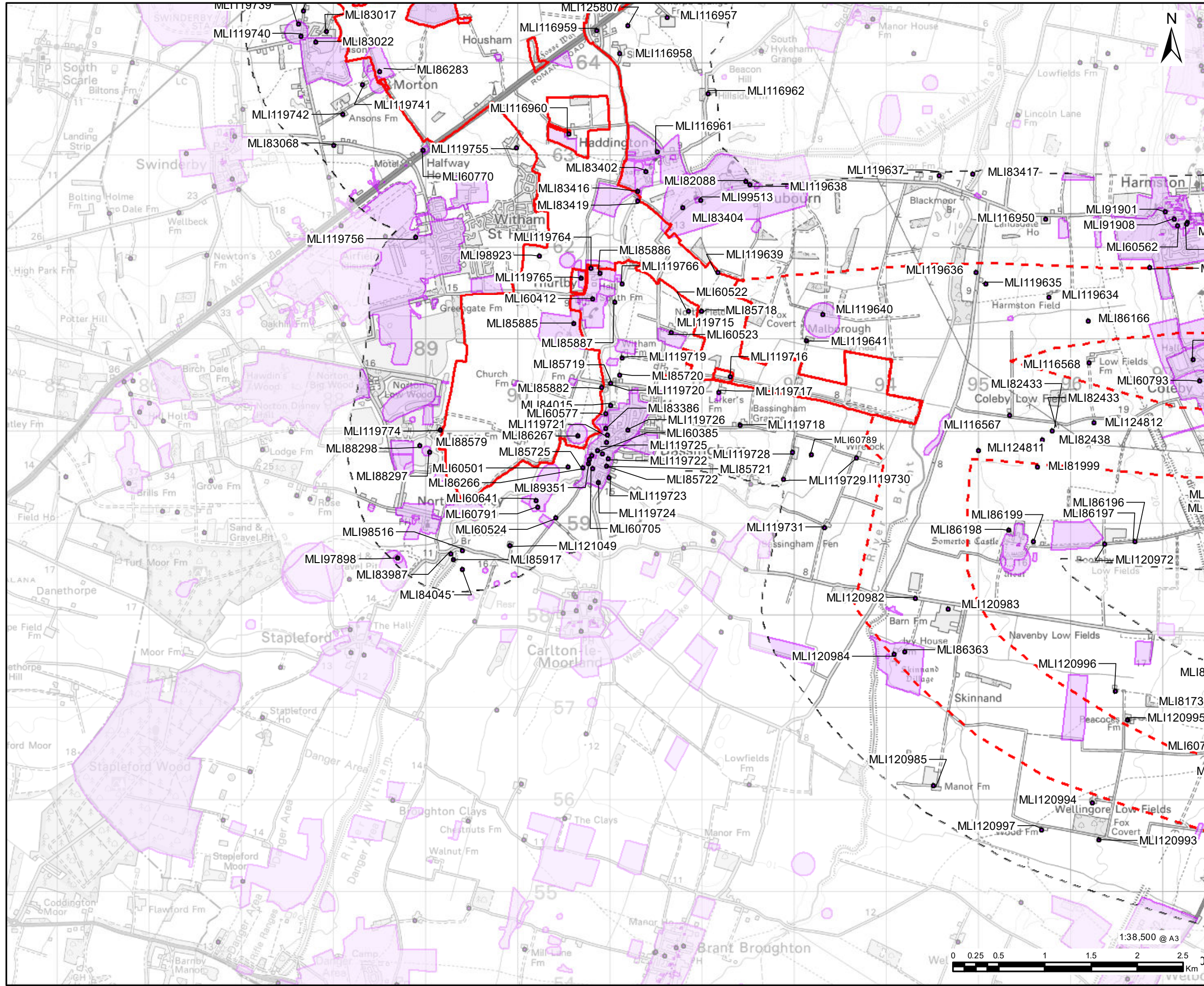
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LS11 9AR  
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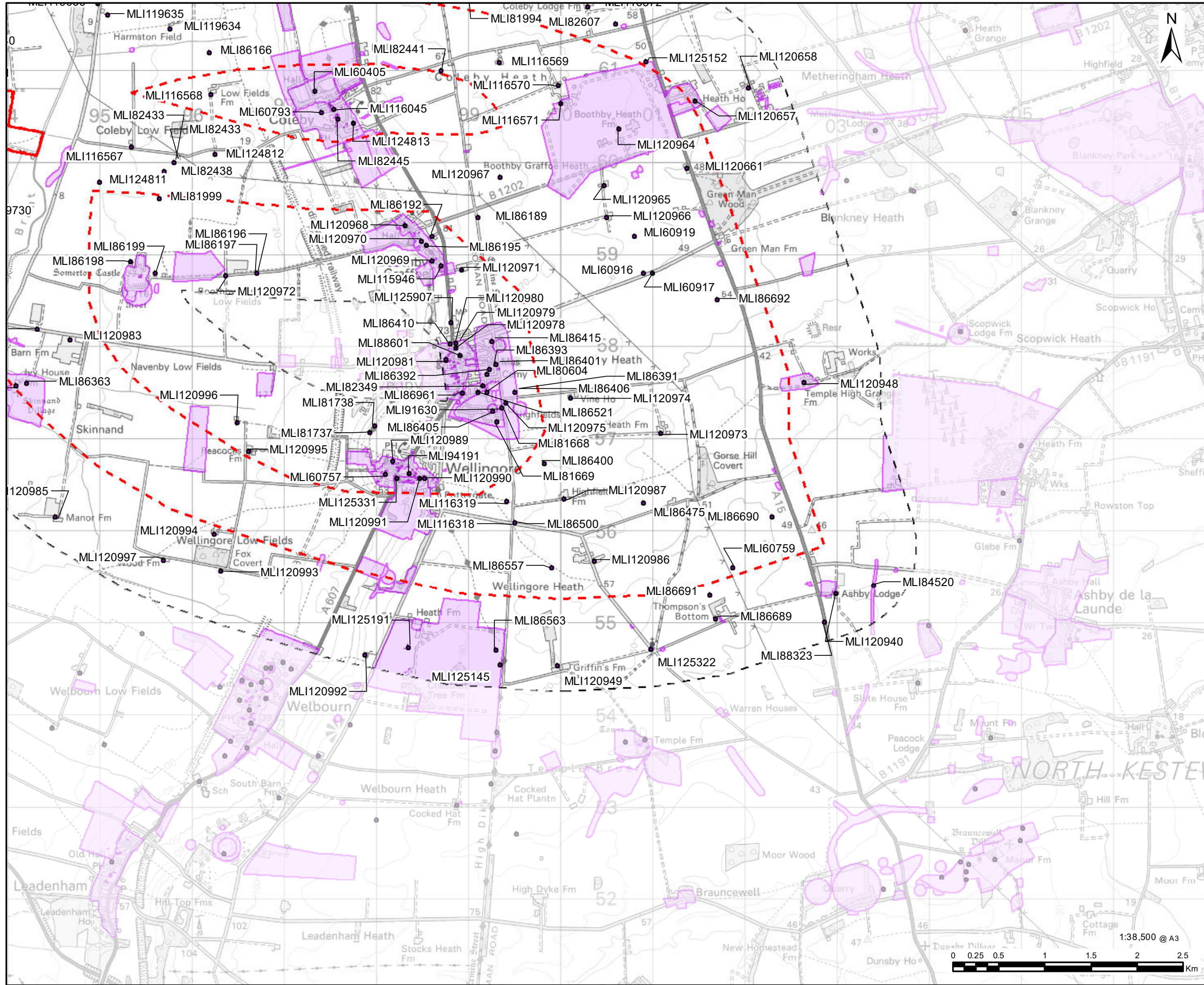
Non-Designated Heritage Assets

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2 City Walk  
Holbeck, Leeds  
LS11 9AR  
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## 8.5 Potential Effects and Mitigation

- 8.5.1 There are a number of designated and non-designated heritage assets within the study area which may be affected by the Proposed Development. Such effects could consist of:
- Physical effects on a heritage asset; and
  - Effects upon the significance of a heritage asset due to changes to its setting.
- 8.5.2 There is potential for previously unrecorded archaeological assets to survive within the Site boundary. These remains could potentially be affected during excavation works required during construction; this includes, but is not limited to, construction of the solar module mounting structures, power control infrastructure, and on-site cabling, the laying of the required connector cables (if laid underground) and the establishment of a construction compounds and access tracks.
- 8.5.3 Due to the potential effects upon the historic environment, cultural heritage is scoped into the EIA.

## 8.6 Assessment Methodology

- 8.6.1 The assessment of potential effects as a result of the Proposed Development on cultural heritage will be undertaken using the methodology set out below.
- 8.6.2 The value of a heritage asset (its heritage significance) is guided by its designated status but is derived also from its heritage interest which may be archaeological, architectural, artistic or historic (NPPF Annex 2, Glossary) (Ref. 7). Each identified heritage asset will be assigned a value in accordance with the criteria set out in **Table 8-1**. Using professional judgement and the results of consultation, heritage assets will also be assessed on an individual basis and regional variations and individual qualities taken into account where applicable.

**Table 8-1: Criteria for assessing the value of heritage assets**

<i>Asset value</i>	<i>Description</i>
High	World Heritage Sites
	Scheduled Monuments
	Grade I and II* listed buildings
	Registered battlefields
	Grade I and II* registered parks and gardens
	Conservation areas of demonstrable high value
	Non-designated heritage assets (archaeological sites, historic buildings, monuments, parks, gardens or landscapes) that can be shown to have demonstrable national or international importance
Well preserved historic landscape character areas, exhibiting considerable coherence, time-depth or other critical factor(s)	

<i>Asset value</i>	<i>Description</i>
Medium	<p>Grade II listed buildings</p> <p>Conservation areas</p> <p>Grade II registered parks and gardens</p> <p>Conservation areas</p> <p>Non-designated heritage assets (archaeological sites, historic buildings, monuments, park, gardens or landscapes) that can be shown to have demonstrable regional importance</p> <p>Averagely preserved historic landscape character areas, exhibiting reasonable coherence, time-depth or other critical factor(s)</p> <p>Historic townscapes with historic integrity in that the assets that constitute their make-up are clearly legible</p>
Low	<p>Locally listed buildings</p> <p>Non-designated heritage assets (archaeological sites, historic buildings, monuments, park, gardens or landscapes) that can be shown to have demonstrable local importance</p> <p>Assets whose values are compromised by poor preservation or survival of contextual associations to justify inclusion into a higher grade</p> <p>Historic landscape character areas whose value is limited by poor preservation and/ or poor survival of contextual associations</p>
Very Low	<p>Assets identified on national or regional databases, but which have no archaeological, architectural, artistic or historic value</p> <p>Landscape with no or little significant historical merit</p>

8.6.3 Having identified the value of the heritage asset, the next stage in the assessment will be to identify the level and degree of impact to an asset arising from the development. Impacts may arise during construction or operation and can be temporary, reversible, or permanent. Impacts can occur to the physical fabric of the asset or affect its setting. The contribution of the setting to the significance of any affected assets will be subject to assessment.

8.6.4 The level and degree of impact (impact rating) will be assigned with reference to a four-point scale as set out in **Table 8-2**. The assessment of the level and degree of impact will be made in consideration of any scheme design mitigation (embedded mitigation). If no impact is identified, no impact rating will be given and no resulting effect reported.

**Table 8-2 Factors influencing the assessment of magnitude of impacts**

<b>Magnitude of Impact</b>	<b>Description of impact</b>
High	<p>Changes such that the significance of the asset is totally altered or destroyed</p> <p>Comprehensive change to, or total loss of, elements of setting that would result in harm to the asset and our ability to understand and appreciate its significance</p>
Medium	<p>Change such that the significance of the asset is significantly altered or modified</p> <p>Changes such that the setting of the asset is noticeably different, affecting significance and resulting in changes in our ability to understand and appreciate the significance of the asset</p>

Magnitude of Impact	Description of impact
Low	Changes 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 significance of the asset
Very Low	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 significance of the asset

- 8.6.5 An assessment to classify the effect, having taken into consideration any embedded mitigation, will be determined using the matrix presented in **Table 6-1** above.
- 8.6.6 Major and moderate effects will be considered significant. Within NPS EN-1, section 5.8 Paragraphs 5.8.14 – 5.8.15 (Ref. 6) and the NPPF Section 16 Paragraphs 199 - 204 (Ref. 7), impacts affecting the value of heritage assets are considered in terms of harm, and there is a requirement to determine whether the level of harm amounts to ‘substantial harm’ or ‘less than substantial harm’. There is no direct correlation between the classification of effect as reported in the ES and the level of harm caused to heritage significance in accordance with the NPPF. A major (significant) effect on a heritage asset would, however, more often be the basis by which to determine that the level of harm to the significance of the asset would be substantial. A moderate (significant) effect is unlikely to meet the test of substantial harm and would therefore more often be the basis by which to determine that the level of harm to the significance of the asset would be less than substantial. A minor or negligible (not significant) effect would still amount to a less than substantial harm. However, a neutral effect is classified as no harm.
- 8.6.7 Pursuant to NPS EN-1, Paragraph 5.8.15 (Ref. 6), any harmful impact to the significance of a designated heritage asset should be weighed against the public benefit of the Proposed Development, whilst Regulation 3 of the Infrastructure Planning (Decisions) Regulations 2010 (Ref. 14) requires the Secretary of State to have regard to the desirability of preserving a listed building or its setting. In all cases, the determination of the level of harm to the significance of the asset arising from development impact is one of professional judgement.
- 8.6.8 Principles of Cultural Heritage Impact Assessment in the UK (Ref. 25) is a guide to good practice in cultural heritage impact assessment published jointly by the IEMA, the IHBC and the ClfA. The document provides guidance on understanding cultural heritage assets and evaluating the consequences of change and will be considered when undertaking the assessment.

## Sources of Information

### Desk-Based Sources

- 8.6.9 The sources that will be consulted during the assessment will be:

- NHLE (Ref. 25);
- LHER and Lincolnshire Historic Landscape Characterisation;
- Online sources such as British Geological Survey (BGS) Geology of Britain Viewer (Ref. 112), and the local planning portal;
- Published grey literature reports for archaeological investigations within the Site and surrounding study area;
- Existing geotechnical data;
- Available LiDAR and aerial photography;
- Available Portable Antiquities Scheme data;
- Documentary, cartographic and other resources as deposited within the local Archives and Local Studies Library and the National Archives at Kew; and
- Local Planning Authority Plans, Guidance and Lists.

8.6.10 Consultation will be undertaken with all relevant heritage bodies as part of the assessment process and will include:

- Historic England;
- The Historic Environment Officers for Lincolnshire; and
- The Conservation Officer for North Kesteven District Council.

### **Walkover survey**

8.6.11 A walkover survey will be undertaken including a survey of known archaeological and built heritage assets within the Site boundary and the immediate vicinity to identify their survival, extent, condition, setting and significance.

8.6.12 A site visit will also be undertaken to the study area to assess the setting of assets which could potentially be affected by the Proposed Development. This visit will establish key features of an asset's setting, alongside any intervisibility with the Site.

### **Field Investigation**

8.6.13 The desk-based research will be supported by a programme of non-intrusive and intrusive archaeological evaluation. A geophysical survey will be undertaken within areas of the Solar and Energy Storage Park that are suitable for survey and where land access can be obtained by way of landowner agreement. Additional geophysical survey will be undertaken along the Grid Connection Corridor once a single route option has been selected and access has been granted.

8.6.14 Further archaeological evaluation, e.g. trial trenching evaluation and detailed setting assessments will be undertaken as part of the assessment process, the scope of which will be informed by the desk-based analysis of information, the outcomes of the geophysical survey of the , and through consultation with relevant bodies.

## 8.7 Elements Scoped Out

- 8.7.1 No elements have been scoped out at this stage. However, this will be reviewed at the PEIR stage, when further design detail is available for the Proposed Development.

## 8.8 Assumptions, Limitations and Uncertainties

- 8.8.1 It is assumed that there will be access to all required land to undertake both intrusive and non-intrusive archaeological surveys and evaluation, and that the results will be available to incorporate within the ES. In the event that access is not available, professional judgement will be used, based on available research and data, to assess the archaeological potential of the area.
- 8.8.2 It is assumed that the data provided by external sources will be accurate.

## 9. Ecology and Biodiversity

### 9.1 Introduction

- 9.1.1 This chapter sets out the approach to the assessment of the Proposed Development's impacts on ecology and nature conservation (collectively referred to as biodiversity). The purpose of the assessment will be to identify and characterise any relevant ecological features (including nature conservation designations, priority habitats and protected or notable species) within the study areas, to consider the nature and scale of potential impacts arising from the Proposed Development, and to assess the significance of any likely effects. The chapter will consider the effects that the Proposed Development is likely to have on their conservation status, inter-relationships, and contribution to local, regional and (if appropriate) national biodiversity.
- 9.1.2 The assessment will identify prevention, avoidance, reduction, mitigation and, if necessary, compensation measures that may be required to enable the Proposed Development to proceed, in compliance with relevant nature conservation legislation and planning policies. It will demonstrate that due consideration has been given to ecological features, including recommendations for biodiversity enhancements.
- 9.1.3 Ecological surveys commenced in February 2023 and will continue through to 2024, to gather detailed baseline ecological information. The requirement and extent of these surveys have been informed by desk study data and walkover surveys, together with AECOM's professional judgement and local knowledge of the geographical area and range of important ecological features.

### 9.2 Study Area

- 9.2.1 The study area for ecological surveys includes the land within the Proposed Development and appropriate buffer zones, as described below.
- 9.2.2 The boundaries and zones for the ecology study area reflect standard industry good practice and the scoping distances that statutory consultees would typically expect to be considered for identification of features external to the Proposed Development that could be affected. This is informed by published guidance and professional judgement.
- 9.2.3 The desk study search was undertaken from the Site Boundary and included:
- Sites of international nature conservation value (e.g., Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites, as well as proposed or potential sites) within 10km (see **Figure 9-1**), as well as any SACs within 30km where bats are noted as the, or as one of the qualifying features;
  - Statutorily and non-statutorily designated sites of nature conservation value (e.g., Sites of Special Scientific Interest (SSSI), LNRs, LWSs (which includes ancient woodland)) within 2km (see **Figure 9-2**);
  - Ancient woodland and other notable habitats within 2km; and

- Records of protected or notable species up to 2km.

9.2.4 The desk study enabled determination of an appropriate study area, in which all important ecological features requiring assessment, as well as ecological features that could be directly or indirectly affected by the Proposed Development, will be subject to field surveys. The study area varies according to the spatial characteristics of each species or habitat potentially impacted. A 'zone of potential influence' representing the areas in which effects could occur from the Proposed Development and associated activities will be identified and detailed in the assessment.

## 9.3 Planning Policy Context and Guidance

9.3.1 Legislation, planning policy and guidance relating to biodiversity (including protected nature conservation sites, significant habitats and, protected or notable species) pertinent to the Proposed Development is outlined below.

### Legislation

9.3.2 Legislation applicable to the Proposed Development and ecology and biodiversity is:

- Regulation (EU) 1143/2014 on the introduction and spread of invasive alien species (IAS) (Ref. 26).
- The Environment Act 2021 (Ref. 105) sets out the UK Government's objectives to restore natural habitats and increase biodiversity and includes proposals to make Biodiversity Net Gain (BNG) a mandatory requirement within the town and country planning system in England. Section 99 and Schedule 15 of the Environment Act relate to the provision of a BNG for NSIPs. However these sections of the Environment Act have not yet come into force, and there is currently no relevant secondary legislation in force stemming from the same. The Environment Act and any subsequent secondary legislation will require all developments, including NSIPs, to achieve a minimum 10% net gain in biodiversity units relative to the site's baseline biodiversity value. As such the Proposed Development will seek to include a minimum target of 10% BNG compared against the pre-development biodiversity value. The Wildlife and Countryside Act (WCA) 1981, as amended (Ref. 28) is a primary piece of UK wildlife legislation, protecting birds, other animals and plants (including vascular plants, bryophytes, lichens and fungi), allowing for the designation of protected areas including SSSIs and promoting protections for such designated areas. The Act also defines a list of invasive non-native species, making it illegal to spread them in the wild.
- The Countryside and Rights of Way Act 2000 (Ref. 29) extends powers relating to the protection and management of SSSIs. This includes powers for entering management agreements, placing a duty on public bodies to further the conservation and enhancement of SSSIs, increasing penalties for conviction, and appeal processes for the notification, management and protection of SSSIs. It also introduced the offence of 'reckless' disturbance of threatened species. The legislative provisions relating to designated



sites and flora and fauna affected by the Proposed Development will be considered in the assessment.

- The Conservation of Habitats and Species Regulations 2017 (as amended) (Ref. 81) transposed the requirements of the EC Habitats Directive (Ref. 152) and Birds Directive (Ref. 153) into UK law, and provide for the designation and protection of European Sites (and adapt planning and other controls for the protection of these sites). This includes Annex I (including habitats) and Annex II (including species) for which such sites can be designated. The Habitats Regulations also provide protection for certain European Protected Species (EPS) that are listed on Schedule 2 (animals) or Schedule 4 (plants). Provision is made for the granting of licences that permit certain acts as lawful, providing the appropriate authority is satisfied that there is no satisfactory alternative, and the favourable conservation status of the species will be maintained. The latest 2019 amendment to the Habitats Regulations (Ref. 81) means that SACs and SPAs in the UK no longer form part of the EU's 'Natura 2000' ecological network, following the UK exit from the EU. The 2019 Regulations have created a national site network on land and at sea, including both the inshore and offshore marine areas in the UK.
- Section 40 of The Natural Environment and Rural Communities (NERC) Act 2006 (Ref. 31) places a duty on public authorities in England to conserve biodiversity, which includes restoring or enhancing species populations or habitat. In England, Section 41 of the NERC Act requires the Secretary of State for Environment to publish and maintain a list of habitats and species that are of 'principal importance' for the purpose of conserving biodiversity, and are regarded as conservation priorities under the UK Post-2010 Biodiversity Framework (Ref. 42). The occurrence of habitats and Species of Principal Importance (SPI) will be identified in the assessment through a desk study and field surveys, and the design of the Proposed Development will include measures for their conservation and enhancement.
- The Protection of Badgers Act 1992 (Ref. 32) provides specific legislation to protect Badgers from cruelty. The protection of Badgers through best working practices, including the legal requirement for licences from Natural England (where required), will be considered as part of the assessment.
- The Hedgerows Regulations 1997 (Ref. 33) introduced protection for countryside hedgerows that are defined as 'important' because they meet specific wildlife or landscape criteria. The assessment will evaluate hedgerows potentially affected by the Proposed Development by way of field survey, to determine whether any qualify as important under the ecological criteria.
- Animal Welfare Act 2006 (Ref. 34) protects vertebrate animals from harm. The provisions of the Act will be taken account of within the assessment by ensuring the welfare of any animals potentially affected by the Proposed Development are considered.
- Salmon and Freshwater Fisheries Act 1975 (Ref. 35) relates to the protection of freshwater fish, including Salmon *Salmo salar* and Trout *Salmonidae* species and their habitats. The assessment will consider the

provisions of the Act in relation to the risk of mortality, migration barriers, pollution and the degradation of habitats potentially resulting from the Proposed Development.

- The Eels (England and Wales) Regulations 2009 (Ref. 36). The assessment will consider the provisions of these Regulations in relation to safe an unobstructed passage for Eel *Anguilla anguilla*, and consideration regarding channel alterations, river crossings and culverting.
- Invasive Alien Species (Enforcement and Permitting) Order 2019 (Ref. 37) came into effect on 1st December 2019. This implemented the EU Invasive Alien Species Regulation 1143/2014 (Ref. 26) on the prevention and management of invasive alien plant and animal species in England and Wales, including the relevant licenses, permits and rules for keeping invasive alien species. If it is not a species of special concern, then the Wildlife & Countryside Act 1981, as amended (Section 14, Schedule 9) (Ref. 28) still applies.
- The Water Framework Directive (WFD) is transposed into environmental legislation in England by the Water Environment (WFD) (England and Wales) Regulations 2017 (Ref. 38). The WFD follows a holistic approach to the sustainable management of water by considering the interactions between surface water (including transitional and coastal waters, rivers, streams and lakes), groundwater and water-dependent ecosystems.

9.3.3 The above legislation will be referenced when identifying potential constraints to the Proposed Development, design options and mitigation. Compliance with the above legislation may require obtaining relevant protected species licences prior to the implementation of the Proposed Development.

9.3.4 As part of the assessment of a development, it is necessary to consider whether the Proposed Development is likely to have a significant effect on areas that have been internationally designated for nature conservation purposes (i.e. European sites (previously the 'Natura 2000 network')). European Union (EU) legislation as it applied to the UK on 31st December 2020 is now a part of UK domestic legislation as 'retained EU legislation'. European sites are protected under the Conservation of Habitats and Species Regulations 2017 (Ref. 30) which effectively continues the legislation which implemented the EU Habitats and Species Directive (Ref. 152) and parts of the Wild Birds Directive (Ref. 153) through the provisions of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ref. 80). The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ref. 80) make it clear that the need for Habitats Regulations Assessment (HRA) continues to apply.

9.3.5 The HRA will be undertaken with reference to the general EC guidance on HRA (Ref. 81), general guidance on HRA published by the UK government in July 2019 (Ref. 154) and Planning Inspectorate (PINS) Advice Note 10 (Ref. 155).

9.3.6 Although the UK has departed the EU, the HRA will nonetheless take account of relevant EU case law (for instance, the *Holohan* (Ref. 82) and *People over Wind* (Ref. 83) cases) as a precaution.

9.3.7 Whilst the HRA decisions must be taken by the competent authority (the Secretary of State, informed by the recommendations of the appointed Examining Authority), the information needed to undertake the necessary assessments must be provided by the Applicant. The information needed for the competent authority to establish whether there are any Likely Significant Effects (LSEs) from the Proposed Development and to assist in carrying out its Appropriate Assessment, will be provided in the HRA Report.

## National Planning Policy

9.3.8 The assessment will take into account relevant NPS for solar, including relevant sections of the draft updated versions of these NPSs, which are currently under consultation from the DESNZ (see Section 1.3.8). The following NPSs are important and relevant to the Proposed Development and ecology and biodiversity and these will be reviewed for reference to relevant sections during the assessment:

- Overarching National Policy Statement for Energy (EN-1) (2011) (Ref. 6);
- Draft Overarching National Policy Statement for Energy (EN-1) (2023) (Ref. 92);
- Draft National Policy Statement for Renewable Energy EN-3 (2023) (Ref. 39);
- National Policy Statement for Electricity Networks Infrastructure (EN-5) (2011) (Ref. 5); and
- Draft National Policy Statement for Renewable Energy EN-5 (2023) (Ref. 156).

9.3.9 The NPPF (Ref. 7), with particular reference to Section 15 and paragraphs 174, 180 and 181, which state that the planning system should contribute to and enhance the natural and local environment by minimising impacts on biodiversity and providing net gains in biodiversity. The NPPF (Ref. 7) is clear that pursuing sustainable development includes moving from a net loss of biodiversity to achieving net gains for nature, and that a core principle for planning is that it should contribute to conserving and enhancing the natural environment and reducing pollution. The NPPF also specifies the obligations that the Local Authorities and the UK Government have regarding statutory designated sites and protected species under UK and international legislation and how this is to be delivered in the planning system. Protected or notable habitats and species can be a material consideration in planning decisions and may therefore make some sites unsuitable for particular types of development, or if development is permitted, mitigation measures may be required to avoid or minimise impacts on certain habitats and species, or where impact is unavoidable, compensation may be required.

9.3.10 Planning Practice Guidance (e.g. Ref. 68, Ref. 69, Ref. 73 and Ref. 135) will also be reviewed for further guidance and interpretation of the NPPF.

## Local Planning Policy

9.3.11 Local Planning Policies that are relevant to the Proposed Development and biodiversity, are:

- Central Lincolnshire Local Plan - Adopted April 2023: Policies S59: Green and Blue Infrastructure Network, S60: Protecting Biodiversity and Geodiversity and S61: Biodiversity Opportunity and Delivering Measurable Net Gains (Ref. 195); and
- Thorpe on the Hill Neighbourhood Plan 2016-2036 Policy 3: Biodiversity and Policy 4: Green Spaces and Green Infrastructure (Ref. 84).

## Other Guidance

9.3.12 Other guidance documents relevant to the assessment of the impacts of the Proposed Development on biodiversity are:

- The Environmental Improvement Plan, 2023 (Ref. 132) which supersedes the 25-year Environment Plan (Ref. 40);
- Biodiversity 2020: A Strategy for England's Wildlife and ecosystem services (Ref. 157);
- Natural England and Department for Environment, Food and Rural Affairs (DEFRA) Standing Advice (protected species) (Ref. 41);
- UK Post 2010 Biodiversity Framework (Ref. 42); and
- Lincolnshire Biodiversity Action Plan (3rd edition) (Ref. 43).

## Biodiversity Net Gain

9.3.13 When the relevant provisions come into force, the Environment Act 2021 (Ref. 105) will include a mandate for at least 10% BNG for projects, including for NSIPs.

9.3.14 BNG is defined as “*development that leaves biodiversity in a better state than before*” and involves an approach where developers work with local governments, wildlife groups, landowners and other stakeholders in order to support their priorities for nature conservation. BNG is achieved when measurable improvements for biodiversity are delivered in association with a development, through the creation of new habitats or enhancement and management of existing habitats either on-site, off-site or through a combination of on-site and off-site measures.

9.3.15 A BNG assessment will be undertaken (using Defra Metric 4.0 or the most up to date metric at the time of the assessment) to identify opportunities for contributing to BNG. These opportunities will be identified and set out within the ES, in line with the requirements of the Environment Act (Ref. 105), the NPPF (Ref. 7) and local planning policy, including the Central Lincolnshire Local Plan (Ref. 195).

## 9.4 Baseline Conditions

9.4.1 The known or predicted ecological conditions are summarised in the following sections.

### Statutory Sites

- 9.4.2 Statutory sites that are designated for nature conservation were identified through a review of the Multi-Agency Geographic Information for the Countryside (MAGIC) (Ref. 111) website within the study area. There are no international sites designated for nature conservation within 10km of the Site boundary. There is one Local Nature Reserve (LNR) statutorily designated for biodiversity reasons (Whisby Pits LNR), which lies 339m north of the Proposed Development, presented in **Figure 9-1** and detailed in **Table 9-1**.
- 9.4.3 There are no international statutory site designations for bats within 30km of the Site.

**Table 9-1 Statutorily Designated Sites within 10km (international) and 2km (local to national) of the Site boundary**

Statutory site name	Area – hectares (ha)	Description of statutory site	Distance (km) and direction from closest point of the Site
Whisby Nature Park LNR	110.6	Whisby Nature Park LNR comprises a complex of small, medium and large flooded gravel pits which have now become 'greened' by nearly 40 years of natural colonisation. There is only one significant flowing stream, the Pike Drain, a small agricultural channel that runs east-west across the southern part of the Park. Some former pits have been used as sediment lagoons and now support wet willow scrub. Of these, one has subsequently been cleared and developed into clay grassland, and others are undergoing systematic coppicing to maintain more open scrub conditions. The majority remain as 'non-intervention' areas. Dense willow and birch scrub occurs over wide areas in the north on spoil in between the pits. This is gradually developing tall canopy scrub resembling woodland. A small oak woodland of some maturity lies alongside a railway crossing. Near to the sites of former gravel works there are very dry, open expanses of gravel-pit waste that, over time, are developing interesting plant communities. Some more orthodox grasslands, both dry and wet, support a variety of flowering plants, and the richest of these is the Orchid Glade.	339m north from the Site.

## Non-statutory Sites

- 9.4.4 There are 39 non-statutory sites designated for nature conservation within 2km of the Site Boundary (as per the study area in Section 9.2.3 of this document) and these presented in **Table 9-2**. These sites have been designated as LWS for their biodiversity value at a county level and are known to have supporting value to a wide variety of protected and ecologically important species and/ or habitats. The locations of these non-statutory sites, relevant to the Proposed Development, are presented in **Figure 9-2**.
- 9.4.5 Non-statutory sites detailed in **Table 9-2** are listed in ascending order with those closest to the Site listed first.

**Table 9-2 Non-Statutory Designated Sites within 2km of the Site**

Non-statutory site Name	Area in hectares (ha) / length (m/km)	Description of the non-statutory site	Approximate Distance (metres (m)) and direction from closest point of the Site
A15, Green Man Road to Cuckoo Lane	Length: 3.2km	Strip of calcareous grassland that was surveyed as part of Lincolnshire Wildlife Trust's Life on the Verge project.	Within the Site.
Boothby Graffoe Road Verges	0.4ha	Calcareous grassland verge that slopes down from the south side of the B1202. Plants that it supports include Small Scabious ( <i>Scabiosa columbaria</i> ), Common Bird's-foot-trefoil ( <i>Lotus corniculatus</i> ), Burnet Saxifrage ( <i>Pimpinella saxifrage</i> ), Salad Burnet ( <i>Sanguisorba minor</i> ), Greater Knapweed ( <i>Centaurea scabiosa</i> ), Lady's Bedstraw ( <i>Galium verum</i> ) and Upright Brome ( <i>Bromus erectus</i> ). The site was cut in 2007 and vegetation was removed.	Within the Site.
Brant Plantation	10.7ha	Plantation that is dominated by Poplar ( <i>Populus</i> ) in the centre and south-west of the wood. The south-eastern corner is dominated by mature Sycamores ( <i>Acer pseudoplatanus</i> ). Other woody species that grow across the plantation include Aspen ( <i>Populus tremula</i> ), Pedunculate Oak ( <i>Quercus robur</i> ) Silver Birch ( <i>Betula pendula</i> ) Downy Birch ( <i>Betula pubescens</i> ) and Honeysuckle ( <i>Lonicera</i> ). The lower canopies and ground flora comprises of Male-fern ( <i>Dryopteris filix-mas</i> ), Wood Millet ( <i>Milium effusum</i> ), False Brome ( <i>Brachypodium sylvaticum</i> ), Buckler Ferns ( <i>Dryopteris dilatata</i> ), Herb-Robert ( <i>Geranium robertianum</i> ), Red Campion ( <i>Silene dioica</i> ), Foxglove ( <i>Digitalis</i> ), and Three-veined Sandwort ( <i>Moehringia trinervia</i> ). The area which is closest to the river has the greatest diversity and includes species such as Creeping-Jenny ( <i>Lysimachia nummularia</i> ), Soft Rush ( <i>Juncus effusus</i> ), Ragged-Robin ( <i>Silene flos-cuculi</i> ), Marsh Bedstraw ( <i>Galium palustre</i> ) and Silverweed ( <i>Potentilla anserina</i> ). There is a long grass area to the eastern margin of the wood. Species such as Tufted Vetch ( <i>Vicia cracca</i> ) and Common Bird's-foot-trefoil ( <i>Lotus corniculatus</i> ) were observed here. A range of bird and invertebrates occupy the plantation including Bullfinch ( <i>Pyrrhula pyrrhula</i> ), Willow Tit ( <i>Poecile montanus</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Migrant Hawker ( <i>Aeshna mixta</i> ), Common Darter ( <i>Sympetrum striolatum</i> ) and Emerald Damselfly ( <i>Lestes sponsa</i> ).	Within the Site.

Non-statutory site Name	Area in hectares (ha) / length (m/km)	Description of the non-statutory site	Approximate Distance (metres (m)) and direction from closest point of the Site
Coleby, Heath Road Verges	Length: 2.2km	Verge made up of calcareous grassland that was surveyed as part of Lincolnshire Wildlife Trust's Life on the Verge project.	Within the Site.
Wellingore Heath Road Verges	Length: 0.8km	Verge made up of calcareous grassland that was surveyed as part of Lincolnshire Wildlife Trust's Life on the Verge project.	Within the Site.
Gorse Hill Lane Verges	Length: 0.4km	Verge made up of calcareous grassland that was surveyed as part of Lincolnshire Wildlife Trust's Life on the Verge project.	Within the Site.
Gorse Lane	Length: 1.3km	<p>A narrow lane, running north from Gorse Hill Lane (TF014563), east of Wellingore, to a minor road (TF013576) connecting Navenby to the A15. It forms the border to three parishes: Navenby in the north-west, Wellingore in the south-west, and Temple Bruer with Temple High Grange in the east.</p> <p>It is separated from arable fields on the west side by a thick, apparently unmanaged hedge. On the east side, the southern half merges into Gorse Hill Covert, a small mainly deciduous wood, and the northern half is separated from arable fields by a hedge along most of its length. In places a stone wall further marks its outer boundary</p>	Within the Site.
Green Man Lane	Length: 3.5km	Verge made up of calcareous grassland that was surveyed as part of Lincolnshire Wildlife Trust's Life on the Verge project. Calcareous grassland indicator species are numerous in this verge, but their distribution is patchy. The grassland is interspersed by coarse, dense vegetation such as Bramble ( <i>Rubus</i> ). There is a wall separating the verge from the arable field, but it is not high enough to protect it from fertiliser spay. Cuts are done regularly.	Within the Site.
High Dike, Coleby Mill to Harmston Verges	Length: 2.1km	Verge made up of calcareous grassland that was surveyed as part of Lincolnshire Wildlife Trust's Life on the Verge project.	Within the Site.
High Dike, Long Lane to Navenby Verges	Length: 5.8km	Verge made up of calcareous grassland that was surveyed as part of Lincolnshire Wildlife Trust's Life on the Verge project.	Within the Site.



Non-statutory site Name	Area in hectares (ha) / length (m/km)	Description of the non-statutory site	Approximate Distance (metres (m)) and direction from closest point of the Site
Navenby Heath Road Verges	Length: 2.8km	Verge made up of calcareous grassland that was surveyed as part of Lincolnshire Wildlife Trust's Life on the Verge project.	Within the Site.
Navenby, Green Man Road Verges	Length: 6km	Verge made up of calcareous grassland that was surveyed as part of Lincolnshire Wildlife Trust's Life on the Verge project.	Within the Site.
River Witham, Aubourn to Beckingham	Length: 11.8km	The banks are grazed in some places by cattle, sheep or horses, and here the flora is far more diverse and interesting than along the more extensive stretches of un-managed coarse vegetation. Mowing occurs in some places. Aquatic plants occurring commonly are Water-starwort ( <i>Callitriche</i> ), Spiked Water-milfoil ( <i>Myriophyllum spicatum</i> ), River Water-crowfoot ( <i>Ranunculus fluitans</i> ), Fennel Pond Weed ( <i>Stuckenia pectinate</i> ) and Unbranched Bur-weed ( <i>Sparganium emersum</i> ). There is a large pond, grazed grassland and plants of mostly un-managed coarser grassland.	Within the Site.
Tunman Wood	38.2ha	A managed woodland which showed the usual mosaic of high forest trees, cleared areas largely covered with scrub and invading saplings, and intermediate stands. As a consequence investigation of the forest floor was possible in places, and elsewhere either difficult or impossible due to brashings and brambles. Most of the areas which were open to investigation had a relatively poor ground flora, due to a combination of deep shade or heavy litter fall.	Adjacent to the Site.
Tunman Wood North	15.4ha	This site is the northern part of Tunman Wood nature reserve, located close to Whisby Nature Park, 2.5km south-west of the Natural World Centre. Planted trees occur throughout, although it is the network of rides that is of most interest in regards to flora and fauna. Corsican Pine ( <i>Pinus nigra</i> ) is the dominant plantation tree here, with smaller numbers of Scot's Pine ( <i>Pinus sylvestris</i> ), Beech ( <i>Fagus sylvatica</i> ) and Pedunculate Oak ( <i>Quercus robur</i> ).	Adjacent to the Site.

Non-statutory site Name	Area in hectares (ha) / length (m/km)	Description of the non-statutory site	Approximate Distance (metres (m)) and direction from closest point of the Site
Harmston Quarry	9.4ha	An active limestone quarry lying within a largely arable landscape. Small areas of reasonably interesting calcareous grassland remain along the site's northern boundary with the road. The site is likely to be of high nature conservation value in the future if it is allowed to succeed naturally once the extraction work has finished. Remnant grassland has the potential to provide a source of grassland species.	29m north from the Site
Brant Washlands	Length: 36.5 ha	Two fields comprising wet woodland wet pasture, ponds and scrapes that are both rich in flora and fauna.	259m north from the Site
Whisby Nature Park, Whisby Pits Complex	110.6ha	Also an LNR, see <a href="#">Table 8-1</a> .	330m north from the Site
St John the Baptist Churchyard, Temple Bruer	0.25ha	St John the Baptist Church was built in 1987, there are trees and shrubs around the edges of the churchyard. The open grassland west and south of the church is very species rich and there is some evidence of seasonal parching. Bat droppings were present in the church porch and it appeared that bats were roosting behind boarding which covered the stonework.	570m south from the Site.
Dunston Heath Lane Verges	Length: 1.6km	Verge made up of calcareous grassland that was surveyed as part of Lincolnshire Wildlife Trust's Life on the Verge project.	677m east from the Site.
Hykeham Railway Line, Whisby Nature Park	3.2ha	A section of active railway line running through Whisby Nature Park. Vegetation cover is largely concentrated in a narrow (c.1-2m wide) belt on both sides of the railway, adjacent to the fence line. This mainly comprises bramble, scrub and tall ruderal vegetation, including species such as Rosebay Willowherb ( <i>Chamaenerion angustifolium</i> ), Nettle ( <i>Urtica</i> ), Field Horsetail ( <i>Equisetum arvense</i> ) and, occasionally, Common Hemp-nettle ( <i>Galeopsis tetrahit</i> ). There are also some small patches of semi-improved neutral grassland vegetation dominated by false oat-grass ( <i>Arrhenatherum elatius</i> ), Couch ( <i>Elymus repens</i> ) and other tall coarse grass species. Occasional patches of shorter turf occur and feature species such as Common Bent ( <i>Agrostis capillaris</i> ) and Sheep's Sorrel ( <i>Rumex acetosella</i> ). Occasional shrubs and trees occur on the fence line,	791m north from the Site.

Non-statutory site Name	Area in hectares (ha) / length (m/km)	Description of the non-statutory site	Approximate Distance (metres (m)) and direction from closest point of the Site
		<p>including Silver Birch, Pedunculate Oak, Hawthorn (<i>Crataegus monogyna</i>), Gorse (<i>Ulex</i>) and Hazel (<i>Corylus avellana</i>). To the west of a footbridge that crosses the railway, the vegetation becomes quite sparse, not least in part due to shading from adjacent woodland.</p> <p>A short section of ditch occurs adjacent to the southern boundary towards the eastern end of the section.</p>	
Ski World, Whisby Pits Complex	25.2ha	<p>Three eutrophic lakes (flooded gravel pits) dominated by Canadian Pondweed (<i>Elodea Canadensis</i>) and, at the time of survey a significant amount of Blanketweed (<i>Cladophora glomerata</i>) with smaller amounts of Fennel-leaved pondweed (<i>Potamogeton pectinatus</i>) and Curled Pondweed (<i>Potamogeton crispus</i>). The larger of the lakes is used for water skiing and as such suffers from minor chemical pollution. The two smaller lakes are also used for recreational activities.</p> <p>Much of the surrounding land is managed as a caravan and camping site with large areas of improved grassland and amenity planting, however remnants of the original heath/dry grassland survive in very limited area.</p>	807m north from the Site.
Mr Neville's Pits West, Whisby Pits Complex	7.2ha	<p>A flooded sand and gravel pit bordered by Willow (<i>Salix</i>) woodland. The lake edges are largely inaccessible due to the density of the bordering woodland and deep wet carr, but, as such, it should be of significant value to birds.</p>	832m north from the Site.
Norton Big Wood	36.1ha	<p>A large area of woodland comprising a mix of planted conifers and hardwoods and longer established native broadleaves. The majority of the site – with the exception of small areas in the north-west and south – is included in the Ancient Woodland Inventory as ancient semi-natural woodland.</p>	851m west from the Site.

Non-statutory site Name	Area in hectares (ha) / length (m/km)	Description of the non-statutory site	Approximate Distance (metres (m)) and direction from closest point of the Site
Mr Neville's Pits East, Whisby Pits Complex	11.4ha	A large lake (flooded gravel pit) with numerous smaller peripheral, seasonally flooded, hollows. The open water is surrounded by dense Silver Birch and Grey Willow ( <i>Salix Cinerea</i> ) woodland which grade into each other. As such most of the marginal habitat is heavily shaded. Mature Ash ( <i>Fraxinus excelsior</i> ) and Oak occur towards the edges where the woodland is more open; grading into discrete areas of rough grassland and acid scrub. Much of the area is impenetrable, particularly nearer the water's edge, and as such the extent of the survey was limited and the only truly aquatic species recorded was Duckweed ( <i>Lemna minor</i> ).	952m north from the Site.
North Hykeham Gravel Pit	94.2ha	<p>Made up of two areas - Cemex Angling Lake and Millennium Green.</p> <p>Cemex Angling Lake formed of gravel pits which is now used for angling and sailing. There are three small islands covered in woodland. The lake itself supports limited flora, some species include Nuttall's Pondweed (which is abundant) (<i>Elodea nuttallii</i>) and Spiked Water Milfoil (<i>Myriophyllum spicatum</i>). Other emergent species such as Yellow Flag Iris (<i>Iris pseudacorus</i>) and Bulrush (<i>Scirpus</i>) are also present. There is a fragment of woodland on the northern edge which is dominated by mature Pedunculate Oak (<i>Quercus robur</i>) and Silver Birch (<i>Betula pendula</i>). Hazel (<i>Corylus avellana</i>) and Alder Blackthorn are most frequent in the understories. On the southern edge of the lake a peninsula (SK925662) is covered by (inaccessible) Birch (<i>Betula</i>) woodland. To the south of this peninsula lie ridges of sand which have been colonised by Broom (<i>Cytisus scoparius</i>). <i>Polytrichum juniperinum</i>, <i>Inocybe arenicola</i> and a species of <i>Cladonia</i> lichen are also noted here. An area of wet scrub and semi-improved neutral grassland can be found to the south of the lake supporting a variety of species. Millennium Green's main habitat is a large lake. Other habitats, flora and fauna are similar to those of in Cemex Angling Lake.</p>	1,035m north from the Site.
Butt Lane Pit	2.2ha	Flooded pit which is used as an angling lake. Surrounded by acid woodland. Spiked Water-milfoil ( <i>Myriophyllum spicatum</i> ) dominates the aquatic flora with occasional clumps of Common Water-Crowfoot	1,077m west from the Site.

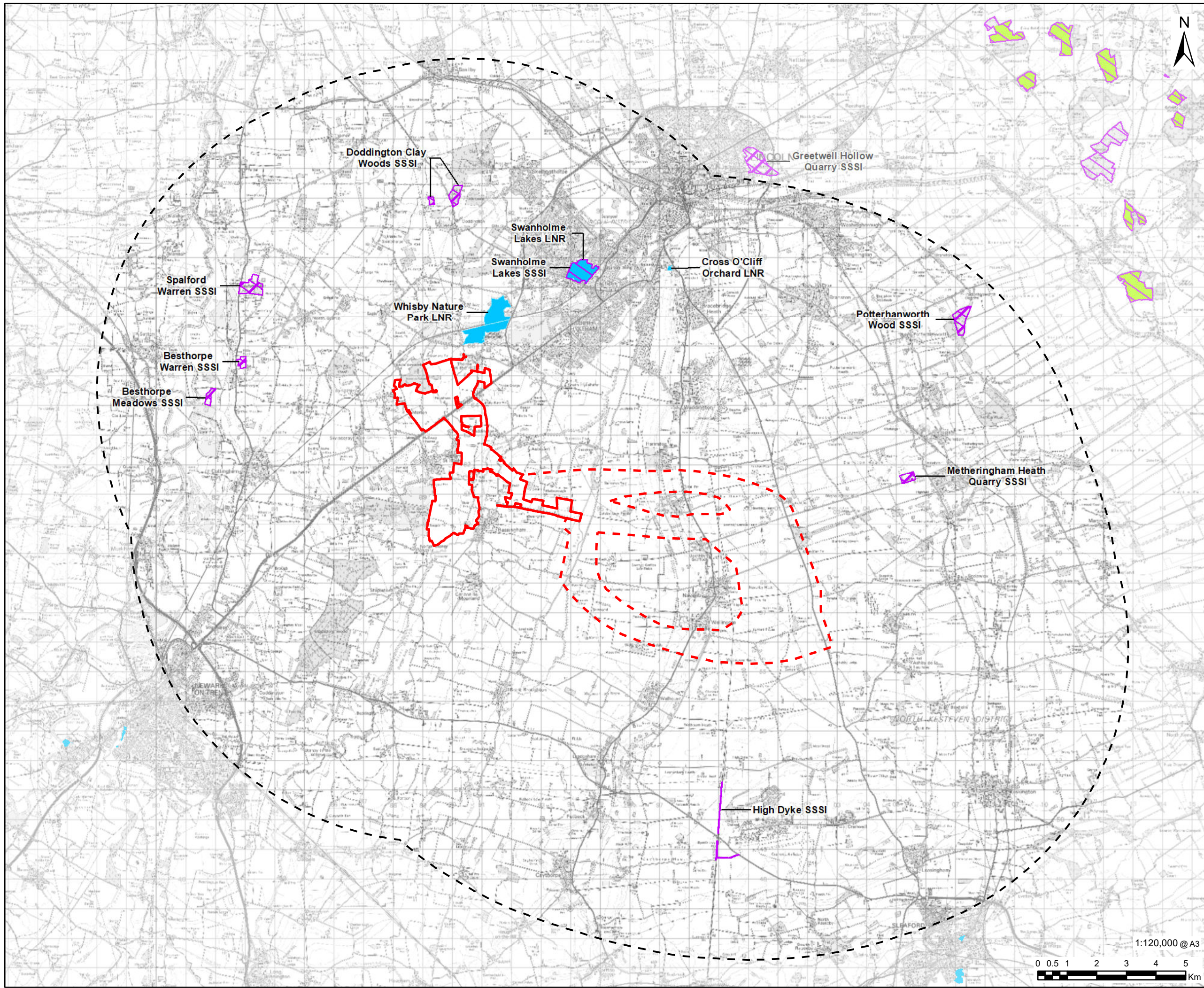
Non-statutory site Name	Area in hectares (ha) / length (m/km)	Description of the non-statutory site	Approximate Distance (metres (m)) and direction from closest point of the Site
River Brant	Length: 4.3km	<p>(<i>Ranunculus aquatilis</i>) and Common Water-Starwort (<i>Callitriche stagnalis</i>). Very small areas of acid grassland around the edge of the lake support Common Centaury (<i>Centaureum erythraea</i>), Wood Small Reed (<i>Calamagrostis epigejos</i>), Cat's-ear (<i>Hypochaeris radicata</i>), Leafy Hawkweed (<i>Hieracium umbellatum</i>), and Sheep Sorrel (<i>Rumex acetosella</i>). Area of acid woodland is dominated by Pedunculate Oak (<i>Quercus robur</i>), Silver Birch (<i>Betula pendula</i>) and Downy Birch (<i>Betula pubescens</i>). Other species include Wild Cherry (<i>Prunus avium</i>), Aspen (<i>Populus tremula</i>), Alder (<i>Alnus glutinosa</i>) and Gorse (<i>Ulex europaeus</i>). Rhododendron (<i>Rhododendron ponticum</i>) has invaded the woodland. Fauna species noted in this area include Green Woodpecker (<i>Picus viridis</i>), Chaffinch (<i>Fringilla coelebs</i>), Carrion Crow (<i>Corvus monedula</i>), Migrant Hawker (<i>Aeshna mixta</i>) and Speckled Wood (<i>Pararge aegeria</i>).</p>	1,234m south from the Site.
Eagle Hall Wood	55ha	<p>Made up of woodland and rides. The ancient, replanted woodland is beginning to regain its natural character following the reduction of the conifer plantation. Semi-mature Pedunculate Oak (<i>Quercus robur</i>) and Ash (<i>Fraxinus excelsior</i>) are dominant across the site and some ancient trees remain, as do old, coppiced Hazel (<i>Corylus avellana</i>). Wet areas in the north-east of the site are dominated by dense scrub. The rides in the woodland are very wet and have ditches along them. Drier areas to the east of the woodland.</p>	1,349m west from the Site.

Non-statutory site Name	Area in hectares (ha) / length (m/km)	Description of the non-statutory site	Approximate Distance (metres (m)) and direction from closest point of the Site
Carlton le Moorland Grassland	0.4ha	Neutral meadowland occupying a leg of a large arable field. Surrounded by species-poor hedges comprising of mainly blackthorn ( <i>Prunus spinosa</i> ). There are several shallow damp depressions, suggesting remnants of a ride and flow system. The owner of this area advised that the hedge to the west is an old parish boundary hedge. The moss <i>Ephemerum minutissimum</i> var <i>minutissimum</i> was also present amongst the stubble on the field margin.	1,450m south from the Site.
Teal's Lake, Whisby Pits Complex	32.8ha	Large, flooded gravel pit surrounded by areas of grazing marsh/damp grassland scrub and small patches of remnant dry and acid grassland. Canadian pondweed ( <i>Elodea canadensis</i> ) dominates the open water. Margins support stands of Common Reed ( <i>Phragmites australis</i> ) and Bulrush ( <i>Typha latifolia</i> ). Australian swamp stonecrop ( <i>Crassula helmsii</i> ) is an invasive plant that dominates the marginal zones of the entire lake. Much of the lake is bordered by a dense Willow ( <i>Salix</i> ) and Birch ( <i>Genus Betula</i> ) woodland. Dry acid grassland fragments around the perimeter of the site support such species as Wormwood ( <i>Artemisia absinthium</i> ), Broom ( <i>Cytisus scoparius</i> ) and Vipers Bugloss ( <i>Echium vulgare</i> ). Managed for lowland acid grassland however much of the site has been taken over by scrub.	1,509m north from the Site.
Hawdin's Wood	49.8ha	A large area of damp acid woodland, forming part of a more extensive woodland. The site appears to have been used largely for conifer plantation (Scot's Pine <i>Pinus sylvestris</i> and Larch <i>Larix decidua</i> ) in the past. A good number of ancient woodland indicator species were recorded including Wood Anemone ( <i>Anemone nemorosa</i> ), Wood Sedge ( <i>Carex sylvatica</i> ), Scaly Male Fern ( <i>Dryopteris affinis</i> ) and Bluebell ( <i>Hyacinthoides non-scripta</i> ). Damp acid rides support a typical flora with abundant common forbs. Large areas of the site are dominated by a vigorous community of Bracken ( <i>Pteridium aquilinum</i> ) and Bramble ( <i>Rubus fruticosus</i> ). A cutting regime is in place with a view to curtailing the dominance of bracken in these areas. There is a pond near the centre of the area. The owner manages the site for wildlife and reports that a full	1,550m west from the Site.

Non-statutory site Name	Area in hectares (ha) / length (m/km)	Description of the non-statutory site	Approximate Distance (metres (m)) and direction from closest point of the Site
		comprehensive survey of the woodland has recently been carried out privately.	
Bloxholm Lane	Length: 8.3km	Verges made up a mixture of good quality calcareous grassland and coarse, dense vegetation such as bramble and hogweed.	1,551m north-east from the Site.
A15, Slate House Farm to Dunsby Pit Plantation	Length: 2.4km	Strip of calcareous grassland that was surveyed as part of Lincolnshire Wildlife Trust's Life on the Verge project.	1,575m south from the Site.
Dunston Heath Pond and Verge	Length: 3.3km	Original site was extended in 2013 from a pond and adjacent verge to a longer stretch on the south side of Duston Heath Lane. It now comprises of a limestone grassland dominated by tor-grasses. The whole area is unmanaged, including the pond. It supports species such as water forget-me-not and water mint.	1,685m east from the Site.
Temple Road Verges, Welbourn to Brauncewell	Length: 4.9km	Verge made up of calcareous grassland that was surveyed as part of Lincolnshire Wildlife Trust's Life on the Verge project.	1,734m south from the Site.
Metheringham Heath Road Verges	2.4km	Two road verges either side of the B1202. Hay crop was removed from the southern verge and from the majority of the northern verge. Much of the grassland is coarse and has little botanical interest. Some areas support a richer sward.	1,770m west from the Site.
River Witham, Bracebridge to South Hykeham	Length: 2.9km	2.9km stretch of the northward-flowing River Witham and its banks immediately south of the City of Lincoln Council boundary with North Kesteven. The channel is 10-14m wide and has grassland long both banks. Diverse management of the banks is key for maintaining the biodiversity along the river. Management regimes include infrequent cutting of vegetation at the water's edge, frequent mowing of much of the grassland, cattle grazing on the east bank and a little grazing by a few tethered horses on the west bank. Wetlands located slightly east of the river. The grassland is dry and supports limited flora. There are scrub boundaries within the grassland which are characterised by species such as hawthorn ( <i>Crataegus monogyna</i> ).	1,924m north from the Site.

Non-statutory site Name	Area in hectares (ha) / length (m/km)	Description of the non-statutory site	Approximate Distance (metres (m)) and direction from closest point of the Site
Stapleford Moor	128.1ha	<p>Largely under coniferous plantation (Scots Pine <i>Pinus sylvestris</i> with Silver Birch <i>Betula pendula</i> and Mountain Ash <i>Sorbus aucuparia</i>) with broadleaved woodland on the edges and in discrete patches in the north and south-east. Very limited areas of acid grassland/heath exist in small clearings in the north of the wood which despite their small size supported a good diversity of species typical of this habitat type. This indicates that the site would respond well to heathland restoration if it were to take place. The soil across most of the site is a layer of peaty humus over sand. There is no evidence of heathland restoration works. Many of the smaller paths are largely fringed by Purple Moor-grass (<i>Molinia caerulea</i>); this was also frequent under the trees in some places. The clearings are dominated by Sheep's Fescue (<i>Festuca ovina</i>) which forms a low tussocky sward.</p>	1,949m west from the Site.





LEGEND

- Solar and Energy Storage Park
- Grid Connection Corridor Options
- 10km Study Area
- Site of Special Scientific Interest (SSSI)
- Local Nature Reserve (LNR)
- National Nature Reserve (NNR)

NOTES

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 No Ramsars, SAC, SPA, NNR and National Parks are noted within the 10km scoping boundary buffer

ISSUE PURPOSE

Scoping Report

PROJECT NUMBER

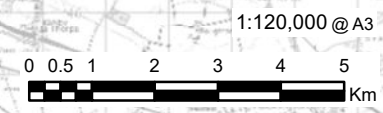
60700987

FIGURE TITLE

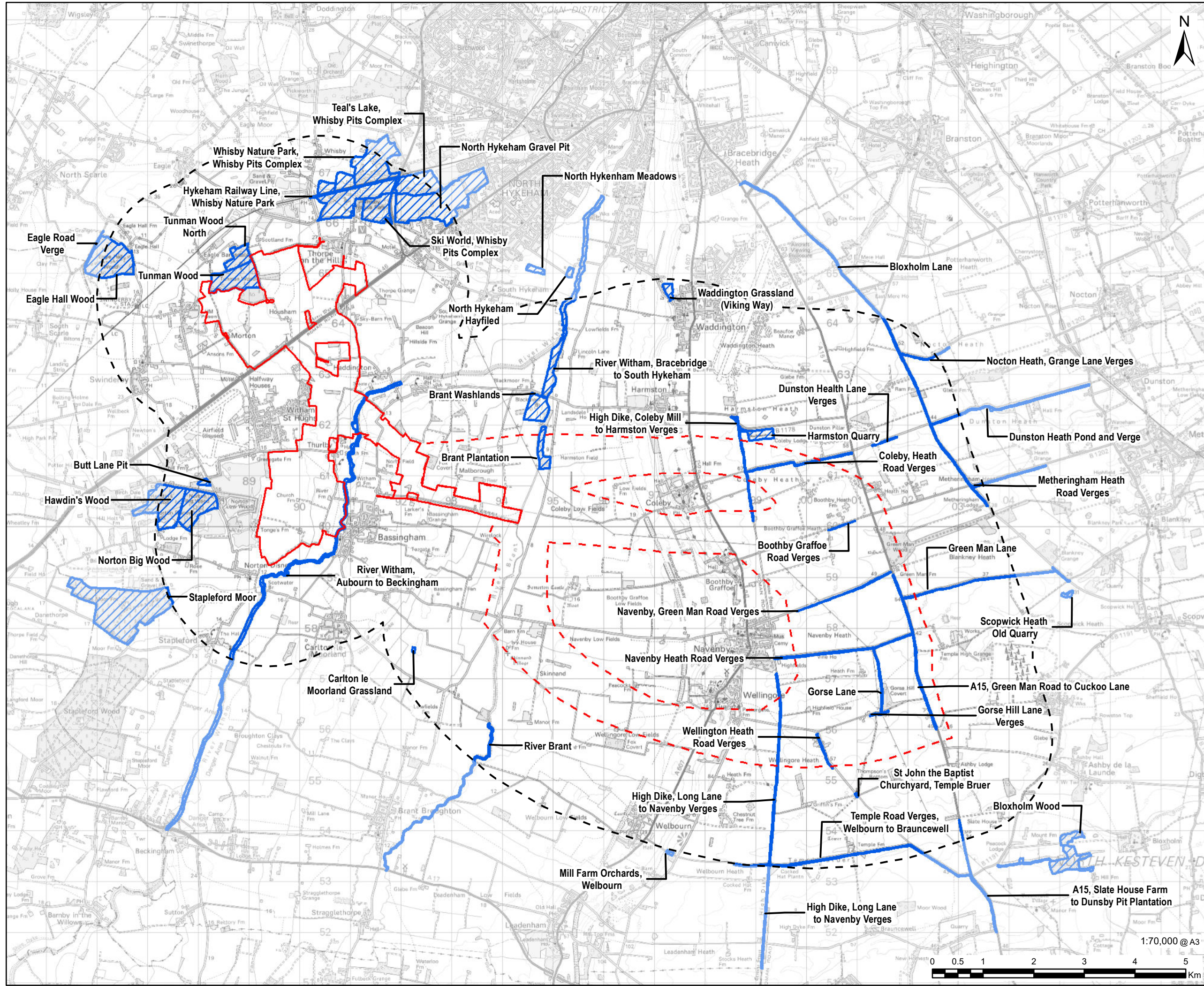
Statutory Sites Within 10km of Scoping Boundary

FIGURE NUMBER

Figure 9-1



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**PROJECT**

Fosse Green Energy

**CLIENT**

Fosse Green Energy Ltd

**CONSULTANT**

AECOM Limited  
2 City Walk  
Holbeck, Leeds  
LS11 9AR  
www.aecom.com

**LEGEND**

- Solar and Energy Storage Park
- Grid Connection Corridor Options
- 2km Study Area
- Local Wildlife Sites (LWS)

**NOTES**

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**ISSUE PURPOSE**

Scoping Report

**PROJECT NUMBER**

60700987

**FIGURE TITLE**

Non-Statutory Sites Within 2km of Scoping Boundary

**FIGURE NUMBER**

Figure 9-2

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## Habitats

- 9.4.6 The desk study identified that within the Site boundary, priority habitats under Section 41 of the NERC Act 2006 (Ref. 31) are present or likely to be present (where determination by further survey is required) include: ancient and/or species rich hedgerows, rivers, standing water/ponds, arable field margins, lowland mixed deciduous woodland, coastal and floodplain grazing marsh, lowland calcareous grassland, lowland meadows, traditional orchards and wood pasture and parkland. These habitats have potential to support a large range of protected and notable species. However, survey is required to confirm the presence of priority habitats.

## Species

### Desk study data

- 9.4.7 The desk study identified records of protected or notable species of flora and fauna within the 2km study area. These included:
- Two notable flowering plant species (Bluebell *Hyacinthoides non-scripta* and Pennyroyal *Mentha pulegium*);
  - One fungus species (Sandy Stiltball *Battarrea phalloides*);
  - Four amphibian species (Great Crested Newt *Triturus cristatus*, Smooth Newt *Lissotriton vulgaris*, Common Frog *Rana temporaria*, and Common Toad *Bufo bufo*);
  - Seventy-two bird species, including specially protected species such as Bewick's Swan *Cygnus columbianus bewickii*, Peregrine *Falco peregrinus*, Hobby *Falco subbuteo*, Barn Owl *Tyto alba*, Kingfisher *Alcedo atthis* and Red Kite *Milvus milvus*;
  - Eight butterfly species (Brown Hairstreak *Thecla betulae*, White-letter Hairstreak *Satyrrium w-album*, Large Tortoiseshell *Nymphalis polychloros*, High Brown Fritillary *Fabriciana adippe*, Small Blue *Cupido minimus*, Chequered Skipper *Carterocephalus palaemon*, Pearl-bordered Fritillary *Boloria euphrosyne* and Purple Emperor *Apatura iris*);
  - Four reptile species (Adder *Vipera berus*, Common Lizard *Zootoca vivipara*, Grass Snake *Natrix helvetica* and Slow-worm *Anguis fragilis*);
  - At least twelve bat species, including Brandt's Bat *Myotis brandtii*, Brown Long-eared *Plecotus auritus*, Western Barbastelle *Barbastella barbastellus*, Common Pipistrelle *Pipistrellus pipistrellus*, Noctule *Nyctalus noctula* and Soprano Pipistrelle *Pipistrellus pygmaeus*;
  - Three notable mammal species (Badger *Meles meles*, Otter *Lutra lutra* and Water Vole *Arvicola amphibius*); and
  - One bony-fish species (Barbel *Barbus barbus*).
- 9.4.8 Reports of Feral Ferrets (*Mustela furo*) were also made, but there were no records of Polecat (*Mustela putorius*).

- 9.4.9 Several of these species are offered full or part protection under the WCA 1981 (Ref. 28). Several species recorded within the study area are also listed on the UK Biodiversity Action Plan (UKBAP); on Section 41 of the NERC Act 2006 (Ref. 31) as being of priority conservation concern and listed as a priority habitat or species in Lincolnshire.

### Additional Survey Requirements

- 9.4.10 To support the ecological impact assessment, the following surveys, in **Table 9-3**, are proposed. Where timing is given in the Survey Period column, note there is no access to the grid corridor expected until later in 2023 once the route has been decided, therefore any surveys required for this area would be undertaken 2023 into 2024.

**Table 9-3 Survey Areas and methods to be used during further ecological surveys**

Survey	Survey Area	Survey Method	Survey Period	Justification for Survey Areas
<b>Habitat Survey</b>	The Site Boundary and to a maximum of 50m from the Site Boundary, where viewable or access permitted.	Walkover survey recording the habitat types and boundary features present following the standard Joint Nature County Council (JNCC) method (Ref. 158), but with the habitats recorded to the UK Habitat Classification system that is better aligned with requirements for BNG. A condition assessment of habitats will also be undertaken for BNG. The habitat mapping will also inform the requirement for further detailed botanical surveys, where necessary.	May to August 2023	Using professional judgement, 50m is an appropriate Survey Area, acknowledging that habitats that are likely to be directly impacted by the Proposed Development are within the Site Boundary.
<b>Terrestrial Habitats and Flora (including invasive non-native species)</b>	The Survey Area will be the Site Boundary. Areas of terrestrial habitat to be surveyed in further detail are those with the potential to be affected by the Proposed Development and potential priority habitats, as identified from the initial Phase 1 Habitat survey and desk study information.	Surveys for arable flora will involve walking arable field boundaries to record notable species as listed in Great Britain (Ref. 159) and England (Ref. 160) Red Data Lists or rated as locally, regionally or nationally scarce in ' <i>A vascular plant red list for England</i> '. Grasslands (including set-aside and verges) will be surveyed in more detail (i.e.: species lists with abundance ratings) for notable species and species composition to help inform mitigation, habitat compensation and enhancement proposals, with the rarity of higher plants given based on ' <i>New Flora of the British Isles</i> ' (Ref. 161).	Between June and September 2023	Using professional judgement, habitat within the Site Boundary is an appropriate Survey Area, acknowledging that habitats that are likely to be directly impacted by the Proposed Development are within the Site Boundary.
<b>Hedgerows</b>	Hedgerows potentially affected by the Proposed Development within the Site Boundary.	Selected hedgerows, where likely to be impacted, will be surveyed and assessed for their 'importance' against the Wildlife and Landscape Criteria, detailed in the Hedgerow Regulations.	Between June and September 2023	Using professional judgement, the Site Boundary is an appropriate Survey Area, acknowledging that the majority of hedgerows within the Site Boundary and

Survey	Survey Area	Survey Method	Survey Period	Justification for Survey Areas
				all hedgerows outside of the Site Boundary will be retained or avoided.
<b>Aquatic habitat and species surveys including for any invasive non-native species (potentially including River Habitat Surveys, pond PSYM, macrophytes, macroinvertebrates and fish surveys)</b>	Up to 1km from the Site Boundary for the desk study and up to 250m for field survey.	An aquatic scoping survey comprising a desk-based assessment of available aquatic ecology data and a walkover survey will inform site selection for further survey. Selected waterbodies (ponds, ditches, rivers) likely to be impacted will be surveyed and assessed using relative standard methodologies for habitat condition (Ref. 162), aquatic macrophytes (Ref. 163, Ref. 164), aquatic macroinvertebrates (Ref. 165, Ref. 166) and PSYM specifically for ponds (Ref. 167).	Between May and October 2023	Up to 250m from the Site Boundary is an appropriate Survey Area to determine any potential impacts arising from the Proposed Development both upstream and downstream (the desk study will assess a wider 1km area).
<b>Terrestrial Invertebrate scoping survey</b>	The Survey Area is within the Site Boundary (Solar and Energy Storage Park only) and the scoping survey will identify habitats suitable to support notable terrestrial invertebrates. Areas subject to any further detailed surveys, if required, will be those which have the potential to be affected by the Proposed Development.	Desk-based study and walkover survey by a specialist entomologist, if required.	March to April 2023	Professional judgement was used to determine that habitat within the Site is an appropriate Survey Area, acknowledging that habitats that have the potential to be permanently impacted (i.e. lost) by the Proposed Development and potentially supporting notable terrestrial invertebrates or assemblages are within this area. The surveys will identify any areas likely to be important for terrestrial invertebrates and inform avoidance, mitigation and enhancement.
<b>Amphibians, including Great Crested Newt</b>	Ponds within 500m of the Site Boundary were identified during the desk study. Further surveys, such as HSI will be undertaken on all water bodies within 250m of the Site Boundary	Habitat Suitability Index (HSI) evaluates suitability of ponds for Great Crested Newt following the standard method (Ref. 168).	HSI surveys between mid-April and June eDNA surveys between mid-April and June	Habitats within the Site Boundary could constitute significant foraging areas, hibernation or resting sites for Great Crested Newts, which can utilise terrestrial habitat up to 500m from their breeding ponds (Ref. 169). All waterbodies within 500m will be identified through desk-based

Survey	Survey Area	Survey Method	Survey Period	Justification for Survey Areas
	(where accessible) and, where further survey is identified as being required, using eDNA methods, will be undertaken on all water bodies within 250m of the Site Boundary that are most likely to support Great Crested Newt and where potentially impacted upon by the Proposed Development.	eDNA method will strictly adhere to the standard survey technique for eDNA (Ref. 169).		assessment, with all waterbodies within 250m subject to further assessment. It is recognised that there is a notable decrease in abundance of Great Crested Newt beyond a distance of 250m from a breeding pond (Ref. 169), and so this will form the focus of the Survey Area.
<b>Reptiles</b>	Suitable habitat for reptiles (such as grassland) within the Site Boundary.	Reptile surveys will involve recording reptile species presence, or absence, using artificial refugia in accordance with Froglife's Advice Sheet 10 for Reptile Surveys (Ref. 170) and Natural England's Standing Advice Sheet for Reptiles (Ref. 171).	May to June and August to September 2023.	Using professional judgement, the Survey Area will provide sufficient information on reptile presence or absence within the Site, acknowledging that habitats that have the potential to be permanently impacted (i.e., lost) by the Proposed Development and potentially supporting reptiles are within this area.
<b>Wintering (including breeding) birds (non-breeding birds)</b>	The Site Boundary and to a maximum of 50m from the Site Boundary.	Wintering bird surveys utilised transect-based walkovers following method detailed in 'Bird Monitoring Methods' (Ref. 172) and 'Bird Census Techniques' (Ref. 173).	February to March 2023 and October to March 2024	Standardised survey buffers for assessing the impacts of development on bird populations do not exist, however, using professional judgement, the Survey Area used provides information on the wintering (non-breeding) birds within the area immediately surrounding the Site Boundary and includes areas contiguous with the Site Boundary, where birds may potentially be adversely affected and is sufficient to determine the likely impacts of the Proposed Development on the majority of wintering bird species occurring or likely to occur in the area.

Survey	Survey Area	Survey Method	Survey Period	Justification for Survey Areas
<b>Breeding (including farmland birds)</b>	birds The Site Boundary and to a maximum of 50m from the Site Boundary for the general breeding bird assemblage and will be extended out from the Site Boundary for species specific surveys, e.g.: Hobby <i>Falco subbuteo</i> and Barn Owl <i>Tyto alba</i> .	Surveys for breeding birds will be based on a standard territory mapping method for surveying breeding birds as detailed in 'Bird Monitoring Methods' (Ref. 172) and 'Bird Census Techniques' (Ref. 173) and will be adapted where necessary to include species-specific methods for other species, as required.	April to mid-July 2023 for the general breeding bird assemblage, with additional survey effort as necessary in August and September 2023.	Standardised survey buffers for assessing the impacts of development on bird populations do not exist, however, using professional judgement, the Survey Area will provide information on the breeding birds within the area immediately surrounding the Proposed Development Boundary and includes areas contiguous with the Site Boundary, where birds may potentially be adversely affected. Depending on the sensitivity of the species, birds occurring outside of the survey area may also be adversely affected (such as those listed on Schedule 1 of the WCA (Ref. 28)) and, therefore where any such species are recorded beyond the 50m survey buffer (up to 200m from the Site Boundary), these will also be recorded. However, the 50m survey buffer is sufficient to determine the likely impacts of the Proposed Development on the majority of breeding bird species occurring or likely to occur in the area.
<b>Bats</b>	Bat activity – Site Boundary (excluding connection corridor). Bat roosts – Site Boundary and to a maximum of 50m.	Surveys for bat activity will be undertaken within the Site and will be based on standard methods for bat activity transect surveys as described in the Bat Conservation Trust (BCT) guidelines (Ref. 174). Following a Preliminary Roost Assessment survey of trees and buildings within the Site Boundary, any trees or buildings with potential to support roosting bats and only those that may be impacted upon by the Proposed Development, will be surveyed following standard method	PRA survey – any time of year Activity surveys: May to September 2023 Roost characterisation surveys in 2024 (if required).	The Survey Areas will provide sufficient information on bat usage of the Site and where impacts are predicted, assessing commuting and foraging habitat and nearby roosts to enable determination of impacts on bat populations occurring within, or adjacent to, the Proposed Development.



Survey	Survey Area	Survey Method	Survey Period	Justification for Survey Areas
		for bat emergence/ re-entry surveys as described in the BCT guidelines.		
<b>Riparian mammals (including invasive non-native species, such as Mink Neovison vison)</b>	All waterbodies and watercourses within the Site Boundary (and to a maximum of 200m from the Site Boundary where access is permitted), identified during the desk study and Phase 1 Habitat survey as being potentially suitable for Water Vole <i>Arvicola amphibius</i> and Otter <i>Lutra lutra</i> .	Water Vole surveys will involve searching watercourses for signs of Water Vole activity as described in the 'Water Vole Conservation Handbook' (Ref. 175) and 'The Water Vole Mitigation Handbook' (Ref. 176). Otter surveys will involve searching watercourses for signs of Otter activity, following guidance in the 'New Rivers and Wildlife Handbook' (Ref. 177); the 'Fifth Otter Survey of England 2009-2010' (Ref. 178) and the 'Ecology of European Otter' (Ref. 179).	Between May and September 2023	Surveying riparian habitats up to 200m from the Site Boundary is sufficient to determine presence or absence of riparian mammals within, or adjacent to, the Site Boundary that may be impacted upon by the Proposed Development.
<b>Badger Meles meles</b>	The Site Boundary and to a maximum of 50m from the Proposed Development.	Surveys for Badger will involve a walkover survey searching for signs of Badger activity as described in the Mammal Society publication 'Surveying Badgers' (Ref. 180) and in the National Badger Survey method with additional reference to 'Surveying for Badgers: Good Practice Guidelines' (Ref. 181).	Any time of year, ideally when vegetation is not in leaf (November 2023 to February 2024)	50m is an appropriate Survey Area acknowledging that the majority of habitats of importance to Badger, such as woodland and hedgerows, will be retained and published guidance recommends a buffer of 30m from setts, therefore the 50m buffer would record any setts outside of the Site Boundary.

- 9.4.11 No specific surveys are proposed for Polecat, Hedgehog (*Erinaceus europaeus*) and Brown Hare (*Lepus europaeus*), but mitigation and enhancement delivered as part of the Proposed Development will seek to avoid disturbance to these species, retain habitats and ensure that connectivity is maintained throughout the Proposed Development and into the wider area. All species are likely to benefit from a reduction in intensively managed agricultural land.
- 9.4.12 A habitat conditions assessment will also be undertaken on land within the Site Boundary in order to undertake a BNG assessment. The baseline information gathered from this, and other surveys, will be used to develop an appropriate strategy in line with the policies identified.

## 9.5 Potential Impacts and Effects, Mitigation and Enhancements

- 9.5.1 The construction, operation and decommissioning of the Proposed Development could potentially result in the following impacts and effects discussed below.

### Construction

- 9.5.2 Impacts on ecology and biodiversity features during construction of the Proposed Development are likely to include:
- Habitat loss or gain – direct impacts associated with changes in land use resulting from the Proposed Development, for example temporary works associated with site clearance, and permanent land-take (mainly arable land) associated with the installation of the Proposed Development;
  - Fragmentation of populations or habitats – indirect impacts due to the Proposed Development dividing a habitat, group of related habitats, site or ecological network, or the creation of partial or complete barriers to the movement of species, with a consequent impairment of ecological function;
  - Disturbance – indirect impacts resulting from a change in normal conditions (e.g., light, noise, vibration and human activity) that result in individuals or populations of species changing behaviour or range;
  - Invasive species – direct impact from spread of invasive species either from or onto the land within the Site Boundary;
  - Habitat degradation – direct or indirect impacts resulting in the reduction in the condition of a habitat and its suitability for some or all of the species it supports, for example changes in chemical water quality, increased sedimentation and dust deposition, or changes in surface flow or groundwater; and,
  - Species mortality – direct impacts on species populations associated with mortalities due to construction activities, for example site clearance.

## Operation

9.5.3 Impacts on biodiversity features during construction of the Proposed Development are likely to include:

- Changes to bird and bat foraging and commuting habitats – direct impacts due to e.g. land use change from agriculture (arable crops) to grassland (potentially cut or grazed);
- Potential for bird nesting and/ or roosting in and around new infrastructure; and
- Indirect beneficial impacts through a possible reduction of agriculture chemical inputs to watercourses / reduction in pesticide use on crops within the local area resulting in an increase in prey availability.

## Decommissioning

9.5.4 Impacts on biodiversity features during decommissioning of the Proposed Development are likely to be the same as construction.

## Mitigation and Enhancement

9.5.5 Compliance with planning policy requires that the Proposed Development considers and engages a mitigation hierarchy, requiring the highest level to be applied, where possible. The mitigation hierarchy is also fundamental to BNG (see Section 9.3). There are four sequential steps that must be taken throughout the lifecycle of a project where there is potential for impacts on relevant ecological receptors:

- Avoidance - actions taken to avoid causing impacts to the environment prior to beginning development (for example, moving the development to a different location);
- Minimisation - measures taken to reduce the duration, intensity, extent and/or likelihood of the unavoidable environmental impacts caused by development (for example, adapting the development design to minimise impacts);
- Restoration or rehabilitation - actions taken to repair environmental degradation or damage following unavoidable impacts caused by development; and
- Offsets - measures taken to compensate for any adverse environmental impacts caused by development which cannot be avoided, minimised and/or restored (e.g. including habitat creation to offset losses).

9.5.6 Embedded mitigation will be developed to successfully integrate the Proposed Development within the context of the existing landscape and prevent or reduce any adverse effects on ecological features. It is expected that the Proposed Development will have sufficient mitigation embedded into the design to avoid significant adverse effects to important ecological features, without additional mitigation measures being required.

- 9.5.7 The Proposed Development will be designed so that impacts upon designated sites and important habitats (including woodland, veteran trees, hedgerows, running water and ponds) are avoided. Undeveloped buffers will be included to protect hedgerows, veteran/ancient trees, ponds and ancient woodland during construction and operation, as set out in **Table 3-1**.
- 9.5.8 Grassland is proposed adjacent to and beneath the solar PV Arrays, including larger open grassland fields within the Proposed Development, to increase the diversity of flora in comparison to existing intensive agriculture and provide new habitat niches to encourage other fauna such as invertebrates and birds, and provide habitat compensation for ground nesting birds.
- 9.5.9 Gaps in currently defunct hedges are proposed to be planted with suitable native species to improve the connectivity of habitats (such as between ancient and other broad-leaved woodland) within and adjacent to the Proposed Development. New areas of tree planting around infrastructure are proposed to provide both screening from infrastructure and to improve habitat connectivity as well as to increase the area of hedge / woodland habitat.
- 9.5.10 The Outline CEMP will set out the measures that will be implemented during construction of the Proposed Development to mitigate construction-related effects on biodiversity associated with dust deposition, air pollution, pollution incidents, water quality, light, noise and vibration. Similarly, the Outline Operational Environmental Management Plan (OEMP) and Outline DEMP will set out measures to mitigate and manage operational and decommissioning related effects on biodiversity, respectively.
- 9.5.11 The implementation of the Outline CEMP and Outline OEMP will be secured through the DCO to manage the environmental effects of the Proposed Development and to demonstrate compliance with environmental legislation.
- 9.5.12 The Proposed Development will aim to deliver significant enhancements for biodiversity in line with national and regional policies and biodiversity priorities. A robust monitoring programme will be provided in the Outline LEMP secured through the DCO, to ensure mitigation and enhancement measures are delivered successfully.

## 9.6 Assessment Methodology

- 9.6.1 The approach used for the Ecological Impact Assessment (EclA) will be undertaken in accordance with best practice guidance as published in the Chartered Institute for Ecology and Environmental management (CIEEM) guidelines (Ref. 182) and summarised below.
- 9.6.2 The principal steps involved in the EclA can be summarised as follows:
- Ecological features that are both present and might be affected by the Proposed Development are identified (both those likely to be present at the time works begin and those predicted to be present at a set time in the future) through a combination of targeted desk-based study and field survey work to determine the relevant baseline conditions;
  - The importance of the identified ecological features evaluated, placing their relative biodiversity and nature conservation value into geographic

context. This is then used to define the relevant ecological features that need to be considered further within the assessment process;

- The changes or perturbations predicted to result as a consequence of the Proposed Development (i.e., the potential impacts), and which could potentially affect relevant ecological features are identified and their nature described. Established good-practice, legislative requirements or other incorporated design measures to minimise or avoid impacts are also described and are taken into account;
- The likely effects (beneficial or adverse) on relevant ecological features are then assessed, and where possible quantified;
- Measures to avoid or reduce any predicted significant effects, if possible, are then developed in conjunction with other elements of the design (including mitigation for other environmental disciplines). If necessary, measures to compensate for effects on features of nature conservation importance are also included;
- Any residual effects of the Proposed Development are reported; and
- Scope for ecological enhancement is considered.

## Ecological Importance

9.6.3 To support focussed EclA, there is a need to determine the scale at which the relevant ecological features identified through the desk studies and field surveys undertaken for the Proposed Development are of value. A hierarchical geographical approach will be used to assign nature conservation resource importance (or value) based upon those within the '*Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine*' (CIEEM) (Ref. 182) (hereafter referred to as the CIEEM guidelines) and professional judgement.

9.6.4 The frames of reference used for the assessment, based on Section 4.7 in the CIEEM guidelines will be:

- Very High (International): Statutorily designated sites, such as Ramsar Sites, SACs (including candidate SACs), SPAs, normally within the geographic area of Europe. Species occurring in numbers approaching that of international importance (i.e., >1% of a biogeographic population). Qualifying species connected to an SAC (such as bats);
- High (National (Great Britain) and Regional (East Midlands)): considering the potential for certain ecological features to be more notable (of higher value) in England, with context relative to Great Britain as a whole. Statutorily designated site, such as a SSSI or National Nature Reserves. Species occurring in numbers approaching that of national importance (i.e., >1% of the UK population). Priority habitats included on Annex I of the Habitats Directive or S41 of the NERC Act 2006 (Ref 32). Regional importance when it is of greater geographical importance than within the county of Lincolnshire but does not reach the threshold to be of National importance

- Medium (County (Lincolnshire) and District (North Kesteven): Non-statutorily designated sites, such as LWSs. Species occurring in numbers approaching that of county or district importance (i.e., >1% of the county or district (if known) population);
- Low (Local): Species of conservation interest, e.g.: UKBAP / Local Biodiversity Action Plan species that contribute to the local community. Areas of habitat that do not meet criteria for selection as LWS in Lincolnshire. Areas of habitat or species that are considered to enrich local area; and
- Negligible (Site): Species that are common and widespread and are not legally protected or included within local planning policy. Areas of habitat that are widespread and of no local value (such as a fence-line or hard-standing).

9.6.5 Species populations are valued based on their size, recognised status (such as through published lists of species of conservation concern and designation of Biodiversity Action Plan (BAP) status, and legal protection. While it is important to consider the status of the species in terms of any legal protection, it is also important to consider other factors such as its distribution, rarity, population trends and the size of the population which would be affected. For example, whilst the Great Crested Newt is protected under European law, and therefore conservation of the species is of significance at an international level, this does not mean that every population of great crested newt is internationally important. It is important to consider the particular population in its context. Assessing the value of features also requires consideration of both existing and future predicted baseline conditions (likely changes such as trends in the population size or distribution of species, likely changes to the extent of habitats and the effects of other Proposed Developments or land use changes). The assessments of value rely on the professional opinion and judgment of experienced ecologists.

9.6.6 Plant communities will be assessed both in terms of their intrinsic value, and as habitat for protected species whose habitat is also specifically protected, and for species of nature conservation concern which are particularly associated with them.

9.6.7 Due regard will also be paid to the legal protection afforded to species during the development of mitigation and compensation measures to be implemented as part of the Proposed Development. For European protected species, there is a requirement that the Proposed Development should not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range. It is not necessary in the assessment to address all habitats and species with potential to occur in the study area and instead the focus should be on those that are 'relevant' i.e., ecological features considered important and potentially affected by the Proposed Development. In its guidance, CIEEM makes clear that there is no need to "carry out detailed assessment of ecological features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable". This does not mean that efforts should not be made to safeguard wider biodiversity, and requirements for this will be considered. National policy documents emphasise the need to achieve net

gains for nature and that a core principle for planning is that it should contribute to conserving and enhancing the natural environment and reducing pollution.

## Magnitude of Impact

9.6.8 In line with Section 1.21 in the CIEEM guidelines (Ref. 182), the terminology used within the EclA will draw a clear distinction between the terms 'impact' and 'effect'. For the purposes of this EclA these terms are defined as follows:

- **Impact** - actions resulting in changes to an ecological feature. For example, construction activities of a development removing a hedgerow; and
- **Effect** – outcome resulting from impact acting upon the conservation status or structure and function of an ecological feature. For example, the effects on a population of bats as a result of the loss of a bat roost.

9.6.9 The magnitude of impact will be based on professional judgement. When describing potential impacts (and where relevant the resultant effects), consideration will be given to the following characteristics likely to influence this (sections 5.11 to 5.18 in the CIEEM guidelines):

- **Positive / Negative** – *i.e.*, is the change likely to be in accordance with nature conservation objectives and policy:
  - **Positive** – a change that improves the quality of the environment, or halts or slows an existing decline in quality *e.g.*, increasing the extent of a habitat of conservation value; or
  - **Negative** – a change that reduces the quality of the environment, *e.g.*, destruction of habitat.
- **Extent** – the spatial or geographical area or distance over which the impact/effect may occur under a suitably representative range of conditions;
- **Magnitude** – the 'size', 'amount' or 'intensity' and 'volume' of an impact - this is described on a quantitative basis where possible;
- **Duration** – the time over which an impact is expected to last prior to recovery or replacement of the resource or feature. Consideration will be given to how this duration relates to relevant ecological characteristics such as a species' lifecycle. However, it is not always appropriate to report the duration of impacts in these terms. The duration of an effect may be longer than the duration of an activity or impact;
- **Timing and frequency** – *i.e.*, consideration of the point at which the impact occurs in relation to critical life-stages or seasons; and
- **Reversibility** – *i.e.*, is the impact temporary or permanent. A temporary impact is one from which recovery is possible or for which effective mitigation is both possible and enforceable. A permanent effect is one from which recovery is either not possible or cannot be achieved within a reasonable timescale (in the context of the feature being assessed).

9.6.10 Cumulative effects will be assessed and are those occurring from several sources (also known as interrelationships) and/or the combined effects of other developments in the area.

## Significance of Effect

9.6.11 There are a number of approaches for determining the significance of effects on ecological features. Whilst the CIEEM guidelines recommend the avoidance of the use of the matrix approach for categorisation (major, moderate and minor), in order to provide consistency of terminology, the CIEEM assessment will be translated into the classification of effects scale, as outlined in **Table 9-4**.

**Table 9-4 Relating CIEEM assessment terms to those used in other EIA chapters**

Effect classification terminology used in other EIA chapters	Equivalent CIEEM assessment
Major beneficial (positive)	1) Beneficial effect on structure / function or conservation status at a regional, national or international level; and 2) The extent, magnitude, frequency, and/or timing of an impact positively affects the integrity or key characteristics of the resource.
Moderate beneficial (positive)	1) Beneficial effect on structure/ function or conservation status at a county level; and 2) The extent, magnitude, frequency, and/or timing of an impact positively affects the integrity or key characteristics of the resource.
Minor beneficial (positive)	1) Beneficial effect on structure / function or conservation status at a local level; and 2) The extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
Negligible beneficial / adverse	No effect on structure / function or conservation status
Minor adverse (negative)	1) Adverse effect on structure / function or conservation status at a local level; and 2) The extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
Moderate adverse (negative)	1) Adverse effect on structure / function or conservation status at a county level; and 2) The extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
Major adverse (negative)	1) Adverse effect on structure / function or conservation status at a regional, national or international level; and 2) The extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.



9.6.12 Sections 5.24 to 5.28 in the CIEEM guidelines (Ref. 182) states that effects should be determined as being significant when:

*“an effect either supports or undermines biodiversity conservation objectives for ‘important ecological features’ or for biodiversity in general. Conservation objectives may be specific (e.g., for a designated site) or broad (e.g., national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local. A significant effect is an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project”.*

*“In broad terms, significant effects encompass impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution)”.*

9.6.13 Using this information and judgment, it is determined whether the effects will be significant or not on the integrity (of site/ecosystems) or conservation status (of habitats/species) of each ecological feature and the impact significance is determined at the appropriate geographical scale.

- **Not Significant** - no effect on structure and function, or conservation status; and
- **Significant** - structure and function, or conservation status is affected.

## Habitats Regulations Assessment

9.6.14 HRA screening is a simple assessment and would be undertaken to determine whether the proposed development would have a significant effect on a European site on its own or in combination with other nearby proposals. The assessment would be done in accordance with PINS Advice Note 10 (Ref 166). The screening will consider:

- The area over which the proposed development would take place;
- Any overlaps or interaction with the protected features of a site in a direct or indirect way; and
- The effect of any essential parts of the proposed development, such as its location, timing or design.

9.6.15 If the screening assessment cannot rule out the risk of the proposed development from having a significant effect, an Appropriate Assessment is likely to be required.

## 9.7 Elements Scoped Out

9.7.1 International and National statutory ecological designations are currently scoped out with no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of these statutory designated sites.

9.7.2 The following potential operational effects are **scoped out** of further assessment:

- Attraction of aquatic invertebrates to the solar panels – although there is limited evidence suggesting, in certain conditions, the attraction of some species of aquatic invertebrates to solar panels, statutorily designated sites with aquatic invertebrate species or assemblages as qualifying features are greater than 1km from the Proposed Development and this potential impact pathway is scoped out of further assessment. Notwithstanding this, appropriate aquatic surveys will be undertaken to assess potential impacts to watercourses.
- Attraction of birds to solar panels – there is no evidence from operational solar Proposed Developments in the UK that the solar panels attract congregations of birds, which may lead to displacement of populations and increase the risk of mortality (through collision with solar panels and infrastructure). In addition, the Proposed Development is not located near areas, such as wetlands, which support large congregations of birds, nor is the Proposed Development located on a migratory flyway or on a flightpath between areas supporting congregations of birds. As such this potential impact pathway is scoped out of further assessment.

## 9.8 Assumptions, Limitations and Uncertainties

9.8.1 The following assumptions and limitations have been noted during the scoping:

- Baseline ecological surveys commenced in 2023 and will continue through 2023 and 2024 to determine the baseline ecological conditions. The surveys may highlight new important ecological features with potential to be significantly affected which have not been identified (or considered not to be significant) at this stage of the assessment.
- A precautionary approach has been taken at this stage which assumes that all habitats within the footprint of the solar PV modules and associated solar and battery storage infrastructure may be affected during construction and/or operation. However, it is expected that the Proposed Development will primarily utilise agricultural or grazing land and that other habitats (e.g. hedgerow, woodland, mature trees and waterbodies) within the Proposed Development will be retained and protected.

# 10. Water Environment

## 10.1 Introduction

- 10.1.1 This chapter relates to the potential effects of the Proposed Development on the water environment, which includes surface water bodies (e.g. rivers, streams, ditches, and canals) and groundwater bodies. Impacts considered cover water quality, water resources, physical changes to hydromorphology and the function of water environment systems, flood risk and drainage. Isolated ponds as receptors are included within **Chapter 9: Ecology and Biodiversity**.
- 10.1.2 Where designated ecological sites are sensitive to changes in hydrology or water quality (i.e. they are 'water dependent') an assessment of the risks to them is considered in this water environment Scoping chapter. However, potential impacts from contaminated land on any controlled water (surface or groundwater) is not considered in this chapter. For this, please refer to **Chapter 15: Other Environmental Topics**.
- 10.1.3 This Scoping chapter also considers the scope for mitigation, and how it is proposed to assess the significance of any identified potential effects.

## 10.2 Study Area

- 10.2.1 A study area of approximately 1km from the Site has been considered in order to identify water features that could reasonably be affected by the Proposed Development. However, as flood risk and water quality impacts may also propagate downstream, the baseline assessment has also considered a wider study area to include as far downstream as a potential impact may influence the quality or quantity of the water body where necessary. In this case, it is considered that the River Witham is the furthest downstream water feature that would realistically be potentially impacted.

## 10.3 Planning Policy Context and Guidance

- 10.3.1 Legislation, planning policy and guidance relating to the water environment, flood risk and drainage and pertinent to the Proposed Development comprises:

### Legislation

- Environment Act 2021 (Ref. 105);
- Water Act 2014 (as amended) (Ref. 44);
- Flood and Water Management Act 2010 (as amended) (Ref. 45);
- Environmental Protection Act 1990 (as amended) (Ref. 47);
- Land Drainage Act 1991 (as amended) (Ref. 48);
- Water Resources Act 1991 (as amended) (Ref. 49);
- Salmon and Freshwater Fisheries Act 1975 (as amended) (Ref. 50);

- Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref. 51);
- The Environmental Damage (Prevention and Remediation) Regulations 2017 (as amended) (Ref. 52);
- Environmental Permitting (England and Wales) Regulations 2016 (as amended 2018) (Ref. 53);
- Groundwater (England and Wales) Regulations 2009 (Ref. 54);
- Eels (England and Wales) Regulation 2009 (as amended) (Ref. 36);
- Control of Pollution (Oil Storage) (England) Regulations 2001 (as amended) (Ref. 55);
- The Control of Substances Hazardous to Health (Amendment) Regulations 2004 (Ref. 58);
- The Anti-Pollution Works Regulations 1999 (Ref. 60); and
- The Water Framework Directive (Standards and Classification) Directions 2015 (Ref. 59).

## National Planning Policy

### National Policy Statements

10.3.2 The following planning policies from relevant NPSs have been taken into account as part of identifying the assessment methodology, receptor selection/sensitivity, potential significant environmental effects, and mitigation:

- **NPS EN-1.** (Ref. 6) with particular reference to section 5.16 Water Quality and Resources. Paragraph 5.16.12 and paragraph 5.15.14. The Secretary of State should be satisfied that a proposal has regard to current River Basin Management Plans and meets the requirements of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (including regulation 19). Also, particular reference to Section 5.8 Flood Risk, paragraphs 5.8.24 to 5.8.42. Additionally, paragraph 4.9.13 states that applicants for new energy infrastructure must take into account the potential impacts of climate change, including the most up to date UK climate change projections, and adopt appropriate mitigation or adaption measures for the lifetime of the proposed infrastructure. Paragraphs 5.16.11-16 outline the decision making process with regard to water pollution, and more weight is attributed to any impacts that would have an adverse effect on the achievement of environmental objectives under the WFD. Within paragraphs 5.16.8-10 it is stated that the possible requirement for mitigation measures over and above those included within the application should be considered by the examining authority;
- **NPS EN-3.** Paragraph 3.4.10 sets out the solar photovoltaic sites should consider resilience to flood risk taking into account climate change. Paragraph 3.10.145 discusses the importance of flooding attenuation and water quality with regards impacts from a solar photovoltaic site.

- **NPS EN5.** Paragraph 2.4.1 of the NPS EN-5 sets out that applications should demonstrate the extent of vulnerability of the proposed development and, as appropriate, how resilient it would be to flooding. NPS EN-5 refers to section 4.8 of EN-1 which advises that the resilience of a project to climate change should be assessed in the ES and that future increased risk of flooding would be covered in an FRA.
- Where a FRA is carried out this must be submitted alongside the applicants ES. This will need to consider the impact of drainage. As solar PV panels will drain to the existing ground, the impact, will not, in general, be significant.
- Where access tracks need to be provided, permeable tracks should be used, and localised SuDS should be used to control runoff.
- Given the temporary nature of solar PV farms, sites should be configured or selected to avoid the need to impact on existing drainage systems and watercourses.
- Culverting existing watercourses/drainage ditches should be avoided. Where culverting for access is unavoidable, it should be demonstrated that no reasonable alternatives exist and where necessary it will only be for the construction period.

### **National Planning Policy Framework**

- 10.3.3 The NPPF 2021 (Ref. 61) does not contain specific policies for nationally significant infrastructure projects, however, national policy statements form part of the overall framework of national planning policy. Within the NPPF, particular reference is given to paragraphs 8 (a and b), 20(b), 149, 151, and paragraphs 8(c), 20(d), 149, and 174 regarding water quality.
- 10.3.4 NPPF 2021 (Ref. 61) paragraphs 159 to 169, states that for developments over 1ha a Flood Risk Assessment (FRA) is required; and paragraph 174 'conserving and enhancing the natural environment' includes a statement that development will be prevented that produces unacceptable levels of water pollution; annex 3: flood risk vulnerability classification, classifies solar farms as essential infrastructure.

### **Other Policy and Guidance**

10.3.5 Consideration will also be given to:

- The UK Government's Environmental Improvement Plan (Ref. 133);
- The UK Government's 25 Year Environment Plan (Ref. 40);
- The UK Government's Plan for Water: Our Integrated Approach to Delivering Clean and Plentiful Water (Ref. 134);
- The UK Government's Future Water Strategy (2011) (Ref. 62);
- National Planning Practice Guidance: Flood Risk and Coastal Change (2022) (Ref. 135);
- The Non-statutory technical standards for Sustainable Drainage Systems (SuDS) (Ref. 63);

- Construction Industry Research and Information Association (CIRIA) Report C753 The SuDS Manual 2<sup>nd</sup> Edition (2016) (Ref. 130);
- The Building Regulations 2010 Approved Document H Drainage and Waste Disposal (Ref. 64);
- The Building Research Establishment (BRE) Digest 365: Soakaway Design and Sewerage Sector Guidance 2022, Appendix C Design and Construction Guidance (Ref. 65); and
- Water UK Sewerage Sector Guidance (Ref. 136).

### Regional Guidance

- 10.3.6 At a regional level, water management is coordinated through ten River Basin Management Plans (RBMPs). RBMPs are prepared by the Environment Agency for six-year cycles and set out how organisations, stakeholders and communities will work together to improve the water environment. The most recent updates to the plans were published in 2022. The study area falls under the Witham Management Catchment within the Anglian RBMP (Ref. 66) and the Trent Lower and Erewash Management Catchment within the Humber RBMP (Ref. 67).

### Local Planning Policy

- 10.3.7 The Proposed Development is located within the North Kesteven District Council area. The Central Lincolnshire Joint Strategic Planning Committee (CLJSPC), which includes North Kesteven District Council, adopted the Central Lincolnshire Plan in 2023 (Ref. 195).
- 10.3.8 The Central Lincolnshire Local Plan (Ref. 195) includes several relevant policies, particularly:
- Policy S14 (Renewable Energy) – proposed renewable energy schemes will have to show that they are acceptable with regard to flood risk; and
  - Policy S21 (Flood Risk and Water Resources) - proposed developments will need to appraise flood risk from all sources, ensure that they are safe for the lifetime of the development taking into account climate change, take a positive approach to reducing overall flood risk and include SuDS to promote water quality improvements. Proposals must also consider requirements of the Water Framework Directive, and ensure that development contributes positively to the water environment and its ecology where possible and does not adversely affect surface and ground water quality. Requirements with regard to foul sewerage connections are also included.

### Local Guidance

- 10.3.9 In 2018, Lincolnshire County Council produced the 'Sustainable Drainage Design and Evaluation Guide' (Ref. 137). This guide links the design of SuDS with the evaluation requirements of planning to facilitate consultation in order to achieve the best possible SuDS design. It is primarily intended for use by developers, designers and consultants who are seeking guidance on the Lead Local Flood Authority (LLFA) standards for the design of sustainable surface water drainage in Lincolnshire.

10.3.10 All major developments will be required to incorporate water management measures to reduce surface water runoff and ensure that it does not increase flood risk elsewhere by considering all sources of flood risk both to and from a proposed scheme. The principal method to do so should be the use of SuDS. Surface water runoff should be managed to ensure that there is no increase in surface water flow rate run off.

## 10.4 Baseline Conditions

10.4.1 Baseline information has been reviewed in the context of the Proposed Development in order to identify the potential for significant effects based on a source-pathway-receptor model and where relevant, consideration has been given to the scope for mitigation.

10.4.2 The water environment baseline conditions have been determined by a desk study of available information, and various other online data sources including:

- Online Ordnance Survey (OS) maps viewed to identify any surface water bodies within 1km of the Site (Ref. 106);
- Online aerial photography (Ref. 107);
- Anglian river basin district river basin management plan (Ref. 108);
- Environment Agency Catchment Data Explorer website (Ref. 109);
- Environment Agency Public Registers website – Environmental Permitting Regulations – Discharges to Water and Groundwater (Ref. 245);
- National Soil Resources Institute Soilscape website (Ref. 110);
- MAGIC map website (Ref. 111);
- BGS Geoindex website (Ref. 112);
- Met Office website (Ref. 113);
- BGS Borehole and Geology Mapping (Ref. 114); and
- Environment Agency Online Interactive Maps (Ref. 115):
  - Flood map for planning (rivers and sea);
  - Risk of flooding from surface water;
  - Risk of flooding from reservoirs; and
  - Flood warning areas and risk.

10.4.3 Where relevant, water features and their attributes have been presented in a series of figures that support this chapter. **Figure 10-1** presents the surface water environment, **Figure 10-2** presents the groundwater environment, and **Figure 10-3** shows Environment Agency Flood Zones (including the location of flood defences and areas benefitting from flood defences) and **Figure 10-4** shows Surface Water Flood Risk.

10.4.4 Further review of existing geological plans, hydrogeological data and site investigation data will be carried out at the PEI stage to provide an initial assessment of local ground and groundwater conditions. Summarised data will be recorded and provided within the FRA and will be used to inform the

Surface Water Drainage Strategy. The FRA and Drainage Strategy will form a technical appendix to the ES.

- 10.4.5 In addition, further information and data will be obtained from the Environment Agency and local councils and will be presented in the next stages of the assessment (i.e. the PEIR). This will include water quality, resources (pollution incidents, licenced and unlicenced (private) water abstractions, and water activity permits (i.e. consented discharges), hydrogeology (e.g. groundwater levels), WFD data and flooding data.
- 10.4.6 It is also proposed to undertake general walkover and hydromorphological surveys of the site at PEIR stage, and the purpose and scope of these are discussed in more detail in the Section 10.6.

## Topography, land use, climate and geology

### Solar and Energy Storage Park

- 10.4.7 The topography of the Study Area is relatively flat, with existing ground levels under 20m AOD according to online Ordnance Survey mapping (Ref. 106) with gentle undulations around the larger watercourses. There are flood plains associated with:
- The River Witham (Main River) which flows through the Study Area;
  - The River Brant (Main River), a tributary of the River Witham which flows through the study area and meets the Witham to the south of South Hykeham; and
  - The South Hykeham Catchment, a Main River located to the northeast of the Study Area.
- 10.4.8 These watercourses are shown in **Figure 10-1**. In addition, there are numerous other Ordinary Watercourses within the Study Area that fall under the jurisdiction of the LLFA (Lincolnshire County Council) or Internal Drainage Boards (Upper Witham Internal Drainage Board and Trent Valley Internal Drainage Board areas both cross into the Study Area, see **Figure 10-1**). These watercourses drain surface water from the surrounding agricultural areas. The majority of these watercourses are shown on **Figure 10-1** on the basis of available mapping, but this will be reviewed following more detailed desk study and site work at which point a referencing system will be developed for the next assessment stage.
- 10.4.9 The area is currently used mainly for agriculture, with a mosaic of agricultural fields. There are several small villages, hamlets, and farms throughout the study area.
- 10.4.10 Based on the Meteorological Office website (Ref. 113), the nearest weather station is located in Waddington (NGR SK 98952 65231), approximately 3.5km north of the study area. Using data from this weather station, for the period 1991-2020, it is estimated that the Study Area experiences approximately 614mm of rainfall per year, with it raining more than 1mm on approximately 116 days per year, which are both low in the UK context. This is relevant to the whole Study Area.



10.4.11 The bedrock and superficial geology for the area is identified by the BGS GeoIndex online mapping (Ref. 112). Parts of the Solar and Energy Storage Park are located on the Scunthorpe Mudstone Group, with a north-south geological boundary. To the east of this line is the Chartmouth Mudstone Group. Overlying the bedrock geology there are several superficial strata. This includes alluvial and river terrace deposits in the floodplains of the River Brant and River Witham. Beyond the river valleys, the superficial deposits comprise the Fulbeck Sand and Gravel Member and Balderton Sand and Gravel Member. The Balderton Member is resting on pre-Quaternary bedrock and possibly, very locally, on the Skellingthorpe Clay Member of the Wolston Formation.

### Grid Connection Corridor Options

10.4.12 The topography of the Grid Connection Corridors Study Area generally rises gently west of the River Brant (at less than 10m AOD) to a high point around 80m AOD at Navenby and this high point broadly follows the A607. The land gently recedes in elevation beyond Navenby, falling to around 40m AOD to the east of the Study Area of Scopwick Heath. Land use is generally agricultural, but with the villages of Harmston, Coleby, Navenby and Wellingore all falling within the Study Area.

10.4.13 Rainfall for the Grid Connection Corridors is the same as described for the Solar and Energy Storage Park above.

10.4.14 The Grid Connection Corridor Study Area is split predominantly across four geological bedrock formations orientated north to south (intersecting all options). The western area of the Grid Connection Corridor surrounding the River Brant and extending west is underlain by the Charmouth Mudstone Formation. Immediately west of the villages of Harmston, Coleby and Wellingore is the Whitby Mudstone Formation, between the Charmouth Mudstone Formation to the west and the Lower Lincolnshire Limestone Member to the east. The Lower Lincolnshire Limestone Member extends towards Navenby Heath where it transitions to the Lincolnshire Limestone Member. In addition, there are pockets of the Upper Lincolnshire Limestone Member north of Metheringham Heath and south of Scopwick Heath.

10.4.15 Overlying the bedrock geology are similar superficial deposits as those of the Solar and Energy Storage Park and these are mainly located in the area between Bassingham and Aubourn while the majority of the study area has no superficial deposits recorded. Those deposits that are present consist predominantly of isolated deposits of the Fulbeck Sand and Gravel Member, river terrace deposits and alluvium around the River Brant valley. There are also some sand and gravel superficial deposits west of Harmston and bands of Head deposits to the south east of Wellingore.

### Flood Risk from all sources

10.4.16 The baseline flood risk from all sources for the site is summarised in **Table 10-1** Solar and Energy Storage Park and **Table 10-2** Grid Connection Corridors below.

**Table 10-1 Solar and Energy Storage Park– Flood Risk from all sources**

<b>Flood Risk Sources</b>	<b>Existing Land Use Vulnerability</b>	<b>Pre-Proposed Development Flood Risk</b>	<b>Comments</b>
Tidal/ Fluvial	Less Vulnerable	High	<p>Main Rivers: The majority of the Solar and Energy Storage Park is located within Flood Zone 1 with areas of Flood Zone 2 and 3 at the extents associated with the main river present within the Grid Connection Corridors extent, Upper Witham.</p> <p>Ordinary Watercourses: Various ordinary watercourses and land drains located within the Solar and Energy Storage Park extent are present. An area of Flood Zone 2 and 3 appear in the northeast of the Solar and Energy Storage Park associated with an ordinary watercourse called Mill Dam Dyke.</p> <p>The Solar and Energy Storage Park does not lie within a tidal flood risk extent.</p>
Surface Water	Less Vulnerable	Low to High	<p>The risk of surface water flooding within the Solar and Energy Storage Park varies from very low to high. The areas of high risk are likely associated with areas of low topography where surface water sits and pools rather than draining away or show areas at risk of flooding from smaller ordinary watercourses and/or local land drains.</p>
Groundwater	Less Vulnerable	Low	<p>North Kesteven District Council's Strategic Flood Risk Assessment indicates the area the Site is located is deemed not to be at risk of groundwater flooding.</p>
Sewers	Less Vulnerable	Low	<p>The Solar and Energy Storage Park is located in a predominantly rural location, however where the route crosses a highway or in proximity to a settlement there is potential for flooding from sewer sources.</p>
Reservoirs	N/A	Low	<p>Environment Agency online mapping shows no artificial sources of flood risk associated within the scoping boundary. Residual Risk is Low.</p>

**Table 10-2 Grid Connection Corridors – Flood Risk from all sources**

<b>Flood Risk Source</b>	<b>Pre-Proposed Development Flood Risk</b>	<b>Comments</b>
Tidal/Fluvial	High	<p>Main Rivers: The majority of the Grid Connection Corridors are located within Flood Zone 1 with areas of Flood Zone 2 and 3 associated with the main river present within the Grid Connection Corridors extent of the River Brant.</p>

Flood Risk Source	Pre-Proposed Development Flood Risk	Comments
		<p>Ordinary Watercourses: Various ordinary watercourses acting as tributaries to the River Brant located within the southeast of the Grid Connection Corridors extent appear to have associated flood zone 2 and 3 extents. The remaining ordinary water courses and the eastern area of the Grid Connection Corridors extent are located within Flood Zone 1.</p> <p>The Grid Connection Corridors do not lie within a tidal flood risk extent.</p>
Surface Water	Low to High	<p>The area of Grid Connection Corridors extent east of Navenby is within an area of very low risk of surface water flooding. The remaining area of the Grid Connection Corridors extent varies in risk from very low to high. Areas of high risk appear to be associated with ordinary watercourses and/or local land drains and topographical low points where surface water sits and pools rather than draining away.</p>
Groundwater	Low	<p>North Kesteven District Council's Strategic Flood Risk Assessment indicates the area is located is deemed not to be at risk of groundwater flooding.</p>
Sewers	Low	<p>The Grid Connection Corridors are located in a predominantly rural location, however where the route crosses a highway or in proximity to a settlement there is potential for flooding from sewer sources.</p>
Reservoirs	Low	<p>Environment Agency online mapping shows no artificial sources of flood risk associated within the Site. Residual Risk is Low.</p>

10.4.17 Main Rivers are defined according to criteria set under the Water Resources Act 1991 (Ref. 49) as usually larger rivers and streams with a potentially significant flood risk associated with them. There are two Main Rivers within the Study Area, for which the Environment Agency is the regulating authority. These are the River Brant and the River Witham. Other watercourses are Ordinary Watercourses and the LLFA (Lincolnshire County Council) is the regulating authority for these, other than those that are IDB drains.

## Surface Water Features

10.4.18 The Proposed Development is located within the Anglian River Basin District, with a small area around Morton Hall falling under the Humber River Basin District. It extends across two management catchments, Witham (Anglian) and Trent Lower and Erewash (Humber) (Ref. 109). The Solar and Energy Storage Park falls under the Witham Upper Operational Catchment. The Grid Connection Corridor falls under the Witham Upper Operational Catchment to the west of the A607 and the Witham Lower Operational Catchment to the

east of the A607. All watercourses in the study area ultimately drain to the River Witham (confluence of the Brant to confluence of Catchwater Drain).

10.4.19 The River Witham flows northeast from the southwest of the Study Area, with the River Brant flowing into the River Witham just north of the Study Area, roughly 2.8km east of Aourn. The six surface water WFD water bodies, within the two management catchments in the Study Area are:

- Witham Upper / Witham from Cringle Brook to Brant Lower Water Body (GB105030056780);
- Witham Upper / Witham from confluence with Brant to confluence with Catchwater Drain Water Body (GB105030062370);
- Witham Upper / Brant Lower Water Body from Brant Upper Water Body to River Witham Water Body (GB105030056770);
- Witham Upper / South Hykeham Catchwater Water Body (GB105030062460);
- Witham Lower / Dunston Beck Water Body (GB105030056230); and
- Witham Lower / Metheringham Beck Water Body (GB105030056210).

10.4.20 These named WFD surface water bodies are shown on **Figure 10-1**.

10.4.21 There are also a number of smaller water features within the Study Area, which do not have WFD classifications in their own right, but which would all ultimately drain to the River Witham or The Fleet (and these are covered by their WFD designations). The key water features are all outlined below.

10.4.22 Within the Study Area, the River Witham (Witham from Cringle Brook to Brant WFD water body, WFD ID: GB105030056780) meanders north from Great Ponton to its confluence with the Brant Lower. The WFD water body length is 56.96km, draining a catchment of 156.7km<sup>2</sup>. The nearest gauging station is located 1.6km downstream from the confluence of the River Witham and River Brant at North Hykeham, Lincolnshire (Station U3001, Witham at North Hykeham, Ref. 116). The annual mean flow is 3.41m<sup>3</sup>/s. The nearest gauging station with available records of Q95 flow (flow exceeded 95% of the time) is 11km upstream from the study area. The Q95 at this monitoring station (Station ID 30001, Witham at Claypole Mill - Ref. 139) between 1959-2021 is 0.385m<sup>3</sup>/s. The mean flow recorded at this station is 1.899m<sup>3</sup>/s.

10.4.23 The Witham from Cringle Brook to River Brant WFD waterbody is at moderate ecological potential and has a chemical status of failing (cycle 3 WFD classifications 2019). It is classified as a heavily modified waterbody. It is not achieving good status for ecological classification due to status of the macrophyte sub element and phosphate, which are both at poor status. There are chemical failures for mercury and its compounds, perfluorooctane sulphonate (PFOS) and polybrominated diphenyl ethers (PBDE). The objective is for moderate status by 2015, and not higher due to being disproportionately expensive and disproportionate burdens. The Environment Agency has identified the reasons for not achieving good status as resulting from poor nutrient management, poor livestock management, sewage

discharge (continuous) and other reasons resulting from physical modification (Ref. 117).

- 10.4.24 Immediately downstream of its confluence with the River Brant water body (and thus in direct hydrological connectivity to the Proposed Development), the River Witham is designated as the '**Witham from confluence with Brant to confluence with Catchwater Drain**' Water Body (WFD ID: GB105030062370). The waterbody has a length of 6.64km and drains an area of 17.86km<sup>2</sup> (Ref. 138). The nearest gauging station is Station U3001 at North Hykeham (Ref. 115), as such water quality data for this water body is the same as for the Witham from Cringle Brook to River Brant WFD water body. The nearest gauging station with a record of Q95 flow is on the Witham at Claypole Mill as described above.
- 10.4.25 The Witham from confluence with Brant to confluence with Catchwater Drain WFD water body is at moderate ecological status and fail chemical status (Cycle 3, 2019). It has 'poor' classifications for macrophyte sub elements and phosphate and fails in mercury and its compounds, PFOS and PBDE. It has an objective of moderate by 2015 and not higher due to being technically infeasible, being disproportionately expensive and due to disproportionate burdens. There are numerous reasons for not achieving good status including physical modification, poor nutrient and livestock management, and urbanisation.
- 10.4.26 The **Brant Lower** water body has a length of 12.05km and flows in a northerly direction between Brant Boughton and South Hykeham, and drains an area of 88.9km<sup>2</sup>. It flows through the Study Area roughly parallel to Broughton Lane. The nearest gauging station on the River Brant is located at Brant Boughton (Station ID 30033, Ref. 119). This is located approximately 2.3km upstream of the Site boundary, to the east of the Brant Boughton area. The annual mean flow is 0.26m<sup>3</sup>/s with a Q95 flow of 0.007m<sup>3</sup>/s, with data recorded between the period 1990-2021.
- 10.4.27 The Brant Lower water body (WFD ID: GB105030056770) is at moderate ecological potential and has a chemical status of fail, and is classified as being heavily modified (cycle 3 classifications 2019). The objective is for good status by 2027, and not higher due to being disproportionately expensive and disproportionate burdens. It is not achieving good ecological status due to a bad status for the macrophyte sub element and poor dissolved oxygen as well as phosphate. The chemical classification is failing due to fails in benzo(g-h-i) perylene, mercury and its compounds, PFOS and polybrominated diphenyl ethers. The Environment Agency have identified poor nutrient and livestock management, sewage discharge (continuous), in-river activities, land drainage and surface water extraction as reasons for not achieving good status.
- 10.4.28 The **South Hykeham Catchwater** WFD Water Body (WFD ID: GB105030062460) is designated immediately east of the Study Area at Danker Wood at South Hykeham. However, the watercourse actually forms from coalescence of several drain and ditches, some of which extend into the study area south of Thorpe on the Hill. Mapping also indicates the watercourse to be known as 'The Beck'. The reportable WFD reach is 3.1km in length and

flows in an easterly direction between Danker Wood and the River Witham. It has a catchment area of 4.8km<sup>2</sup>. The watercourse drains directly into the River Witham north of its confluence with the River Brant. There are no gauging stations associated with this watercourse. It is designated as a heavily modified river. The water body is at moderate ecological potential, and has a chemical classification of fail (cycle 3 classifications 2019). Ecological classification is moderate due to moderate results for invertebrates, macrophyte sub elements, dissolved oxygen, phosphate and mitigation measures assessment. Chemical classification is a failure resulting from fails in benzo(g-h-i) perylene, mercury and its compounds PBDE. The Environment Agency determined that poor nutrient management, sewage discharge (continuous & intermittent), private sewage discharge, trade/industry discharge and land drainage (Ref. 121). The objective is for moderate status by 2015, and not higher due to being disproportionately expensive, disproportionate burdens and being technically unfeasible.

10.4.29 There are catchments of two WFD waterbodies within the Witham Lower operational catchment that fall within the Study Area but for which the watercourses themselves are not actually within the 1km Study Area. These both relate to the Grid Connection Corridors section of the Proposed Development, and there may be pathways to these watercourses via surface water runoff in their catchments.

10.4.30 The first of these is **Dunston Beck** (WFD ID: GB105030056230) which drains into the River Witham east of Dunston, its catchment area extending westwards from Waddington south to Wellingore eastwards towards Dunston. It is designated as a heavily modified river. The reach of this waterbody is 6.4km, with a catchment area of 40.1km<sup>2</sup>. The nearest gauging station is at Dunston Beck (Station ID: 030019 Ref. 118) which is approximately 5km east of the Study Area. The annual mean flow is 0.17m<sup>3</sup>/s . Q95 flow is not available at this stage. The watercourse is currently at moderate ecological potential, with a failure for chemical status (cycle 3 classifications, 2019). The water body is not at a good ecological status due to a bad status for fish, and only moderate classification for invertebrates. There are failures for mercury and its compounds and PBDE. The objective is for good overall potential by 2021 and was not higher due to being disproportionately expensive and disproportionate burdens. The Environment Agency has identified poor soil management, riparian/in-river activities, physical modification and surface water abstraction as activities resulting in failure to achieve good status. (Ref. 123).

10.4.31 The **Metheringham Beck** WFD water body (WFD ID: GB105030056210) drains an area eastward from Wellingore Heath to Metheringham into the River Witham. The water body is designated heavily modified. The length of this water body is 2.7km with a catchment area of 35.5km<sup>2</sup>. There are no gauging stations on this water body. The water body is at moderate ecological status and has a chemical status of fail, with an overall objective of good status by 2027 for ecological classification and 2063 for chemical classification. The water body is at moderate ecological status due to poor status for phosphate and moderate mitigation measures assessment. Chemical classification was a failure due to failures for mercury and its compounds, and PBDE. The

Environment Agency has identified sewage discharge (continuous) and physical modification as the reasons for not achieving good status (Ref. 124).

10.4.32 There are various other named watercourses or water features within the study area as shown in **Figure 10-1**.

- West Brant Syke watercourse rises at Broughton Clays and flows in a north and northeasterly direction for approximately 8.5km to meet the River Brant east of Bassingham. It flows within the study area for a total length of approximately 2.0km and borders the Solar and Energy Storage Park along Fen Lane immediately upstream of its confluence with the River Brant. Based on mapping the watercourse appears heavily modified, straightened and likely to be of artificial character for much of its length.
- Pike Drain rises in the north of the study area at Housham and flows in a northeast direction through Whisby Nature Park and on through North Hykeham where it reaches its confluence with the River Witham at Bracebridge. It has a total length of approximately 9.4km. At this stage the extent of connectivity with the numerous sand and gravel pit lakes within Whisby Nature Park is not known, and this will be determined at the next assessment stage.
- The Mill Dam Dyke rises in the western extent of the Study Area, immediately west of the Site boundary at Morton. It forms from the coalescence of several drains and ditches, and then flows northwest out of the study area towards North Scarle and ultimately drains into the Fleet near Girton. It has a total length of approximately 6.5km.
- Cardinal Dyke is wholly located in the study area adjacent to the southern Grid Connection Corridor option. It rises west of Wellingore and flows west into the River Brant to the east of Bassingham. It is approximately 6.8km in length.
- There are several large sand and gravel pit lakes to the northwest of the Study Area near Thorpe on the Hill including several within Whisby Nature Park. These appear to be important sites for recreation with fishing and sailing usage. There is potential hydrological connectivity to these watercourses via Pike Drain.
- There are a collection of large lakes immediately south of Witham St Hughs within the Study Area. This is located to the west of the Solar and Energy Storage Park. Given the fall of the land here is sloping gently west to east, and decreasing towards the Site boundary, there would not be anticipated to be any potential impacts on these water bodies and they will not be considered further.
- There are two small reservoirs roughly 800m west of Carlton le-Moorland, at NGR SK 89687 58156 and SK 89511 58226. There is no direct hydrological connectivity to these water features and they will also not be considered any further.
- Various small agricultural ponds are situated throughout the Study Area See **Chapter 9: Ecology and Biodiversity** for further details.

## Water Quality

- 10.4.33 Water quality data for the River Witham at Aubourn Bridge, River Brant at Blackmore Bridge, South Hykeham Catchment at South Hykeham headwaters, Dunston Beck at Dunston Beck Spring and Metheringham Beck at Metheringham downstream of a sewage treatment works has been interrogated from the Environment Agency's Water Quality Archive website (Ref. 125). Data has been compared to WFD Environmental Quality Standards (EQS).
- 10.4.34 The water quality within the Witham at Aubourn Bridge is slightly alkaline in nature with an average pH of 8.25, but falls within the threshold for WFD high classification based on data sampled here from 2008 to 2023. A 10<sup>th</sup> percentile dissolved oxygen saturation of 87.78% falls within the high WFD classification (with 70% being high). A 90<sup>th</sup> percentile Biochemical Oxygen Demand (BOD) of 2.1mg/l and ammonia of 0.0017mg/l are both classified as high under WFD (with 4 and 0.3 being high, respectively).
- 10.4.35 Water quality within the River Brant at Blackmore Bridge is slightly alkaline with an average pH of 8.06, but falls within the WFD high classification based on data sampled here from 2000 to 2023. A 10<sup>th</sup> percentile dissolved oxygen saturation of 62.11% falls within the good WFD classification (with 60% being good). A 90<sup>th</sup> percentile of 2.916mg/l and 0.0025mg/l, for BOD and ammonia respectively, fall under the high WFD classifications.
- 10.4.36 Water quality within the South Hykeham Catchment at South Hykeham is slightly alkaline with an average pH of 7.81, but falls within the WFD high classification based on data sampled here from 2012 to 2023. A 10<sup>th</sup> percentile dissolved oxygen saturation of 56.85% falls within the moderate WFD classification (with 54% being moderate). A 90<sup>th</sup> percentile for BOD of 6.98mg/l falls within a moderate WFD classification (with 6.5 being moderate). A 90<sup>th</sup> percentile for ammonia of 0.009mg/l falls within the high WFD classification.
- 10.4.37 Water quality within the Dunston Beck WFD water body at Dunston Beck Spring is slightly alkaline in nature with a pH of 7.7, but falls within the WFD high classification based on data sampled here from 2000 to 2019. A 10<sup>th</sup> percentile dissolved oxygen saturation of 86.8% falls within the WFD high classification. There has been no monitoring of BOD or ammonia at this monitoring location.
- 10.4.38 Water quality within Metheringham Beck at Metheringham Ds Stw is slightly alkaline in nature with an average pH of 7.88, but falls within the WFD high classification based on data sampled here from 2012 to 2023. A 10<sup>th</sup> percentile dissolved oxygen saturation of 63.65% is within the good WFD classification. A 90<sup>th</sup> percentile for BOD of 1.95mg/l and 0.0021mg/l for ammonia both fall within the high WFD classifications.
- 10.4.39 Nitrate and orthophosphate values are somewhat elevated for all monitored sites, and indicates probable pressure from the surrounding agricultural land uses through use of fertilisers and other products which may runoff to the watercourses. Orthophosphate (reactive as P) classifications for the River Brant, River Witham and Metheringham Beck at the aforementioned locations are all within the moderate classification band. Respectively, these locations



had a mean orthophosphate value of 0.49mg/l, 0.389mg/l and 0.575mg/l (with a moderate classification being above 0.222mg/l [River Brant], 0.217mg/l [River Witham] and 0.224mg/l [Metheringham Beck]). The South Hykeham WFD waterbody is within the good classification with a mean value of 0.129mg/l (with a good classification being above 0.097mg/l).

## Water Resources

- 10.4.40 Within the Study Area there is a Drinking Water Protected Area, which is mapped to the east and west of the River Witham. Drinking Water Protected Areas (Surface Water) are where raw water is abstracted from rivers and reservoirs and additional measures are required to protect the raw water supply to reduce the need for additional purification treatment (Ref. 111).
- 10.4.41 No areas of the Proposed Development are located within a drinking water safeguard zone for surface water. Drinking Water Safeguard Zones are established around public water supplies where additional pollution control measures are needed. (Ref. 111).
- 10.4.42 The entirety of the Study Area lies within the Lower Witham Nitrate Vulnerable Zone (NVZ) (Number S375). NVZs are areas designated as being at risk from agricultural nitrate pollution. The designations are made in accordance with the Nitrate Pollution Prevention Regulations 2015 (Ref. 111).
- 10.4.43 Information on pollution incidents, licences and unlicensed water abstractions, and water activity permits (i.e. discharges) will be obtained from the Environment Agency and presented in the PEIR and ES.

## Aquatic ecology and nature conservation sites

- 10.4.44 Statutory sites designated for nature conservation were identified through a review of MAGIC (Ref. 111). The following are located within the Study Area, or within a few kilometres downstream (considered in order of nearest to the Proposed Development):
- Whisby Nature Park (LNR) – Located approximately 1km north of the Solar and Energy Storage Park, the LNR consists of flooded gravel pits, wetlands, scrub woodland and some grassland. The LNR supports various species such as water voles, bats and various species of bird.
  - Swanholme Lakes (SSSI) – The SSSI is located approximately 4.2km northeast of the Solar and Energy Storage Park. There are no known hydrological connections between watercourses flowing through the study area to Swanholme lakes, however, this will be confirmed at the next assessment stage. The site is designated for the diversity of ecology resulting from unpolluted water and range of physical and chemical conditions. The area supports several uncommon species of submerged plants and an outstanding community of breeding dragonflies, as well as various other fauna. The SSSI is outside of the operational catchment zones contained within the Proposed Development, although is downstream from the confluence between the River Witham and Brant. There is potential for hydrological links between the Proposed Development and SSSI site.

## Groundwater

### Hydrogeology

- 10.4.45 There is an approximately north-south geological boundary with Scunthorpe Mudstone (Mudstone and Limestone interbedded) Formation Group, which is designated a Secondary B aquifer and Charmouth Mudstone Formation Group, also a Secondary B aquifer to the west, and Lincolnshire Limestone, a Principal aquifer to the east (Ref. 112).
- 10.4.46 The overlying superficial deposits which include the river terrace deposits, alluvial deposits, Balderton Sand and Gravel Member and the Fulbeck Sand and Gravel Member are designated as Secondary A aquifers, whilst the Head (clay, silt, sand and gravel) deposits south of Wellingore is designated as a Secondary (undifferentiated) aquifer.
- 10.4.47 Principal aquifers comprise layers that have high permeability, meaning they usually provide a high level of water storage and transmission. They typically support public / private water supply and/or river baseflow on a strategic scale.
- 10.4.48 Secondary A aquifers comprise permeable layers that can support local water supplies, and may form an important source of baseflow to rivers.
- 10.4.49 Secondary B aquifers comprise predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.
- 10.4.50 Secondary undifferentiated aquifer has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
- 10.4.51 No site specific ground investigation information is currently available at this stage, however a review of selected BGS borehole records available on the Geoindex website was undertaken (Ref. 114). The borehole logs indicates that shallow groundwater at depths of 2 to 3m below ground level (bgl) is likely to present in the area, particularly in the river valleys and where the permeable superficial deposits are encountered. The depth to groundwater in the underlying bedrocks is currently unknown, however depending on the depths of excavations proposed for the Proposed Development, this may or may not be encountered.

### WFD Groundwater Bodies

- 10.4.52 The Proposed Development is mostly located within the Anglian (WFD groundwater) Management Catchment. However, the northernmost section of the Solar and Energy Storage Park lies within the Humber (WFD groundwater) Management Catchment. The Study Area is underlain by three groundwater water bodies (see also **Figure 10-2**):

- Witham Lias (WFD ID: GB40502G401400);
- Witham Limestone Unit A (WFD ID: GB40501G444800); and

- Trent Lower Erewash – Secondary Combined (WFD ID: GB40402G990300).

10.4.53 The Witham Lias (WFD ID: GB40502G401400) generally covers the area west of the A607 from Waddington to William St Hughs and Thorpe on the Hill (see **Figure 10-2**). It has a surface area of 683.6km<sup>2</sup>. This has an overall classification of good (cycle 2 classification) with all classification elements being good.

10.4.54 The Witham Limestone Unit A (WFD ID: GB40501G444800) generally covers the area east of the A607 and Waddington and stretches towards the villages of Dunston and Metheringham, as shown on **Figure 10-2**. The groundwater body has an overall classification of poor (cycle 2 classification) with both quantitative elements and chemical status being poor. From 2013-2019 the Quantitative Dependent Surface Water Body Status is designated as poor, as well as Quantitative Water Balance being poor between 2015-2016. The General Chemical Test was classified as poor between the 2013-2019 period. The waterbody has an overall waterbody objective of poor by 2015, and was not higher due to being disproportionately expensive and technically infeasible. However, the waterbody has an objective of good status by 2027 for Quantitative Elements. The reasons for not achieving good status are poor nutrient management and groundwater abstraction.

10.4.55 The Trent Lower Erewash – Secondary Combined (WFD ID: GB40402G990300) covers the far west of the Study Area, around the village of Morton and generally west of the A46. This has an overall cycle 2 classification of good for 2019 for both Quantitative elements and Chemical Status.

### Groundwater Resources

10.4.56 Groundwater Source Protection Zones (SPZs) are defined zones centred on groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution to the source and surrounding area. The closer the activity to the source, the greater the risk. The SPZs are subdivided into 3 Zones; where Zone 1 is the Inner Protection Zone, Zone 2 is the Outer Protection Zone and Zone 3 is the Total catchment.

10.4.57 There is an area of SPZ 3, total catchment in the northeast of the Study Area. Also, there is a small area of SPZ 1 – Inner Source Protection Zone east of the A15. This is outside of the Grid Connection Corridor but lies within the Study Area. These relate to abstraction in the Lincolnshire Limestone Principal aquifer (Ref. 111). Details of abstractions will be requested from the Environment Agency to inform the impact assessment.

- SPZ 3 (Total Catchment) is defined as the area around a supply source within which all the groundwater ends up at the abstraction point. This is the point from where the water is taken. This could extend some distance from the source point.
- SPZ 1 (Inner Catchment) is defined by a 50 day travel time of pollutant to source with a 50 metres default minimum radius.

10.4.58 There is a drinking water safeguard zone (surface water) in the Study Area (Ref. 129) in the Study Area, located around the River Witham (conf Cringle Bk to conf Brant). This is currently considered not at risk.

## 10.5 Potential Effects and Mitigation

### Construction and Decommissioning

10.5.1 A number of activities during the construction and decommissioning phases are likely to generate impacts which have the potential to affect the water environment, if unmitigated.

10.5.2 The greatest risk of adverse impacts during construction and decommissioning are in the following six WFD catchments: Witham from Cringle Bk to Brant Lower, Witham from confluence with Brant to confluence with Catchwater Drain, Brant Lower, South Hykeham, Dunston Beck and Metheringham Beck which may be directly affected by the Proposed Development.

10.5.3 During construction the following adverse impacts may occur:

- Pollution of surface water or groundwater (and any designated ecology sites that are water dependent) due to deposition or spillage of soils, sediments, oils, fuels, or other construction chemicals, or through uncontrolled site run-off including dewatering of excavations or piling;
- Temporary impacts on the hydromorphology of watercourses from open-cut watercourse crossings or temporary vehicle access crossings as may be required;
- Temporary changes in flood risk from changes in surface water runoff (e.g. disruption of stream flows during any potential culvert construction works), and exacerbation of localised flooding, due to deposition of silt, sediment in drains, ditches; and changes; and
- Potential impacts on groundwater resources and local water supplies (licenced and unlicenced abstractions) and potentially the baseflow to watercourses from temporary dewatering of excavations or changes in hydrology.

10.5.4 The Proposed Development includes the construction of a Grid Connection Corridor to join the Solar and Energy Storage Park to a National Grid substation.

10.5.5 If laid underground, this will necessitate the crossing of watercourses and drainage ditches in the area. The construction of cables crossing watercourses has the potential to result in modifications to WFD water bodies. Some of these may be temporary, such as to provide field access across watercourses or for an open-cut excavation of the channel for the installation of the new cables.

10.5.6 There may be crossings of the more significant sized water bodies by non-intrusive trenchless techniques (e.g. HDD) at a suitable depth beneath the bed level to avoid the risk of future exposure by scour of the bed (typically cables

will be at least 1.5m below the bed of a watercourse). It is also possible that watercourse crossings (or modifications to existing crossings) are required as part of works to solar infrastructure. For any other crossings it is likely that an open cut method would be used. Crossings of other drainage features would be risk assessed on a case by case basis. During decommissioning, potential impacts would be similar to the construction phase although it is anticipated that the power cables would be left in situ beneath watercourses and there would be less excavation works required close to watercourses.

## Operation

10.5.7 During the operational phase, the following adverse impacts may occur:

- Impacts on water quality in watercourses and groundwater from run-off and the potential for accidental spillages from new permanent hardstanding and maintenance activities, assuming surface water run-off does ultimately drain to a surface watercourse rather than simply to ground;
- Potential for impact on groundwater or surface water from firewater runoff in the event of a fire in the battery storage areas;
- Potential impacts on hydrology as a result of the Proposed Development. This may also have a subsequent effect on aquatic habitats and water-dependent nature conservation sites;
- Potential for permanent physical impacts to watercourses if crossings are required for access and depending on the design of the structure used;
- Potential impacts on the rate and volumes of surface water run-off entering local watercourses and increasing the risk of flooding;
- Potential for impact of foul drainage / water supply in the area due to the offices / maintenance facilities required as part of the Proposed Development and/or requirement for regular panel cleaning;
- The current arable fields are likely treated with fertiliser and pesticides. During the life of the project the use of such chemicals will be ceased which could lead to beneficial impacts on the water environment; and
- Potential impacts on groundwater resources and local water supplies, which may include reduced irrigation demands.

10.5.8 Due to the potential for impacts and effects on water receptors and resources by the Proposed Development, a full Water Environment Impact Assessment will be included in the ES. This will also be supported by a Surface Water Drainage Strategy, a FRA and a WFD Assessment. The scope for these assessments and how the significance of effects will be determined is described in the following section.

## 10.6 Assessment Methodology

### Water Quality and Resource Assessment

10.6.1 Relevant data will be requested and obtained from the Environment Agency. A Site Walkover Survey will be undertaken during the PEIR stage of the

assessment, which would be undertaken by a hydromorphologist and a water resources specialist. This will be to observe surface water features in the Study Area and to make observations about their current condition and character, the presence of existing risks and any potential pathways for construction, operation and decommissioning impacts as a result of the Proposed Development. Further site surveys may be required as the Proposed Development progresses. However, no water quality sampling is proposed as it is not considered necessary to inform the determination of water feature importance or inform the impact assessment, which adopts a qualitative risk based approach.

- 10.6.2 A qualitative assessment of potential effects on surface water quality from construction, operation and decommissioning of the Proposed Development will be undertaken. This will consider the risk to surface water bodies resulting from construction, decommissioning works or future operation activity using a source-pathway-receptor approach. Where there is a risk of pollution, mitigation measures will be described with reference to best practice guidance (e.g. Guidance on Pollution Prevention Notes and Construction Industry Research and Information Association guidance).
- 10.6.3 The appropriateness of the surface water drainage measures in terms of providing adequate treatment of diffuse pollutants will be assessed with reference to the Simple Index Assessment method described in the SuDS Manual (Ref. 130). The Simple Index Approach follows three steps:
- Step 1 – Determine suitable pollution hazard indices for the land use(s);
  - Step 2 – Select SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index (for three key types of pollutants - total suspended solids, heavy metals and hydrocarbons). Only 50% efficiency should be applied to second, third etc. treatment train components; and
  - Step 3 – If the discharge is to a water body protected for drinking water, consider a more precautionary approach.
- 10.6.4 The SuDS Manual (Ref. 130) only provides a limited number of land use types and so those selected will be the most suitable for the components of the Proposed Development, based on professional judgement. Where more than one pollution hazard category applies to a component of the Proposed Development, the worst pollution hazard will be selected.
- 10.6.5 As part of the groundwater assessment a groundwater risk analysis would be undertaken of each location where there be a watercourse crossing. This would compare the likely depth of excavation with available estimates of groundwater level at each location.

## Hydromorphology and Water Framework Directive Assessment

- 10.6.6 Due to the potential impacts upon WFD designated water bodies, initially a Screening and Scoping WFD Assessment will be undertaken in keeping with PINS Advice Note 18: The Water Framework Directive (Ref. 51) This assessment would be undertaken at the PEIR stage. The assessment would determine the potential for any non-compliance of the Proposed Development

with WFD objectives for affected water bodies, using readily available information and site observations. This will include a qualitative examination of the potential construction, operation and decommissioning phase impacts of the Proposed Development on relevant WFD hydromorphological, biological and physio-chemical parameters. Depending on the outcomes of the preliminary assessment, more detailed investigations may be required, which will be determined in consultation with the Environment Agency.

## Surface Water Drainage Strategy

- 10.6.7 The design of drainage systems aims to ensure that there will be no significant increases in flood risk downstream, during storms up to and including the 1 in 100 (1%) annual probability design flood, with an allowance for climate change.
- 10.6.8 A Surface Water Drainage Strategy will be undertaken to ensure the risk of surface water flooding is not increased as a result of the Proposed Development, and any increased land take for foundations and any access roads.
- 10.6.9 Careful consideration of the SuDS features, in-keeping with local planning policy and through liaison with the LLFA, the IDB and Environment Agency, will be undertaken to ensure that the Surface Water Drainage Strategy adequately attenuates and treats runoff from the Proposed Development, whilst not increasing flood risk to the site and surrounding areas.
- 10.6.10 In accordance with planning policy and general good practice, mitigation will be provided by restricting surface water discharge rates and providing on-site attenuation, primarily via SuDS, such as Rural SuDS (RSuDS) techniques or other appropriate solutions.
- 10.6.11 A water quality risk assessment of all solar infrastructure will be undertaken using the Simple Index Approach described in the SuDS Manual (2nd edition) (Ref. 130). This will inform what, if any treatment measures are required to manage the risk from diffuse urban runoff to watercourses or ground.

## Flood Risk Assessment

- 10.6.12 A FRA will be prepared to review the current and future flood risk to the Study Area from all sources (including surface water, groundwater, tidal and fluvial sources), in-keeping primarily with the NPS and also in accordance with NPPF guidance, to inform the Proposed Development design and set out any proposed mitigation requirements that are to be addressed within the Surface Water Drainage Strategy.
- 10.6.13 The NPPF classifies solar farms as Essential Infrastructure (Annex 3). This classification is acceptable within Flood Zone 1 with regards to not requiring the Exception Test. Cable routes are not generally considered in long term flood risk terms, other than temporary works during installation, as the cables would be buried with no above ground infrastructure required to impact flood risk in the long term. The FRA will assess flood risk during construction; mitigation and construction methods will also be captured in the Outline CEMP and Outline DEMP. However, the approach to the Sequential and Exception

Tests for the Grid Connection Corridor will be clarified with the Environment Agency and the LLFA as required, with due consideration for the NPPF and NPS (including Draft NPS) policies.

10.6.14 Part of the Scoping Boundary lies within a significant flood storage area associated with the Lincoln Flood Alleviation Scheme. Liaison with the Environment Agency will be undertaken to discuss the impacts of the Proposed Development to ensure no increase in flood risk will occur as a result of the Proposed Development.

10.6.15 Where development is to take place within areas at risk of flooding, there may be a requirement for fluvial modelling and the construction of flood compensation or mitigation measures to ensure no detrimental effect to flooding potential within or from the affected watercourse in the catchment once the Proposed Development is operational. This will involve discussions with the Environment Agency and the LLFA / IDBs. The conclusions of this will be referred to within the flood risk, drainage and surface water assessment presented in the ES. The FRA will be a technical appendix to the ES.

10.6.16 However, above ground infrastructure and solar PV panels in the Solar and Energy Storage Park will be located away from areas at risk of fluvial flooding where possible and mitigated within areas at risk of surface water flooding and from any other identified source of flood risk.

10.6.17 Any impacts identified through the FRA, during either construction or operation phases, will be evaluated for the impact assessment presented in the ES and an effect significance value attributed to each impact in accordance with the methodology outline in this chapter. The impact assessment only considers the potential impact of the Proposed Development on flood risk, not the suitability of the Proposed Development in the context of flood risk acting on the site. The FRA will consider the flood risk to the Proposed Development.

## Assessment of Effect Significance

10.6.18 The impact assessment will be based on a source-pathway-receptor model. For an impact on the water environment to exist the following is required:

- An impact source (such as the release of polluting chemicals, particulate matter, or biological materials that cause harm or discomfort to humans or other living organisms, or the loss or damage to all or part of a water body);
- A receptor that is sensitive to that impact (i.e. water bodies and the services they support); and
- A pathway by which the two are linked.

10.6.19 Once an impact has been identified and assessed, the effect category will be determined with reference to the criteria set out within the Design Manual for Roads and Bridges LA113 (Ref. 131).

10.6.20 This can be applied to all development types and represents the most robust and nationally accepted criteria for the determination of potential effects on the water environment.



10.6.21 The criteria will be adapted where required to take account of hydromorphological impacts and the full range of flood risks. Impacts and effects will be categorised as adverse / beneficial, direct / indirect, temporary / permanent and short term or long term, as per the methodology described in **Chapter 6: EIA Methodology** of this Scoping Report. After embedded mitigation measures, any additional mitigation measures are taken into account, and residual effects are those effects which are still predicted to potentially take place. Effects that are moderate or greater will be considered significant.

## 10.7 Elements Scoped Out

10.7.1 No elements have been scoped out at this stage. However, this will be reviewed at the PEIR stage, when further design detail is available for the Proposed Development.

## 10.8 Assumptions, Limitations and Uncertainties

10.8.1 The assessment of potential effects is currently based on the description of the Proposed Development set out in **Chapter 2: Site Description and Context** of this Scoping Report.

10.8.2 The final routes for the Grid Connection Corridor, and the construction methodologies and mitigation, have not yet been determined. This is of particular importance when considering impacts associated with the watercourse crossings, the quality of surface water runoff, impacts to hydromorphology and channel hydraulics.

10.8.3 Flood risk receptors considered in this assessment will include existing infrastructure assets, residential buildings, commercial buildings, agricultural land, and property potentially affected by the Proposed Development.

10.8.4 Details on construction methodologies are not yet available. It is assumed that solar PV panels will be off set from watercourses by a by a minimum of 10m measured from the centre line of narrow watercourse channels (i.e. typically 2-5m wide) and from the bank edge of watercourses with a wider channel with (as bank top is a variable feature). The purpose of this buffer reduces the risk of any pollutants entering the watercourse directly or direct physical impacts, whilst also providing space for mitigation measures (e.g. fabric silt fences) should they be required as identified at the PEIR and ES stages.

10.8.5 The locations of private water supplies and licenced abstractions have not yet been obtained, and so these are not included as receptors at this time. Water activity permits (i.e. permitted discharges) are also not yet known in detail and have not been considered in the current baseline. These receptors and water feature attributes will be considered at the PEIR stage.

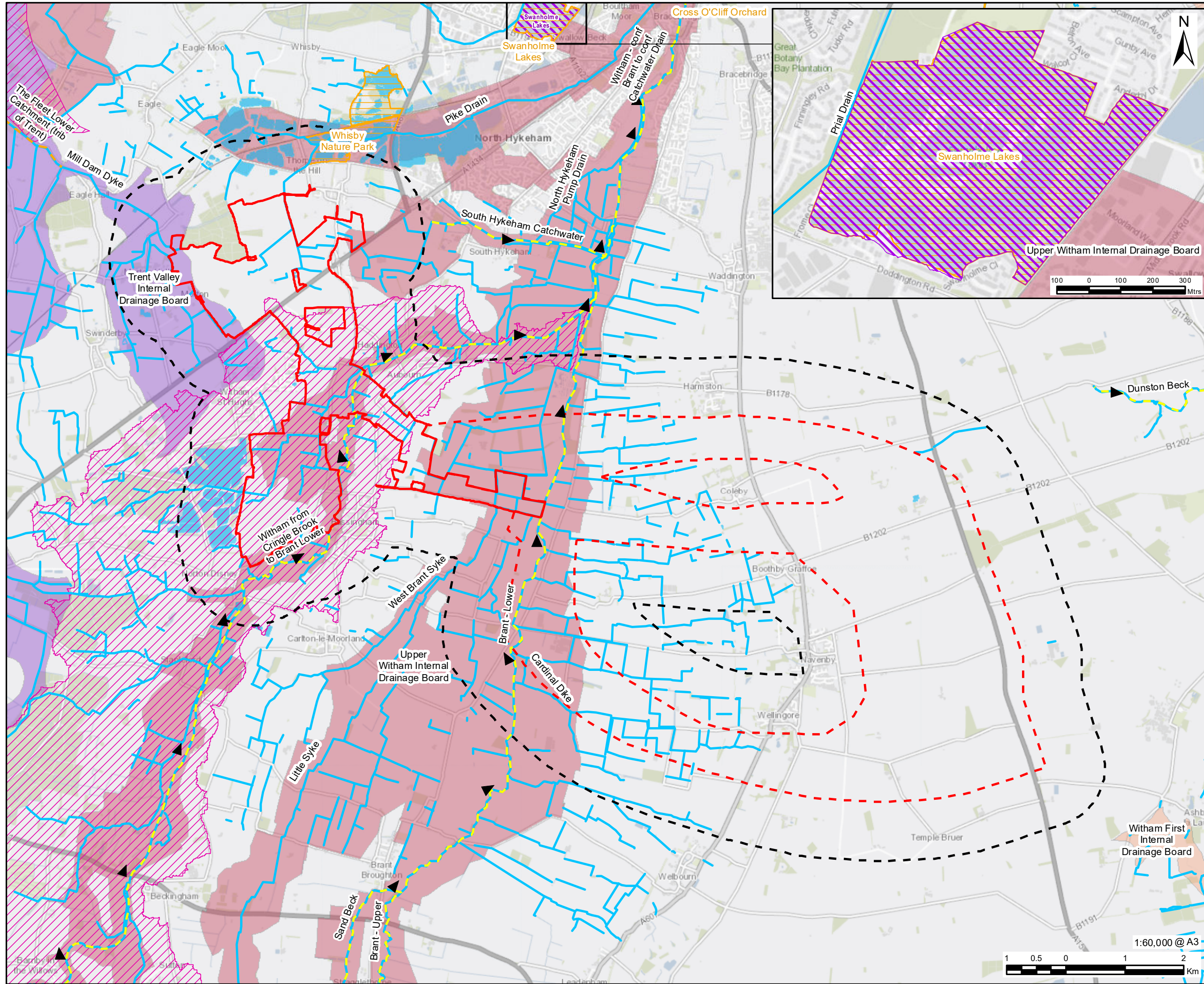
10.8.6 Requirements for hydraulic modelling of watercourses will be discussed with the Environment Agency / LLFA; any modelling required will be undertaken as part of the ES to inform the FRA and Surface Water Drainage Strategy.

10.8.7 Visual surveys will be undertaken of accessible water/drainage features to inform the Surface Water Drainage Strategy, impact assessment and WFD

assessment. However, it may not be possible to survey all significant locations (such as crossing locations) or structures due to access constraints or visibility issues (e.g. dense vegetation). Where this is the case, we will attempt to survey close to the area of interest and use data from that as a proxy. In addition, some watercourses may be small, ephemeral and flow only intermittently, and these may not be identified in the field or observed when flowing.

- 10.8.8 It is considered that given the nature of the Proposed Development, having a relatively light footprint and limited ground works, it does not warrant a water quality monitoring programme at this stage. The nature of water features within the Study Area are generally minor comprising small ponds and ditches. Water quality of the more significant watercourses such as the River Brant and River Witham will be determined with reference to background water quality data from routine Environment Agency monitoring. Importance of water features will be determined from a holistic review of water body features and does not rely on water quality due to the principle that no controlled water may be polluted (i.e. regardless of the existing water quality there should be no additional pollution as a result of the Proposed Development). Background water quality data is available for a number of locations on the Environment Agency Water Quality Archive website. Furthermore, water quality impacts are determined based on a risk assessment that does not require input of raw background water quality data. Water quality monitoring is also only effective when there is a clear purpose for it and may require monitoring over a long period of time to ensure reliable and robust results.
- 10.8.9 Other than the site walkover survey, the FRA and Surface Water Drainage Strategy will be based on desktop surveys and best available site layout proposals. Where available, topographical data will be used to support the FRA. In the absence of topographical data, LiDAR data will be used to inform the FRA and the Surface Water Drainage Strategy.
- 10.8.10 Temporary works will not be assessed unless they are of a potentially significant scale and have the potential to adversely affect flood risk or impact the quality or form of water bodies. The temporary works where such risks are considered significant (for example, excavations for the cable routes, if it is laid underground), will be identified and assessed within the FRA, extended Screening and Scoping WFD Assessment and impact assessment.
- 10.8.11 As part of the full environmental impact assessment, the risk from surface water drainage to surface or groundwater bodies will be assessed according to the Simple Index Approach presented in the C753 The SuDS Manual (Ref. 130). Given the very low risk the need for treatment measures is expected to be minimal. Given the availability of space it is not anticipated that there would be any issues providing any treatment of diffuse pollutants, should the Simple Index Approach assessment identify such a need.
- 10.8.12 At the time of writing, it is not confirmed how any wastewater generated from the Proposed Development will be managed. Options may include connecting to the nearest available public sewer or a self-contained independent non-mains domestic storage and / or treatment system. The alternative where this is not possible, would be for a self-contained foul drainage system to a septic

tank or similar. These tanks would be regularly emptied under contract with a registered recycling and waste management contractor.



**PROJECT**  
Fosse Green Energy

**CLIENT**  
Fosse Green Energy Ltd

**CONSULTANT**  
AECOM Limited  
2 City Walk  
Holbeck, Leeds  
LS11 9AR  
www.aecom.com

- LEGEND**
- Solar and Energy Storage Park
  - Grid Connection Corridor Options
  - 1km Study Area
  - Ordinary Watercourse
  - Flow Direction
  - Local Nature Reserve (LNR)
  - Site of Special Scientific Interest (SSSI)
  - Drinking Water Protected Area
- Internal Drainage Boards**
- Trent Valley Internal Drainage Board
  - Upper Witham Internal Drainage Board
  - Witham First Internal Drainage Board
- WFD Surface Waterbody Status**
- Moderate Heavily Modified
  - Poor Not Designated A/HMWB

The entire study area is within a Nitrate Vulnerable Zone.

**NOTES**

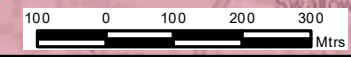
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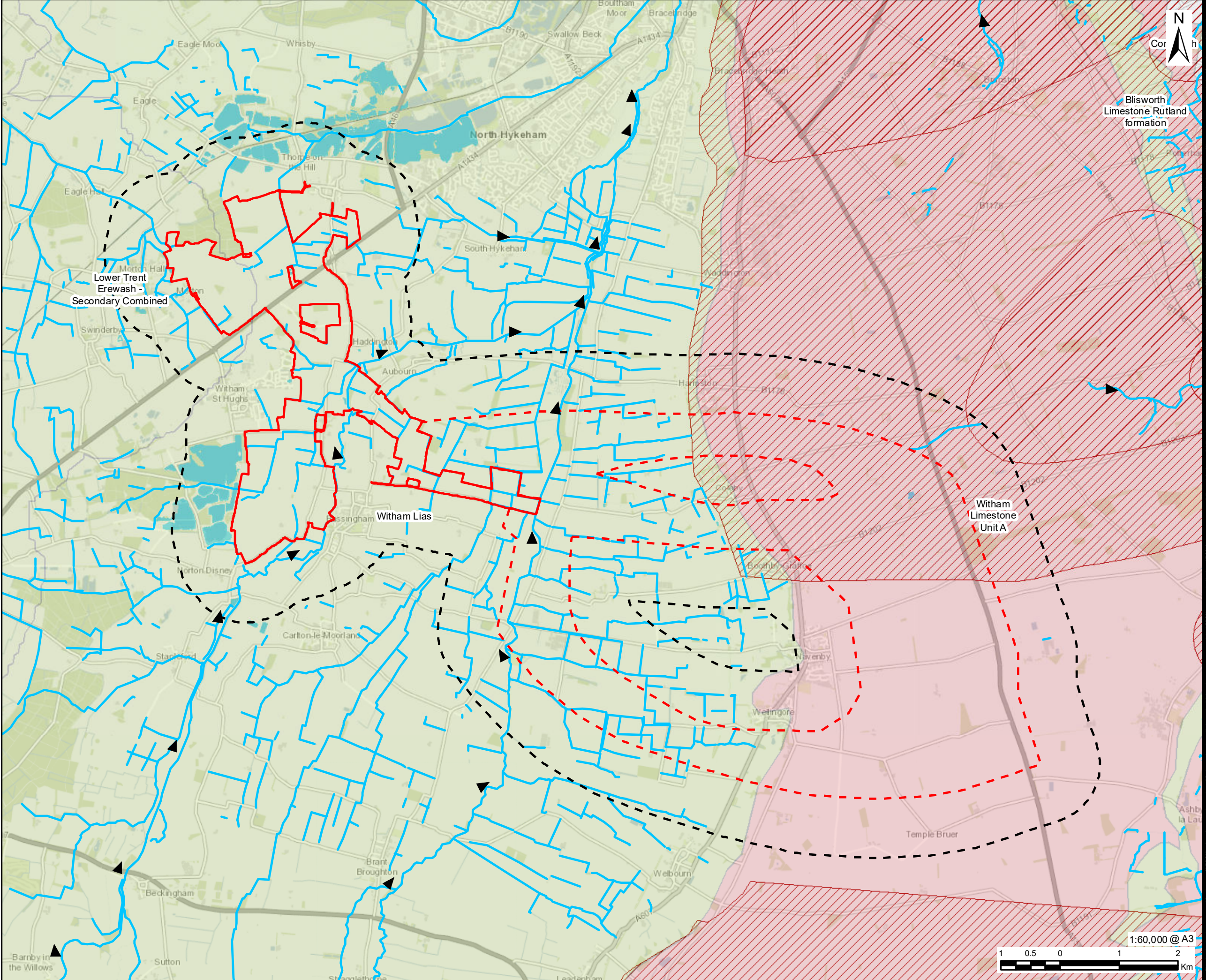
**FIGURE TITLE**  
Surface Water Features and their Attributes

**FIGURE NUMBER**  
Figure 10-1



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**PROJECT**  
Fosse Green Energy

**CLIENT**  
Fosse Green Energy Ltd

**CONSULTANT**  
AECOM Limited  
2 City Walk  
Holbeck, Leeds  
LS11 9AR  
www.aecom.com

- LEGEND**
- Solar and Energy Storage Park
  - Grid Connection Corridor Options
  - 1km Study Area
  - Ordinary Watercourse
  - Flow Direction
  - Groundwater Source Protection Zone (SPZ)
  - WFD Groundwater Body Classifications (2019)
    - Good
    - Poor

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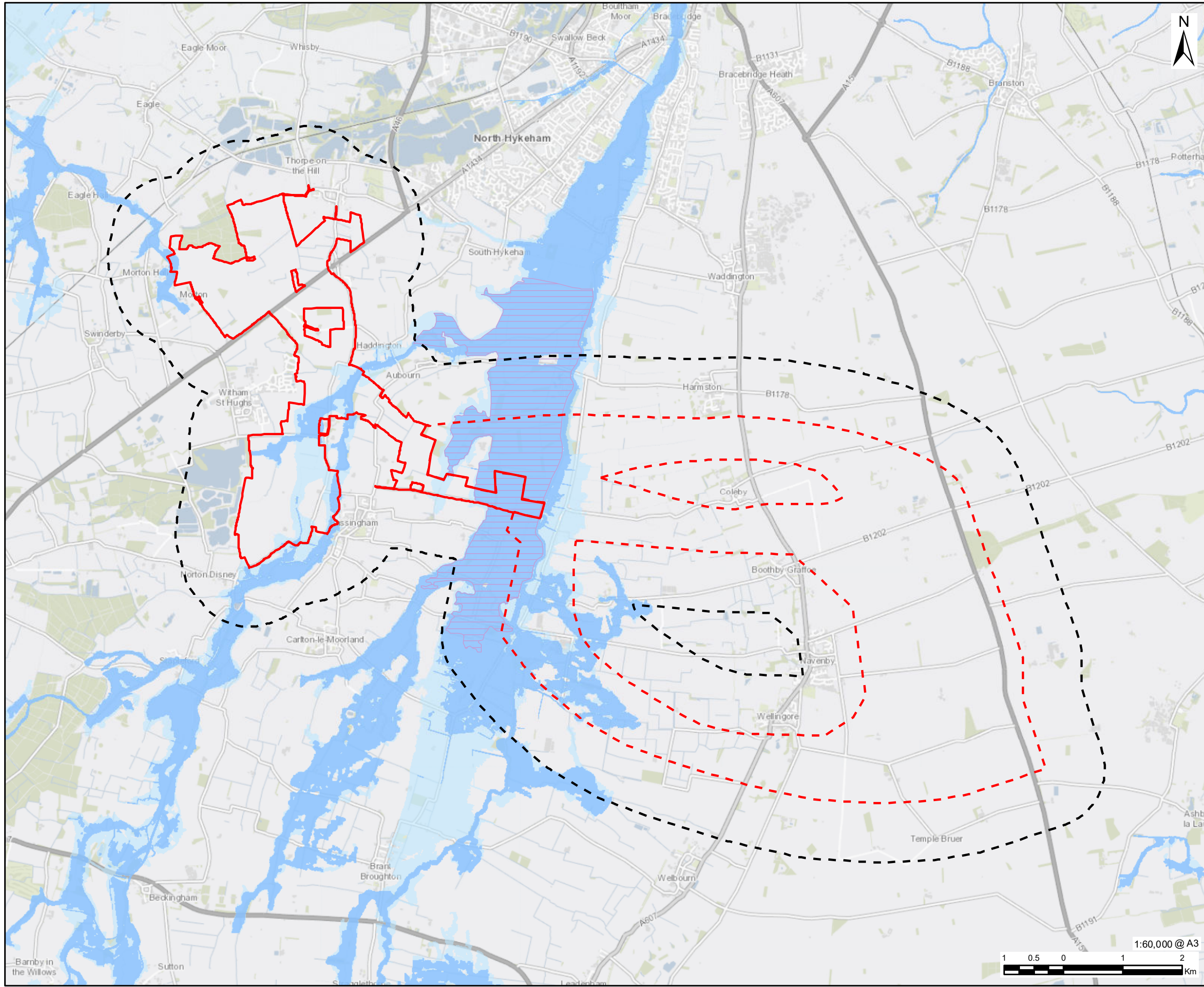
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**FIGURE TITLE**  
Groundwater Features and their Attributes

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# AECOM

**PROJECT**  
Fosse Green Energy

**CLIENT**  
Fosse Green Energy Ltd

**CONSULTANT**  
AECOM Limited  
Sunley House  
4 Bedford Park  
Surrey, CR0 2AP, UK  
www.aecom.com

- LEGEND**
- Solar and Energy Storage Park
  - Grid Connection Corridor Options
  - 1km Study Area
  - Flood Storage Area
  - Flood Zone 3
  - Flood Zone 2

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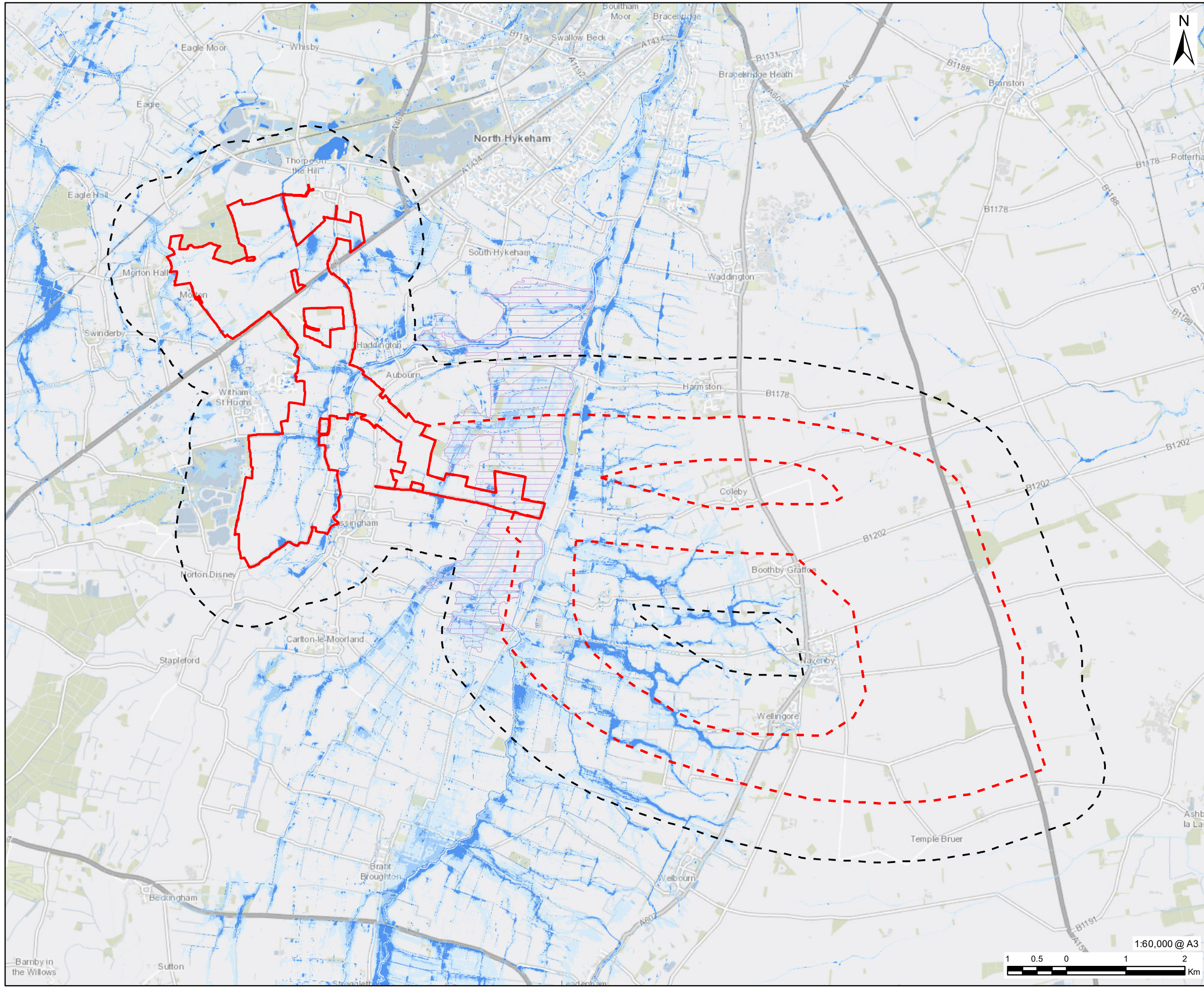
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**FIGURE TITLE**  
Fluvial Flood Risk

**FIGURE NUMBER**  
Figure 10-3



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**PROJECT**  
Fosse Green Energy

**CLIENT**  
Fosse Green Energy Ltd

**CONSULTANT**  
AECOM Limited  
Sunley House  
4 Bedford Park  
Surrey, CR0 2AP, UK  
www.aecom.com

- LEGEND**
- Solar and Energy Storage Park
  - Grid Connection Corridor Options
  - 1km Study Area
  - 3.33% Annual Exceedance Probability (AEP)
  - 1% Annual Exceedance Probability (AEP)
  - 0.1% Annual Exceedance Probability (AEP)
  - Flood Storage Area

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**FIGURE TITLE**  
Surface Water Flood Risk

**FIGURE NUMBER**  
Figure 10-4



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# 11. Landscape and Visual Amenity

## 11.1 Introduction

- 11.1.1 This chapter sets out the landscape and visual matters which will be addressed within the ES and provides an overview of the landscape and visual impact assessment (LVIA) methodology.
- 11.1.2 Landscape effects relate to changes to the landscape as a resource, including physical changes to the fabric or individual elements of the landscape, its aesthetic or perceptual qualities, and landscape character.
- 11.1.3 Visual effects relate to changes to existing views of identified visual receptors (people), from the loss or addition of features within their view due to the Proposed Development.
- 11.1.4 The LVIA will be undertaken in accordance with the Guidelines for Landscape and Visual Impact Assessment, Third Edition, 2013 (GLVIA 3) (Ref. 183) and with reference to other environmental topics, including Ecology and Cultural Heritage, and other reports including the Arboricultural and Glint and Glare Assessment.

## 11.2 Study Area

- 11.2.1 In accordance with GLVIA 3 (Ref. 183), the study area will include *“the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner”*. GLVIA 3 explains that this will *“usually be based on the extent of Landscape Character Areas likely to be significantly affected... [or be based] on the extent of the area from which the development is potentially visible... or a combination of the two”*.
- 11.2.2 GLVIA 3 sets out that at the scoping stage the study area will be preliminary and may change as more detailed analysis is undertaken, discussion with Local Parish Authorities (LPAs) is undertaken and the design of the Proposed Development progresses. As the design of the Proposed Development evolves, the study area to be used for the LVIA may need to be refined to ensure all works, including temporary areas required for construction and permanent infrastructure, are included. The maximum parameters of these, in terms of height and location, will be determined as the Proposed Development design develops, taking into account environmental and technical factors. A reasonable worst case will be assessed and presented in the ES.
- 11.2.3 Based on the desk based review undertaken to date, and the fieldwork undertaken in April 2023, the extent of visibility of the Proposed Development will vary in different directions, dependent on surrounding landform, woodland, field boundaries, roadside vegetation and built features. The preliminary study area relating to the Solar and Energy Storage Park therefore extends up to 2km from its boundary to cover:
- Land between Swinderby, Eagle and North Hykeham in the north; and



- Land between Stapleford, Carlton le Moorland and South Hykeham in the south.
- 11.2.4 Although the Proposed Development may be visible beyond 2km, it is unlikely to result in any notable change to people's views given the intervening distance, vegetation, built form and overall visibility.
- 11.2.5 The study area will also cover land up to 500m from the potential connection corridors. In the event that the option of an overhead line, as set out in Section 3, forms part of the Proposed Development, the study area will be increased through consultation with LPAs to an extent defined by the potential for the overhead lines and associated infrastructure to have significant effects on landscape character and visual amenity.
- 11.2.6 The extent of the LVIA study area will be reviewed throughout the iterative design process, informed by ongoing desk based research and field based analysis during winter and summer conditions, to account for when deciduous vegetation is not in leaf. The extent of the LVIA study area will be consulted upon with the LPAs and the justification for its final extent provided in the ES.

## 11.3 Planning Policy Context and Guidance

- 11.3.1 This section sets out the planning policy and guidance which relates to landscape character and visual amenity, and is pertinent to the Proposed Development.

### National Planning Policy

#### National Policy Statements

- 11.3.2 NPS EN-1 (Ref. 6) section 1.7, which identifies new energy infrastructure is likely to have some negative effects on landscape and visual amenity. The following paragraphs are of particular relevance to the LVIA:
- paragraphs 4.5.1 to 4.5.3, which outline the requirements of high-quality design, including the aesthetic, functionality, fitness for purpose and sustainability of the Proposed Development, and noting “*good design in terms of siting relative to existing landscape character, landform and vegetation*”.
  - paragraphs 5.9.5 to 5.9.8, which set out the requirements for a landscape and visual impact assessment;
  - paragraph 5.9.14 which sets out the importance of landscape character assessments in LVIAs;
  - paragraphs 5.9.14 to 5.9.17, which set out how local landscape designations should be considered, and the requirement to consider whether the Proposed Development has been designed to minimise harm to the landscape;
  - paragraph 5.9.18, which sets out that energy infrastructure is likely to have visual effects for many visual receptors; and

- paragraph 5.9.21 to 5.9.23 outlines methods for minimising adverse effects, including “*siting of infrastructure, colours and materials, landscaping schemes and building design.*”
- 11.3.3 NPS EN-3 (Ref. 39), notably paragraph 2.4.2 which states that “*proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity*”.
- 11.3.4 NPS EN-5 (Ref. 5), notably paragraph 2.2.5 which sets out that consideration should be given to the location of substations to account for topography and the possibility of screening.

### **Draft National Policy Statements**

- 11.3.5 The Draft Overarching National Policy Statements were issued for consultation in March 2023 to identify whether the revised documents are fit for purpose. It is anticipated that these documents will be adopted by the time that the DCO Application is submitted. Emerging NPS EN-1, EN-3 and EN-5 will therefore be reviewed and considered during the production of the ES.
- 11.3.6 In the Draft NPS EN-3, policy relevant to landscape, visual and residential impacts of Solar Photovoltaic Generation are set out in Paragraphs 3.10.84 – 3.10.92.

### **National Planning Policy Framework**

- 11.3.7 The NPPF, July 2021 (Ref. 61) does not contain specific policies for nationally significant infrastructure projects, however the following paragraphs are of relevance to landscape and visual matters:
- Paragraph 100 in respect of protecting and enhancing PRoW;
  - Paragraph 130 which requires development to be sympathetic to local character and setting;
  - Paragraph 174 in relation to conservation and enhancing the natural environment; and
  - Paragraph 185 in relation to development that is appropriate for its location taking account of effects and mitigation.
- 11.3.8 The Government’s Department for Levelling Up, Housing and Communities published a consultation draft of a revised NPPF in 2022. Other than the paragraph numbering, the consultation draft does not amend the paragraphs listed above

## **National Guidance**

### **Planning Practice Guidance**

- 11.3.9 Reference will be made to the following Planning Practice Guidance (PPG) through the LVIA and design process:
- PPG, Natural Environment, paragraph 37 (Ref. 68), which sets out the benefits of landscape character assessments and the importance of considering green infrastructure in the early stages of schemes.

- PPG, Renewable and Low Carbon Energy (Ref. 69), which sets out that planning has an important role in the delivery of new renewable and low carbon energy infrastructure. The PPG identifies several LVIA considerations, including visual impact, mitigation through screening and glint and glare.

## Local Planning Policy

11.3.10 Adopted in April 2023, the Central Lincolnshire Local Plan (Ref. 195) contains planning policies to guide development across Central Lincolnshire. The proposals and LVIA will have regard to the following policies:

- Policy S14: Renewable Energy
- Policy S53: Design and Amenity
- Policy S58: Protecting Lincoln, Gainsborough and Sleaford's Setting and Character
- Policy S59: Green and Blue Infrastructure Network
- Policy S60: Protecting Biodiversity and Geodiversity
- Policy S61: Biodiversity Opportunity and Delivering Measurable Net Gains
- Policy S62: Area of Outstanding Natural Beauty and Areas of Great Landscape Value
- Policy S63: Green Wedges
- Policy S66: Trees, Woodland and Hedgerows

## Neighbourhood Plans

11.3.11 The LVIA will also have regard to the following neighbourhood plans:

- Thorpe on the Hill (Made Plan), noting Policy 5: Landscape and Views (Ref. 84);
- Basingham (Made Plan), noting Policy ES4: Landscape and Countryside Surrounding the Village (Ref. 86); and
- Swinderby (drafting in progress).

## 11.4 Baseline Conditions

11.4.1 This section provides an overview of the landscape and visual features and characteristics across the preliminary LVIA study area.

### Landscape Context

#### Landform and Hydrology

11.4.2 At the broad landscape scale, the study area occupies part of a lowland landscape defined by the River Trent (over 7km west of the Site) and River Witham that run north/south between the Southern Lincolnshire Edge to the east, and the sandstone hills of Sherwood to the west. As such the study area is mostly level and low lying, with local undulations as described below.

- 11.4.3 The northern part of the study area, located north of the Site, comprises a shallow valley between Thorpe on the Hill and Tuman Wood in the south, at a height of approximately 25m AOD, and Eagle Road in the north which follows a minor ridge at a height of approximately 30m AOD. The base of the shallow valley comprises a series of waterbodies, formed from disused gravel pits, which are part of a wider network that form part of the Whisby Nature Park, extending east towards North Hykeham. A series of field drains (ditches) are set out in a rectilinear network, following field boundaries.
- 11.4.4 The central part of the study area comprises the Solar and Energy Storage Park and adjacent land, extending approximately 2km to the east and west. The River Witham crosses the central part of the study area, broadly from north east to south west. The River Witham marks the lowest topographical point in the study area. Land to the north west rises towards a series of local high points, broadly following the A46 towards North Hykeham. Land east of the River Witham is low lying and crossed by the River Brant. East of the River Brant the land remains level at c.10m AOD. Similarly, the southernmost extent of the study area (associated with the Solar and Energy Storage Park), south of Bassingham, is also crossed by the River Witham and River Brent, and is level and low lying, typically at a height of approximately 10m AOD.
- 11.4.5 The southern and easternmost part of the study area includes the Southern Lincolnshire Edge which rises abruptly above the land to the west to a height of approximately 80m AOD. Further east the land gradually descends towards the eastern edge of the study area.

### **Settlement, Land Use and Infrastructure**

- 11.4.6 A series of villages, hamlets and individual properties are located across the study area. The village of Eagle and the hamlet of Eagle Moor are located on Eagle Moor Road towards the northern extent of the study area. The hamlets of Whisby and Eagle Barnsdale, and the village of Thorpe on the Hill are also located in the northern part of the study area, as is Morton Hall Prison.
- 11.4.7 Witham St Hughs, located in the centre of the study area, is the largest settlement in proximity to the Site and includes an industrial and logistics park. A disused airfield is located immediately west of the village. A series of hamlets, including Norton Disney, Thurlby, Haddington and Aubourn, are located on the local road network.
- 11.4.8 The villages of Bassingham and Carlton-le-Moorland, and the hamlet of Stapleford, are in the south of the study area (associated with the Solar and Energy Storage Park).
- 11.4.9 A series of villages including Harmston, Coleby, Boothby Graffoe, Navenby and Wellingore, are located along the western side of the A607, on top of the Southern Lincolnshire Edge.
- 11.4.10 Land further east, within the study area associated with the potential connection corridors, is sparsely populated, typically limited to individual farmsteads.
- 11.4.11 The northern part of the study area is crossed by a railway line extending between Hykeham Station in the east and Swinderby Station in the west. The

A46 broadly runs parallel to the railway approximately 2.5km to the south. A network of local roads and lanes extends across the study area, connecting villages and providing access to farmsteads and individual properties.

11.4.12 A line of pylons stretches across the study area from its northern extent, extending to the south eastern corner, south of Colby.

11.4.13 The remaining landscape is in agricultural use.

### **Vegetation Patterns**

11.4.14 Whilst the combination of largely flat topography and agricultural land results in an open character to the fields, there are blocks and belts of woodland that create a sense of enclosure locally.

11.4.15 A network of woodland clumps and tree belts cross Whisby Nature Park, in the north of the study area, line the edge of waterbodies and flank part of the railway line. Tunman Housham Woods, identified as Ancient Replanted Woodland, cover approximately 50ha and are located west of Thorpe on the Hill.

11.4.16 The eastern and central part of the study area is typically sparsely wooded, other than a network of small woodland blocks, for example Moor Covert, Aubourn Moor and Fox Covert, occupying land south of Aubourn. The western side of the central and southern parts of the study area is typically more wooded, occupied by Hawdin's Wood and Norton Big Wood, both located south west of Witham St Hughs. Both woodlands, totalling approximately 57ha, are identified as Ancient Woodland.

11.4.17 Field boundaries across the study area are typically defined by hedgerows interspersed with hedgerow trees. Combined with the relatively flat topography found across much of the study area, this gives the appearance of a more wooded character than maps or aerial photographs suggest.

### **Public Rights of Way**

11.4.18 With reference to Lincolnshire County Council's online PRow map (Ref. 196), there is an extensive network of routes across the study area, with a notable concentration extending from Thorpe on the Hill (Footpaths 7146, 5711, 7841, 5710, 5708, 5703, 7289 and 5697). There is also a concentration of paths connecting settlements through the centre of the study area, such as Footpath 7125 between South Hykeham and Aubourne.

11.4.19 There is relatively sparse public access across the easternmost part of study area and across land east of the River Brent.

11.4.20 The Viking Way, a long distance trail, follows the Southern Lincolnshire Ridge in the south eastern extent of the study area.

11.4.21 National Cycle Route 64 follows Eagle Moor Road on the northern edge of the study area.

### **Tranquillity**

11.4.22 With reference to CPRE's Tranquillity Map (Ref. 187), infrastructure corridors and settlements within the study area typically reduce the level of tranquillity

locally. Areas not crossed by main roads or rail corridors, such as the River Witham River Valley, are shown to be the most tranquil. The level of tranquillity will be included in the definition of Local Landscape Character Areas proposed as part of the LVIA.

## Designations

11.4.23 Neither the Site nor the study area is covered by any statutory landscape designations, i.e. National Parks or Areas of Outstanding Natural Beauty.

11.4.24 An Area of Great Landscape Value (AGLV) extends south from Lincoln, broadly following the line of the Southern Lincolnshire Ridge, followed by the A607. Policy LP17: 'Landscape, Townscape and Views', within the Central Lincolnshire Local Plan (Ref. 195), applies to the whole of the Local Plan area, but the "*considerations set out in this policy are particularly important when determining proposals which have the potential to impact upon the ... Areas of Great Landscape Value*". Neither the policy, nor the supporting text or documents, set out why the AGLV is important or particular features that are valuable and should be protected. The Inspector's Report on the examination of the 2016 Local Plan (Ref. 185) points to landscape character assessments to provide evidence of key features which are sensitive to change. As such, in the absence of a published description of the AGLV and its key features, the LVIA does not propose to assess the AGLV as a landscape receptor. Rather the designation will inform the value attributed to landscape character areas, which will comprise the landscape receptors in the LVIA.

11.4.25 Coleby Hall Registered Park and Garden (RPG) is located on the northern edge of Coleby. The LVIA will consider impacts on the RPG.

11.4.26 Beyond the AGLV and RPG, the following parts of the study area are covered by designations of relevance to the LVIA:

- Whisby Nature Park Green Wedge (relating to Central Lincolnshire Local Plan policy LP22);
- Whisby Nature Park Local Nature Reserve (relating to Central Lincolnshire Local Plan policy LP21); and
- Conservation Areas in:
  - Bassingham
  - Waddington
  - Harmston
  - Coleby
  - Boothby Graffoe
  - Navenby
  - Wellingore

11.4.27 Whilst these designations are of relevance to the LVIA, they are not landscape designations. Rather they contribute to the understanding of the spatial function, and ecological and heritage value attributed to the landscape. As

such, the presence of such designations will inform the landscape baseline and the value attributed to each landscape character area.

## Published Landscape Character Assessments and Related Studies

11.4.28 The study area and Site boundary are covered by several published character assessments and related studies. These documents will be reviewed as part of the iterative design process and to inform the definition of Landscape Character Areas (LCAs) for the landscape assessment. The following section provides an overview of these publications.

### National Landscape Character Assessments

11.4.29 At the national level, the Site and the study area is within National Character Area (NCA) 48: Trent and Belvoir Vales (Ref. 186) which is characterised by: *“undulating, strongly rural and predominantly arable farmland, centred on the River Trent. A low-lying rural landscape with relatively little woodland cover, the NCA offers long, open views... The powerful River Trent and its flood plain provide a strong feature running through the landscape. It is the greatest biodiversity resource, being a major corridor for wildlife moving through the area and supporting a variety of wetland habitats.”*

11.4.30 Statements of Environmental Opportunity for NCA 48 include:

*“Enhance the woodland and hedgerow network through the planting of small woodlands, tree belts, hedgerow trees and new hedgerows to benefit landscape character, habitat connectivity and a range of ecosystem services, including the regulation of soil erosion, water quality and flow.”*

### Regional and District Landscape Character Assessments and Studies

11.4.31 The LVIA will make reference to the following assessments and studies:

- East Midlands Regional Landscape Character Assessment, 2010 (Ref. 188)
  - The landscape assessment will pay particular reference to the following Landscape Character Types (LCTs) located within the study area:
    - LCT 4a: Unwooded Vales;
    - LCT 4b: Wooded Vales; and
    - LCT 6a: Limestone Scarps and Dipslopes.
- North Kesteven District Landscape Character Assessment, 2007 (Ref. 189)
  - The landscape assessment will pay particular reference to the following LCTs and LCAs located within the study area:
    - LCT: Trent and Witham Vales:
      - LCA 2: Terrace Sandlands;
      - LCA 4: Lincoln Fringe; and
      - LCA 5: Witham and Brant Vales.

- LCT: Lincoln Cliff
  - LCA 6: Lincoln Cliff.
- LCT: Lincoln Plateau
  - LCA7: Limestone Health.
- Green Infrastructure Study for Central Lincolnshire, 2011 (Ref. 70)
  - The landscape assessment will pay particular reference to the following strategic green corridors, green access links and green infrastructure zones that are within the study area:
    - Strategic Green Corridor 4: Upper Witham Green Corridor;
    - Strategic Green Access Link: Upper Witham Link; and
    - Green Infrastructure Zone 23.

### Local Landscape Character

11.4.32 Given the age and scale of the assessments and studies listed above, the LVIA will define Local Landscape Character Areas (LLCAs) to inform design development and the assessment of landscape effects. The boundaries and key characteristics of the LLCAs will be based on field work and the published studies, and will be provided for consultation with LPAs.

### Visual Amenity

- 11.4.33 Initial fieldwork has been undertaken across the study area to identify visual receptors (people) whose views may be impacted by the Proposed Development. The fieldwork was undertaken during April 2023 and found that the Site is not visible in its entirety from any one location, given variations in landform and the screening effect of vegetation.
- 11.4.34 The northern part of the Site is visible from Thorpe on the Hill, due to the settlement's elevated location (approximately 27m AOD) and proximity to the Site. The Site is also visible from footpaths connecting Thorpe on Hill in the east and Morton in the west. The north western part of the Site is also visible in views experienced by motorists travelling on Haddington Lane overbridge, Fosse Lane, Station Lane and Eagle Lane. However, the Site is not visible from Swinderby or Eagle, on account of the intervening distance and vegetation.
- 11.4.35 Overall, north of the Site, potential visibility of the Site typically doesn't extend further north than the railway line between Swinderby and Hykeham. Similarly, there is no intervisibility between the Site and dwellings located on the south western edge of North Hykeham.
- 11.4.36 The central part of the Site is visible from Witham St Hughs and the north-eastern part of Bassingham. Such visibility is typically afforded through gaps in vegetation that forms field boundaries and flanks the local road network. The Site is also visible from footpaths extending to the north and west of Bassingham. The central part of the Site is also visible from Clay Lane, Moor Lane and Fen Lane. However, there are no views of the Site from Aubourn.



- 11.4.37 The south-eastern part of the Site is typically screened by intervening vegetation including hedgerows, shelter belts and small clumps of woodland, such as Fox Covert, which are scattered across the flat landscape. Accordingly, motorists travelling along Broughton Lane typically have no views of the eastern parts of the Site. Similarly, there are no views of the Site from land between Broughton Lane and the base of the South Lincolnshire Ridge.
- 11.4.38 The Site is theoretically visible from settlements and PRow, including the Viking Trail, that span the South Lincolnshire Ridge. However, the intervening distance (approximately 4km) between the Solar and Energy Storage Park and the settlements reduces the extent of potential visibility such that the Site is barely discernible.
- 11.4.39 However, if the overhead line options is pursued, there is intervisibility between the potential connection corridors and the settlements of Waddington, Harmston, Coleby, Boothby Graffoe and Navenby. The Grid Connection Corridors would also be visible in views from PRow, including the Vikings Way.
- 11.4.40 Further fieldwork will be undertaken throughout the design and assessment process. The fieldwork will be informed by ZTV mapping, which will model the key structures proposed in relation to existing landform (bare earth) and with the addition of existing vegetation and buildings (with screening).
- 11.4.41 The findings of the fieldwork and desk based mapping will be presented to the LPAs, seeking their agreement of the visual receptors who have potential to be impacted by the Proposed Development, and the locations of viewpoints that will be used to represent their views.
- 11.4.42 Photography will be captured from each representative viewpoint used in the assessment in both summer and winter conditions, showing the effect of the seasons on the potential visibility of the Proposed Development. This photography will be undertaken in accordance with the methodology for Type 1 photographs as set out in the Landscape Institute's Technical Guidance Note 06/19 Visual Representation of Development Proposals (Ref. 194). Photomontages will be prepared from a selection of these representative viewpoints. The location of the photomontages will be agreed with LPAs through consultation.

## Landscape and Visual Receptors for Assessment

- 11.4.43 **Table 11-1** records the preliminary list of landscape and visual receptors that will be assessed in the LVIA. This list is based on the analysis completed to date and will be reviewed as the design and assessment of the Proposed Development progresses. Agreement regarding updates to the list of receptors will be sought with the LPAs.

**Table 11-1 Landscape and visual receptors to be scoped in**

Receptor Group	Receptor
Landscape receptor	NCA 48: Trent and Belvoir Vales (Ref. 186)

Receptor Group	Receptor
	<p>East Midlands Regional Landscape Character Assessment, 2010 (Ref. 190):</p> <p>LCT 4a: Unwooded Vales</p> <p>LCT 4b: Wooded Vales</p> <p>LCT 6a: Limestone Scarps and Dipslopes</p> <p>North Kesteven District Landscape Character Assessment, 2007 (Ref. 189):</p> <p>LCA 2: Terrace Sandlands</p> <p>LCA 4: Lincoln Fringe</p> <p>LCA 5: Witham Brant Vales</p> <p>LCA 6: Lincoln Cliff</p> <p>Local Landscape Character Areas (to be defined and agreed throughout assessment process).</p> <p>Coleby Hall Registered Park and Garden.</p>
Visual receptors - residents	Residents of: Eagle, Eagle Moor, Thorpe on the Hill, Scotland Farm, Thorpe Grange Farm, South Hykeham Grange, Eagle Barnsdale, Morton, Housham, Sky-Barn Farm, Haddington, Witham St Hughs, Aubourn, Hillside Farm, Greengate, Thurlby, North Field Farm, Witham Farm, Church Farm, River Farm, Tonge's Farm, Bassingham, Bassingham Grange, Malborough, Waddington, Harmston, Coleby and Boothby Graffoe.
Visual receptors – people engaged in recreational activity	Users of PRow (walking and cycling) within the Site boundary and a proportionate number of routes across the study area to provide a representative assessment of views from the north, east, south and west of the Site boundary.
Visual receptors – motorists and people travelling on trains	<p>People travelling on the road network including on Eagle More Road, A46, Fosse Lane, Station Lane, Stone Lane, Haddington Lane, Moor Lane, Bassingham Road, Fen Lane, Sleaford Road.</p> <p>People travelling on the railway between Swinderby Station and Hykeham Station</p>

## 11.5 Potential Effects and Mitigation

11.5.1 The Proposed Development has the potential to result in temporary significant adverse landscape effects during the construction phase, due to alterations to surface landform and vegetation, the presence of construction machinery and associated reductions in tranquillity. These aspects of the construction phase also have the potential to result in temporary significant adverse visual effects, due to the changes in the composition of views, in comparison to views of fields and general farming activity.

11.5.2 The Proposed Development has the potential to result in significant adverse landscape effects during operation (assessed at year 1 and year 15) due to

the change in land use resulting from the presence and massing of the solar panels and associated structures, although the Proposed Development is reversible. Similarly, the Proposed Development has potential to result in significant adverse visual effects resulting from the introduction of solar panels and associated infrastructure into people's views.

- 11.5.3 The Proposed Development also has the potential to also result in beneficial landscape and visual effects in the longer term, resulting from changes to land cover and new planting across the site boundary.
- 11.5.4 The decommissioning phase has the potential to result in significant adverse landscape and visual effects, similar to the construction phase, due to the presence of machinery and general activity to remove the panels and associated structures.
- 11.5.5 The LVIA will inform the iterative design process of the Proposed Development and the mitigation measures, specifically with regard to the siting and layout of the solar panels and associated structures; as well as the colour and tone of associated structures to minimise their visibility and perceived scale in people's views.
- 11.5.6 The LVIA will also seek opportunities for new green infrastructure, including new planting and recreational access, to be embedded into the Proposed Development, connecting into the wider green infrastructure network.
- 11.5.7 The relevant landscape and visual mitigation will be set out in the LVIA.

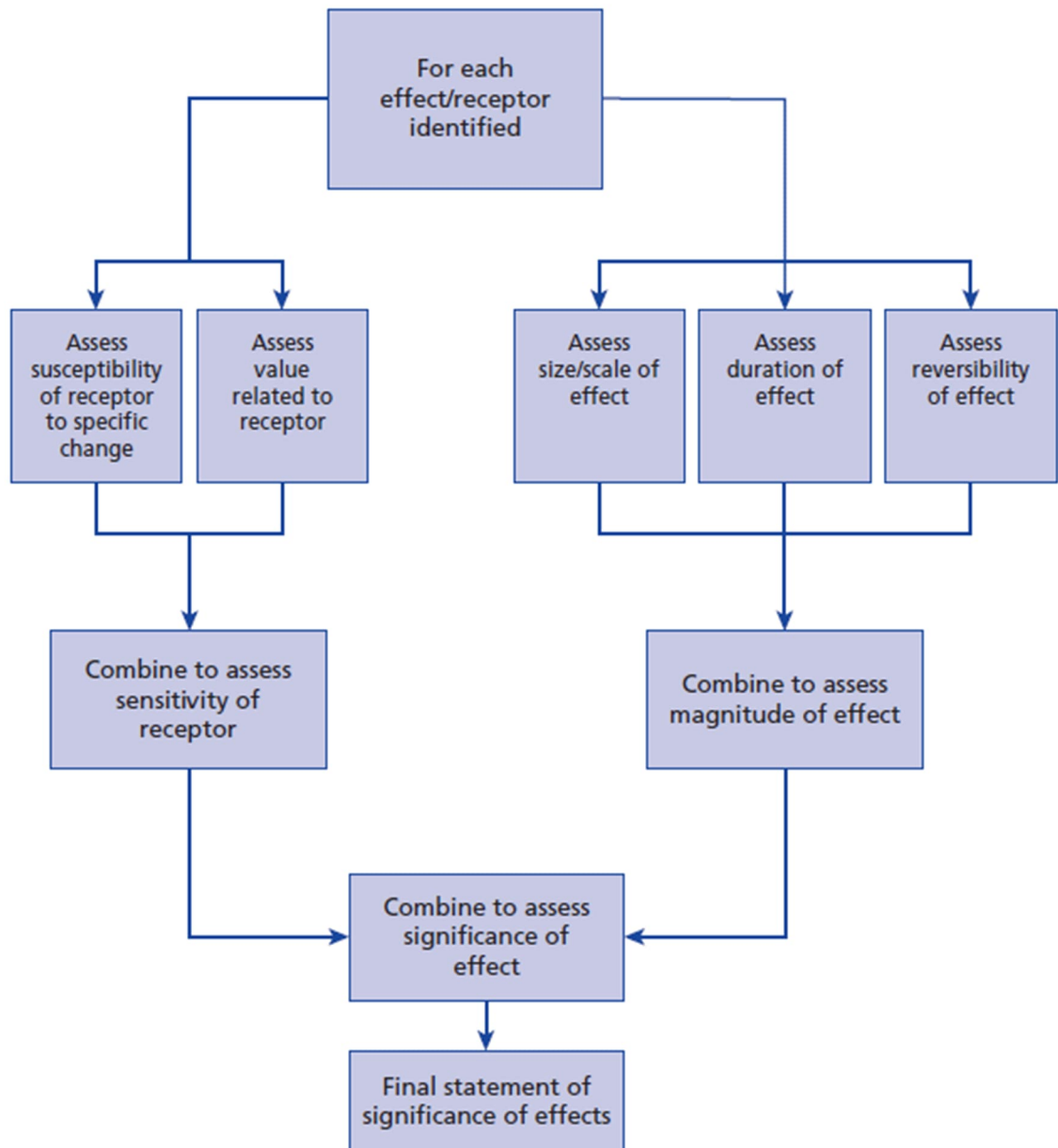
## 11.6 Assessment Methodology

### Overview

- 11.6.1 The LVIA will be undertaken in accordance with the following best practice guidance:
- GLVIA3 (Ref. 183);
  - The Landscape Institute's Technical Guidance Note 02/21: Assessing Landscape Value Outside National Designations, 2021 (Ref. 191); and
  - The Landscape Institute's Technical Guidance Note 06/19: Visual Representation of Development Proposals, 2019 (148).
- 11.6.2 These publications form a standard reference for undertaking LVIA for renewable energy schemes in the UK.
- 11.6.3 The LVIA will also refer to:
- An Approach to Landscape Character Assessment, by Natural England (Ref. 191);
  - Infrastructure Technical Guidance Note 04/2020 by the Landscape Institute (Ref. 192);
  - Tranquillity Technical Guidance Note (2017) by the Landscape Institute (Ref. 193); and

- Technical Guidance Note 2/19: ‘Residential Visual Amenity Assessment’ (2019) by the Landscape Institute (Ref. 194).

11.6.4 The LVIA methodology will be presented in full to the LPAs to receive their comment and seek their agreement. The methodology will reflect the process set out in Figure 3.5 of GLVIA3 (Ref. 183) as shown below as **Figure 11-1**:



**Figure 11-1 LVIA methodology, as presented in GLVIA3**

11.6.5 In accordance with the GLVIA3 process, the LVIA methodology will include the following key stages:

- Building on the analysis presented above, a baseline review of published landscape assessments, studies, relevant supporting evidence base documents, aerial photography, mapping and fieldwork to identify the landscape and visual baseline and receptors. These shall be presented to the LPAs to seek their agreement of the scope of the LVIA, including the extent of the study area.

- An assessment of the sensitivity of landscape and visual receptors, based on an assessment of their respective value and susceptibility to change.
- An assessment of the magnitude of impact resulting from the Proposed Development during construction, Year 1, Year 15 and decommissioning. The assessment of magnitude of impact will consider the scale, duration, and reversibility of the impact.
- Combination of the receptor's sensitivity and the magnitude of impact experienced to determine the resultant level of effect.
- An assessment of the significance of the effect to the landscape and visual receptors identified. The threshold for a significant effect will be agreed with the LPAs.

## 11.7 Elements Scoped Out

11.7.1 No potential landscape or visual receptors located within the preliminary LVIA study area are proposed to be scoped out. Should it become apparent, through the design and assessment process, that there would be no landscape or visual effects on a receptor, the receptor will be scoped out through consultation with the LPAs.

## 11.8 Assumptions, Limitations and Uncertainties

- 11.8.1 All fieldwork will be undertaken from publicly accessible locations. Professional judgement will be used to assess residents' views, aided by aerial photography and fieldwork observations.
- 11.8.2 Short term durations are considered to be two years or less; medium term durations are considered to be between two and five years; and long-term durations are considered to be more than five years.
- 11.8.3 For the construction phase assessment, the assumptions are that, as a worst case, construction activity will occur in winter and will be undertaken across the Site at the same time, although as discussed in **Chapter 2: Description of the Proposed Development**, works will likely be undertaken sequentially and construction in some plots is likely to be complete whilst others are on-going. PRoW which cross the Site boundary will be kept open or temporarily closed for short periods of time only, and therefore recreational receptors along these routes will be assessed for the construction phase.
- 11.8.4 This scoping chapter has been prepared based on a reasonable interpretation of the Proposed Development required to reach the target energy generation. As such it has been assumed that the proposed solar array would not occupy the entire Solar and Energy Storage Park.
- 11.8.5 For the year 1 operational assessment, the assumption is that the Proposed Development will be operational in winter conditions. The year 15 assessment will assume summer conditions and the establishment of mitigation planting.
- 11.8.6 For the decommissioning assessment, the assumptions are the Proposed Development is no longer operational, and the solar panels and associated structures and equipment are being removed in a manner similar to the

construction phase, requiring machinery and localised excavation. It is currently assumed that the biodiversity mitigation and enhancement measures (planting) would be left in-situ, provided they do not act as a hinderance to future agricultural use, given they could provide ecological and landscape value (although the Applicant cannot control what the landowners do to the Green Infrastructure after completion of the decommissioning and once the land is returned; any changes at this point would not be part of the Proposed Development).

- 11.8.7 Uncertainties at this stage are the layout, siting and heights of the solar panels, sub-stations and associated structures. The LVIA study area, and landscape and visual receptors, will be reviewed as details are confirmed in relation to the heights of these features, informed by ZTVs.
- 11.8.8 It is assumed that any lighting during the construction phase would be directional, temporary and only used during working hours. When used, lighting would be designed to minimise potential for light spillage beyond the Site, particularly towards houses, roads and ecological habitats, in so far as it is reasonably practicable. During operation any lighting will be directed at infrastructure and only triggered by motion detection or manually. A standalone quantitative lighting assessment is not included in the scope of the LVIA. Rather the effect of lighting will be considered as part of the Proposed Development, and will therefore be included in the description of impacts on landscape character and visual amenity.
- 11.8.9 The LVIA will review the Glint and Glare Assessment to include consideration of how glint and / or glare might contribute to landscape or visual effects.
- 11.8.10 The LVIA will assess the potential visual effects to different types of visual receptor, including residential receptors, i.e. private views (albeit assessed from publicly accessible locations). In the event that the visual assessment identifies major adverse effects on residents at year 15 of operation (i.e. major adverse visual effects that have not been mitigated), a Residential Visual Amenity Assessment will be undertaken in line with the Landscape Institute's Technical Guidance Note 2/19: 'Residential Visual Amenity Assessment (Ref. 194).

## 12. Noise and Vibration

### 12.1 Introduction

- 12.1.1 This chapter sets out the scope and methodology for the noise and vibration assessment of the Proposed Development. The purpose of the assessment will be to identify and characterise any relevant sensitive receptors, to consider the nature and scale of potential impacts arising from the Proposed Development, and to assess the significance of any likely effects.
- 12.1.2 Note that the scope of this section considers noise and vibration effects on human receptors and excludes assessment of noise and vibration on ecological or heritage receptors. In-combination effects on local ecological or heritage receptors due to the introduction of the Proposed Development will be considered in **Chapter 8: Cultural Heritage** and **Chapter 9: Ecology and Biodiversity**.

### 12.2 Study Area

- 12.2.1 The study area has been defined to include construction and operational noise and vibration features likely to be at risk from possible direct and/or indirect impacts that might arise from the Proposed Development.
- 12.2.2 For construction noise effects from the Solar and Energy Storage Park, the area for which impacts are expected is considered to be 300m, based on guidance in British Standard (BS) 5228-1 (Ref. 199), which states construction noise predictions are generally reliable up to 300m. However, for the operational Solar and Energy Storage Park, the study area is based on the extent of operational noise effects, which is set at 500m. This distance of 500m is based on previous experience of solar farm projects.
- 12.2.3 The study area for construction noise effects along the grid connection will include receptors within 300m, as per guidance in BS 5228-1 (Ref. 199). These receptors will be identified once one of the Grid Corridor Option has been selected and refined post-scoping.
- 12.2.4 Receptors presented in Table 12-1 have been determined by desktop study. A finalised list of receptors to be included within the assessment will be selected through the scoping process and consultation with key stakeholders including the Environmental Health Officers of Lincolnshire County Council and North Kesteven District Council.

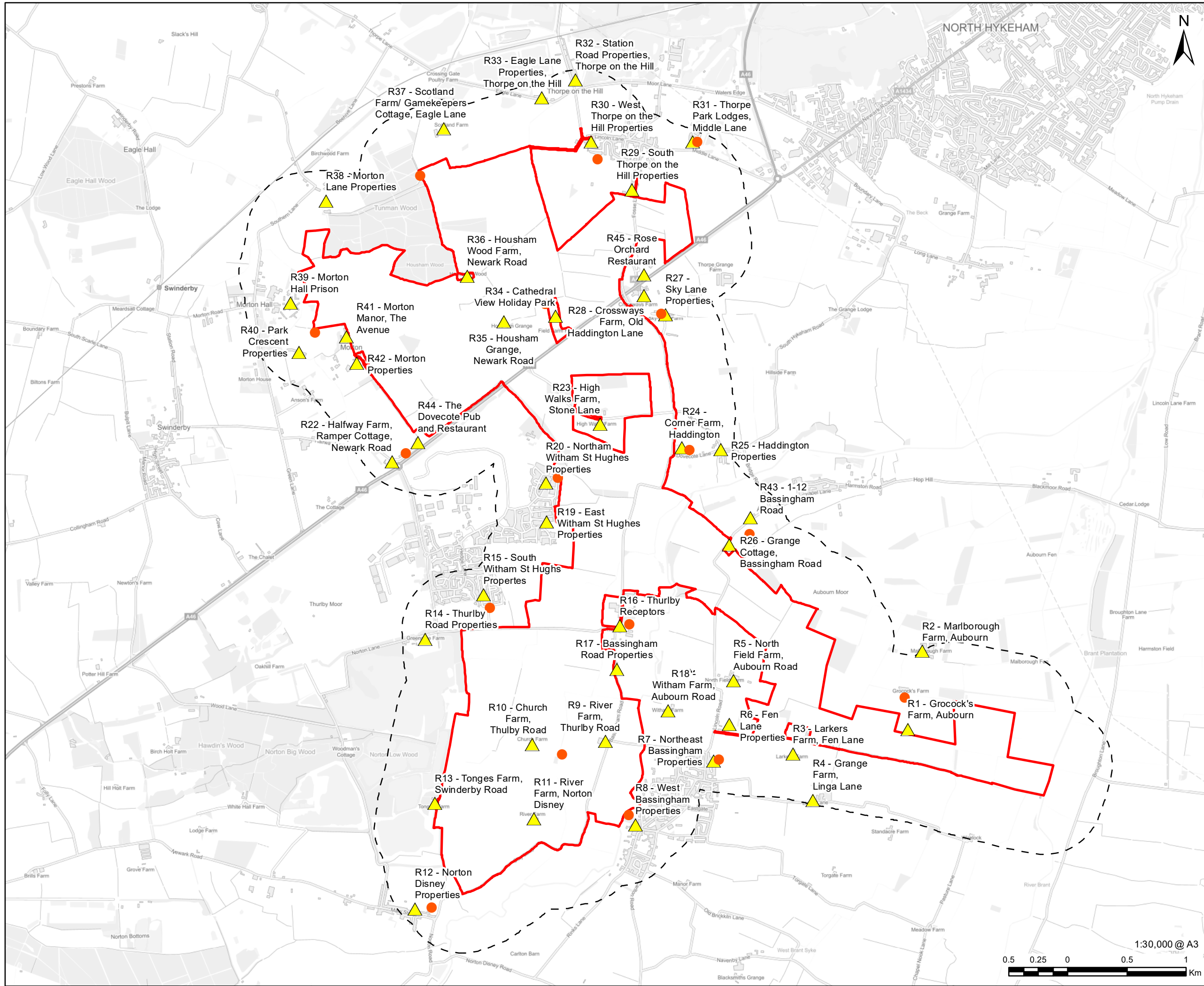
**Table 12-1: Sensitive Receptor Locations**

Receptor ID	Name	Approximate Coordinates
R1	Grocock's Farm, Aubourn	53.137760°, -0.609023°
R2	Marlborough Farm, Aubourn	53.140671°, -0.607029°
R3	Larkers Farm, Fen Lane	53.133067°, -0.623558°
R4	Grange Farm, Linga Lane	53.129517°, -0.621214°

Receptor ID	Name	Approximate Coordinates
R5	North Field Farm, Aubourn Road	53.138730°, -0.630897°
R6	Fen Lane Properties	53.135387°, -0.631533°
R7	Northeast Bassingham Properties	53.132631°, -0.633605°
R8	West Bassingham Properties	53.127890°, -0.643638°
R9	River Farm, Thurlby Road	53.134280°, -0.647263°
R10	Church Farm, Thulby Road	53.134169°, -0.656515°
R11	River Farm, Norton Disney	53.128498°, -0.656466°
R12	Norton Disney Properties	53.121832°, -0.671720°
R13	Tonges Farm, Swinderby Road	53.129815°, -0.668917°
R14	Thurlby Road Properties	53.142306°, -0.669787°
R15	South Witham St Hughs Properties	53.145620°, -0.662324°
R16	Thurlby Receptors	53.143034°, -0.645155°
R17	Bassingham Road Properties	53.139776°, -0.645592°
R18	Witham Farm, Aubourn Road	53.136541°, -0.639289°
R19	East Witham St Hughes Properties	53.151055°, -0.654135°
R20	Northam Witham St Hughes Properties	53.153993°, -0.654110°
R21	Sheepwalks Farm, Witham St Hughes	53.157544°, -0.656726°
R22	Halfway Farm, Ramper Cottage, Newark Road	53.155845°, -0.673569°
R23	High Walks Farm, Stone Lane	53.158374°, -0.647140°
R24	Corner Farm, Haddington	53.156450°, -0.636903°
R25	Haddington Properties	53.156269°, -0.631972°
R26	Grange Cottage, Bassingham Road	53.149064°, -0.631083°
R27	Sky Lane Properties	53.166608°, -0.638620°
R28	Crossways Farm, Old Haddington Lane	53.168083°, -0.641319°
R29	South Thorpe on the Hill Properties	53.176145°, -0.642586°
R30	West Thorpe on the Hill Properties	53.179869°, -0.647644°
R31	Thorpe Park Lodges, Middle Lane	53.179718°, -0.634767°
R32	Station Road Properties, Thorpe on the Hill	53.184561°, -0.649474°
R33	Eagle Lane Properties, Thorpe on the Hill	53.183272°, -0.653727°
R34	Cathedral View Holiday Park	53.166640°, -0.652524°
R35	Housham Grange, Newark Road	53.166333°, -0.659083°
R36	Housham Wood Farm, Newark Road	53.169788°, -0.663586°
R37	Scotland Farm/ Gamekeepers Cottage, Eagle Lane	53.181063°, -0.666265°
R38	Morton Lane Properties	53.175712°, -0.681271°
R39	Morton Hall Prison	53.168047°, -0.685986°



Receptor ID	Name	Approximate Coordinates
R40	Park Crescent Properties	53.164268°, -0.685068°
R41	Morton Manor, The Avenue	53.165376°, -0.679002°
R42	Morton Properties	53.163378°, -0.677812°
R43	1-12 Bassingham Road	53.151092°, -0.628395°
R44	The Dovecote Pub and Restaurant	53.157255°, -0.670243°
R45	Rose Orchard Restaurant	53.169665°, -0.641244°



**PROJECT**  
Fosse Green Energy

**CLIENT**  
Fosse Green Energy Ltd

**CONSULTANT**  
AECOM Limited  
2 City Walk  
Holbeck, Leeds  
LS11 9AR  
www.aecom.com

- LEGEND**
- Solar and Energy Storage Park
  - 500m Study Area
  - ▲ Noise Receptor
  - Noise Monitoring Location

**NOTES**  
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**ISSUE PURPOSE**  
EIA Scoping Report

**PROJECT NUMBER**  
60700987

**FIGURE TITLE**  
Proposed Noise Study Area, Sensitive Receptors and Noise Monitoring Locations

**FIGURE NUMBER**  
Figure 12-1



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## 12.3 Planning Policy Context and Guidance

12.3.1 Legislation, planning policy and guidance relating to noise and vibration, and pertinent to the Proposed Development is set out below.

### Legislation

- Control of Pollution Act 1974 (Ref. 71); and
- Environmental Protection Act 1990 (Ref. 47).

### National Planning Policy

- 12.3.2 NPS EN-1 (Ref. 6) sets out national policy for energy and will be an 'important and relevant consideration' in the Secretary of State's ('SoS') determination of consent in respect of the Proposed Development. Reference will be made to Section 5.11 and Paragraphs 5.11.4 to 5.11.7, in relation to the assessment of noise;
- 12.3.3 NPS EN-5 (Ref. 5), taken together with NPS EN-1, provides the primary basis for decisions taken by the SoS on applications it receives for the categories of nationally significant electricity networks infrastructure included within it. Reference will be made to Section 2.9 and Paragraphs 2.9.7 which relates to noise from substation equipment;
- 12.3.4 Draft versions of NPS EN-1 (Ref. 92) and EN-3 (Ref. 39) and EN-5 (Ref. 5) were published for consultation by the Department for Business, Energy & Industrial Strategy from March to May 2023. Paragraph 5.12.6 of the draft NPS EN-1 provides details of what should be included in a noise assessment. Section 3.10 of the draft EN-3 includes the consideration of transport noise and vibration associated with solar photovoltaic generation schemes.
- 12.3.5 The NPPF (Ref. 7) contains the government's planning policies relating to noise in Paragraph 174 and 185; and
- 12.3.6 The Noise Policy Statement for England (NPSE) (2010) (Ref. 73) sets out the long-term vision of the government's noise policy. The NPSE sets definitions for 'significant adverse effects' and 'adverse effects' using the concepts:
- Lowest Observed Adverse Effect Level (LOAEL) – the level above which, as an average response, adverse effects on health and quality of life can be detected; and
  - Significant Observed Adverse Effect Level (SOAEL) – the average response level above which, as an average response, significant adverse effects on health and quality of life occur.

### National Guidance

12.3.7 PPG, Noise (Ref. 198) provides guidelines that are designed to assist with the implementation of the noise requirements set out in the NPPF.

## Local Planning Policy

- 12.3.8 Central Lincolnshire Local Plan Adopted April 2023 (Ref. 195): with particular reference to Policy S14: Renewable Energy, which requires that it should be determined whether noise impacts from renewable energy schemes are acceptable. Policy LP26: Design and Amenity, which states *“All development proposals will [...] Not result in adverse noise and vibration taking not account surrounding uses”*.
- 12.3.9 Lincolnshire Minerals and Waste Local Plan including the Core Strategy & Development Management Policies Plan adopted in June 2006 (Ref. 8): with particular reference to Policy DM3: Quality of Life and Amenity, which states *“Planning permission will be granted for minerals and waste development provided that it does not generate unacceptable adverse impacts arising from: [...] noise”*.

## 12.4 Baseline Conditions

- 12.4.1 The land use within the Site boundary is primarily agricultural. The surrounding land use also comprises arable farming, woodland, residential areas and quarries. There are individual and clusters of residential properties located adjacent to the Site boundary.
- 12.4.2 The dominant sources of sound in the area are considered to be road traffic on:
- A46;
  - Haddington Lane;
  - Fosse Lane;
  - Butts Lane;
  - Basingham Road; and Moor Lane.
- 12.4.3 Additionally, the former RAF Swinderby site to the west of the Proposed Development is now used by Cemex as a quarry.
- 12.4.4 Baseline sound monitoring will be undertaken at selected locations to define representative baseline data at noise-sensitive receptors around the Site. Seventeen monitoring locations have been selected with approximate locations illustrated in **Figure 12-1**.
- 12.4.5 The monitoring procedures will follow guidance from BS 7445-1:2003 ‘Description and environment of environmental noise – Part 1: Guide to quantities and procedures’ (Ref. 201) and BS 4142:2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’ (Ref. 202).
- 12.4.6 A combination of long-term unattended and short-term attended measurements will be used. A weather station will also be installed for the duration of the sound surveys so any periods of adverse weather conditions could be identified and omitted from the noise data.

- 12.4.7 Baseline sound surveys will be carried out post-Scoping stage, and the scope and methodology will be sought to be agreed in consultation with the local planning authorities, where possible, prior to commencement of surveys.

## 12.5 Potential Effects and Mitigation

### Construction and Decommissioning Noise and Vibration (temporary effects)

- 12.5.1 Potential noise and vibration effects during the construction and decommissioning phases are likely to include works activities associated with site preparation, plant installation, substation construction, cable laying, and construction-related vehicle movements within the Site boundary and along access routes.
- 12.5.2 Measures to control noise as defined in Annex B of BS 5228:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites - Part 1: Noise' (Ref. 199) and measures to control vibration as defined in Section 8 of BS 5228:2009+A1:2014 'Part 2: Vibration' (Ref. 200) will be adopted where reasonably practicable.
- 12.5.3 These measures represent 'Best Practicable Means' (BPM) (as defined by section 72 of the Control of Pollution Act 1974) (Ref. 71) to manage noise and vibration emissions from construction activities. Examples of BPM that may be implemented during construction works are presented below:
- Unnecessary revving of engines will be avoided, and equipment will be switched off when not in use;
  - Appropriate routing of construction traffic on public roads and along access tracks;
  - Drop heights of materials will be minimised;
  - Plant and vehicles will be sequentially started up rather than all together;
  - Plant will always be used in accordance with manufacturers' instructions. Care will be taken to site equipment away from noise-sensitive areas. Where possible, loading and unloading will also be undertaken away from such areas; and
  - Regular and effective maintenance by trained personnel will be undertaken to keep plant and equipment working to manufacturer's specifications.
- 12.5.4 Embedded mitigation measures relevant to the construction phase will be described within an Outline CEMP, which will be developed in to a detailed CEMP prior to the start of construction. Embedded mitigation measures relevant to the decommissioning phase will be described within an Outline DEMP.

### Operational Noise (reversible long-term effects)

- 12.5.5 The potential noise effects during operation of the Proposed Development are likely to include noise from solar infrastructure (e.g. inverters, transformers,

switchgear) and associated BESS (e.g. cooling units, transformers), the on-site substation (e.g. transformers), and any associated vehicle movements.

- 12.5.6 Plant items such as solar PV modules, PV module mounting structures, and cabling (both onsite and via the connection route) will not produce any operational noise emissions.
- 12.5.7 No major vibration sources are envisaged to be introduced as part of the Proposed Development and as such there will be no associated operational vibration effects. It is proposed that operational vibration is scoped out of any further assessment.
- 12.5.8 At this stage no specific noise mitigation measures have been included for operational plant. However, based on the proposed plant installations it is assumed that plant will be designed to have no tonal, impulsive or intermittent features.
- 12.5.9 As the plant design is progressed, the specification of plant and machinery with low noise emission and properly attenuated supply and extract terminations will help to minimise noise emissions. The use of enclosures, local screening, mufflers, and silencers will also be used as appropriate.

## 12.6 Assessment Methodology

### Impact Assessment Methodology

- 12.6.1 All noise effects are local, only affecting nearby sensitive receptors, and are direct in nature; however, defining a likely effect and whether it is significant or not depends on the nature of a noise source. Likely effects have been defined based on guidance set out in national policy.
- 12.6.2 A new source of noise is assessed through the absolute noise level it generates at sensitive receptors. Where an exceedance of the defined SOAEL for each noise source occurs, it is an indication of a likely significant effect. However, where an existing noise source is changed (i.e. construction traffic changing road traffic noise levels), the assessment of the effect level due to the change in noise refers to guidance within IEMA Guidelines for environmental noise impact assessment (Ref. 203).
- 12.6.3 Government policy for noise is based on community exposure response relationships and noise insulation of a typical dwelling. Consequently, an assessment based on LOAELs and SOAELs cannot be applied to non-residential sensitive receptors. As such, the approach to the assessment of non-residential receptors differs from that adopted for residential receptors. Non-residential receptors are considered on a case-by-case basis by considering the applicable design criteria for good internal noise levels.

### Construction and Decommissioning Noise and Vibration

- 12.6.4 Noise and vibration levels associated with construction and decommissioning works will be assessed (at chosen sensitive receptors). Annex E of BS 5228-1 provides example methods for the assessment of the significance of

construction noise effects. With reference to the NPSE, the LOAEL and SOAEL thresholds have been set in Table 12-2 below.

**Table 12-2: Thresholds of Potential Effects of Construction and Decommissioning Noise at Residential Buildings**

Time Period	Threshold Value (LAeq,T dB)		
	LOAEL	SOAEL	UAEL
Day (07:00 – 19:00) Saturday (07:00 – 13:00)	65	75	85
Evening (19.00 – 23.00) Weekends (13.00–23.00 Saturdays and 07.00–23.00 Sundays)	55	65	75
Night (23.00 – 07.00)	45	55	65

12.6.5 Table 12-3 details the Peak Particle Velocity (PPV) levels (a standard measure of vibration effects) and their potential effect on humans based on guidance from BS 5228-2.

**Table 12-3: Thresholds of Potential Effects of Construction and Decommissioning Vibration (human response)**

Magnitude of Impact	PPV Vibration Level	BS 5228-2 Description of Impact
LOAEL	0.3mm/s	Vibration might be just perceptible in residential environments.
SOAEL	1.0mm/s	It is likely that vibration of this level in residential environments will cause complaint, but it can be tolerated if prior warning and explanation has been given to residents.

12.6.6 The temporary changes in road traffic noise levels along the local road network due to construction traffic will be assessed based on guidance from the IEMA Guidelines for environmental noise impact assessment (Ref. 203). Assessment criteria are presented in Table 12-4.

**Table 12-4: Construction Traffic Noise Assessment Criteria**

Effect Level	Magnitude Criteria
Negligible	≥ 0 dB and < 1 dB
Minor	≥ 1 dB and < 3 dB
Moderate	≥ 3 dB and < 5 dB
Major	≥ 5 dB

## Operational Noise

12.6.7 The impact of the proposed operational plant such as noise from the inverters, tracker panels (if this option is taken through to the ES) and battery energy storage system will be assessed following guidance from BS 4142:2014 (Ref. 202). Reference is also made to BS 8233:2014 Guidance on sound insulation

and noise reduction for buildings. (Ref. 204) and the World Health Organization (WHO) ‘Guidelines for Community Noise’ (1999) (Ref. 205).

- 12.6.8 The assessment criteria for noise from fixed plant installations are summarised in Table 12-5. The assessment will be based on available information on the operating conditions and the levels of noise generated by the plant.

**Table 12-5: Operational Noise Assessment Criteria**

Effect Level	Rating Level (External) at Receptor, $L_{Ar,Tr}$	
	Daytime (07:00-19:00) and Evening (19:00-23:00)	Night-time (23:00-07:00)
LOAEL	Less than or equal to the typical background level ( $L_{A90,T}$ ) – minimum of 35 dB $L_{Ar,Tr}$	Less than or equal to the typical background level ( $L_{A90,T}$ ) – minimum of 30 dB $L_{Ar,Tr}$
SOAEL	Greater than 10 dB above the background noise level – minimum of 45 dB $L_{Ar,Tr}$	Greater than 10 dB above the background noise level – minimum of 40 dB $L_{Ar,Tr}$

## Assessment of Non-residential Receptors

- 12.6.9 Design criteria for good internal conditions in non-residential receptors are set in BS 8233:2014 Guidance on sound insulation and noise reduction for buildings. (Ref. 204) and the WHO ‘Guidelines for Community Noise’ (Ref. 205). Reference to specific design criteria for the non-residential receptor use will be undertaken when deriving the assessment criteria.

## 12.7 Elements Scoped Out

- 12.7.1 A summary of the elements scoped into and out of the assessment of noise and vibration are presented in Table 12-6.

**Table 12-6: Elements scoped out of the assessment of noise and vibration**

Element	Description
Construction traffic vibration	Road traffic can cause vibration; however, DMRB LA 111 states: “operational vibration is scoped out of the assessment methodology as a maintained road surface will be free of irregularities as part of project design and under general maintenance, so operational vibration will not have the potential to lead to significant adverse effects.” Given that the condition of road surfaces on the highway network is outside the scope of the Proposed Development, an assessment of construction traffic vibration has been scoped out.
Vibration from the operation of the Proposed Development	No plant that would generate perceptible levels of vibration are part of the Proposed Development and, as such, there will be no associated operational vibration effects. It is proposed that operational ground-borne vibration is scoped out of any further assessment.



Element	Description
Separate assessment for noise from the decommissioning phase	The noise assessment presented for the construction phase will therefore be considered representative (or an overestimate) of the decommissioning phase.

## 12.8 Assumptions, Limitations and Uncertainties

- 12.8.1 Predictions of sound levels have an associated degree of uncertainty. Modelling and measurement processes have been carried out in such a way to reduce such uncertainty; however, it is unavoidable that some degree of prediction uncertainty remains so a precautionary approach will be adopted in sound predictions.
- 12.8.2 Construction works noise levels will be predicted following guidance from BS 5228-1 (Ref. 199) which provides a realistic estimate of sound propagation from construction plant. The predictions will use representative noise levels, sourced from industry standard guidance documents such as BS 5228-1, for typical items of plant that are used in such developments.
- 12.8.3 Construction phase vibration will be assessed based on historic vibration measurement data from relevant guidance documents including BS 52282:2009+A1:2014 (Ref. 200) and Transport Research Laboratory (TRL) Report 429 (Ref. 248). No predictions of ground-borne vibration propagation are proposed.
- 12.8.4 Predictions of operational plant and activities sound pressure levels will be undertaken following guidance from International Organisation for Standardisation (ISO) 9613 'Attenuation of sound during propagation outdoors' (Ref. 206), which are based on an assumption of moderate downwind propagation, and hence could be considered as a worst-case calculation. However, the standard also indicates an estimated accuracy of  $\pm 3$  dB(A) in predicted levels.
- 12.8.5 Any measurement of existing ambient or background sound levels will be subject to a degree of uncertainty. Environmental sound levels vary between days, weeks, and throughout the year due to variations in source levels and conditions, meteorological effects on sound propagation and other factors. Hence, any measurement survey can only provide a sample of the ambient levels and a small degree of uncertainty will always remain in the values taken from such a measurement survey.
- 12.8.6 Every effort will be made to ensure that measurements are undertaken in such a way as to provide a representative sample of conditions, such as avoiding periods of adverse weather conditions, and school holiday periods (which are often considered to result in atypical sound levels). Consequently, the level of uncertainty in measurements has been reduced as far as reasonably practicable.

# 13. Socio-Economics and Land Use

## 13.1 Introduction

13.1.1 This chapter sets out the scope and methodology for the socio-economics and land use assessment of the Proposed Development.

## 13.2 Study Area

13.2.1 The potential economic and employment impacts arising are considered relative to a study area that represents the principal labour market catchment area for the Proposed Development,. This will be derived based on analysis of reasonable travel times to the Proposed Development and drawing on demographic and economic data/indicators for the combined statistical areas that aligns with the radius deemed most appropriate.

13.2.2 The assessment of impacts on recreation receptors, and existing and future land use receptors (agricultural land, recreational facilities including PROW, and community facilities) will consider those within the Site, including the Grid Connection Corridor Options and the immediately adjacent land, and any direct effects that may occur due to this change.

## 13.3 Planning Policy Context and Guidance

13.3.1 There is no applicable legislation specific to the assessment of socio-economics and land use. Planning policy and guidance relating to socio-economics and land use, and pertinent to the Proposed Development comprises:

### National Planning Policy

- NPS EN-1 (Ref. 6) with particular reference to paragraphs 4.1.3 and 4.1.4 in relation to adverse effects and benefits, paragraph 4.2.1 in relation to EU directive requirements, paragraph 4.2.2 in relation to socioeconomics, paragraph 5.10.8 in relation to impacts on best and most versatile agricultural land (BMV), and paragraph 5.12.2 in relation to socio-economics;
- Draft NPS EN-3 (Ref. 39), where applicable as it includes the additional consideration of socio-economic impacts associated specifically with solar photovoltaic generation schemes, with reference to paragraphs 2.48.13 to 2.48.15 regarding agricultural land classification;
- NPPF (Ref. 7) with particular reference to Section 6: Building a strong, competitive economy (paragraphs 81-83), Section 12: Achieving well designed places (paragraphs 127-128) and Section 15: Conserving and enhancing the natural environment (paragraph 174b, in relation to impacts on best and most versatile agricultural land) and Section 17 (Facilitating the sustainable use of minerals);
- National Economic Development Policy (Ref. 93) with particular reference to the Government's Industrial Strategy White Paper ambitions to increase

productivity and drive growth, one way that is highlighted is through Clean Growth to lead the world in the development, manufacture and use of low carbon technologies; and

- PPG (Ref. 198) with particular reference to guidance on planning and the economy and the potential future needs of the population in terms of economic development, jobs and employment opportunities.

## Regional Planning Policy

- Greater Lincolnshire Local Enterprise Partnership Local Industrial Strategy (Ref. 208) with reference to aspirations to pioneer the industrial decarbonisation sector, building upon local industrial specialisms. Reference is also made to employment and skills ambitions.

## Local Planning Policy

- Central Lincolnshire Local Plan (2023) (Ref. 195) with particular reference to Policy S2 (Growth Levels and Distribution), Policy S14 (Renewable Energy), S5 (Development in the Countryside), Policy S48 (Walking and Cycling Infrastructure), Policy S50 (Community Facilities), and Policy S67 Best and Most Versatile Agricultural Land.

## 13.4 Baseline Conditions

13.4.1 The potential impacts arising from the Proposed Development are assessed relative to the baseline conditions and benchmarked against regional and national standards where appropriate. The key indicators and measures of the areas will be established for:

- Population and deprivation;
- An overview of the local economies;
- The local labour markets; and
- Land use.

13.4.2 A high-level summary of baseline conditions has been presented in the following paragraphs, based upon review of the following documents:

- Office for National Statistics (ONS), 2011 (Ref. 209) and 2021 Census data (Ref. 210);
- Ministry of Housing, Communities and Local Government, (2019); English indices of deprivation (Ref. 211).
- ONS, (2021); Business Register and Employment Survey (Ref. 212).
- ONS, (2017); Gross Value Added (Income Approach) (2016) (Ref. 213).

13.4.3 The Proposed Development is located within the area administered by North Kesteven District Council (NKDC). This section will therefore establish the baseline conditions relative to this area in comparison to the wider East Midlands region, and England and Wales.

- 13.4.4 The usual resident population of North Kesteven has grown from 107,766 in 2011 to 118,075 in 2021 representing an increase of 9.6% which is greater than that exhibited in the East Midlands (+7.7%) and England and Wales as a whole (6.3%) (Ref. 209, Ref. 210).
- 13.4.5 In terms of deprivation, North Kesteven is ranked 268th out of 317 local authority areas, where 1st is most deprived. None of the Lower Super Output Areas (LSOAs) in North Kesteven are ranked amongst the 20% most deprived LSOAs nationally. Accordingly, 61% of LSOAs are ranked amongst the 30% least deprived nationally.
- 13.4.6 Gross Value Added (GVA) per head is slightly lower in Lincolnshire (£18,959 per head of population at current basic prices in 2018) when compared to the East Midlands region (£21,522) (Ref. 213).
- 13.4.7 In 2021, Census data showed that 29.9% of usual residents aged 16 and over hold degree-level qualifications (National Vocational Qualification 4+), which is broadly in line with the equivalent rate for the East Midlands region (29.1%), although slightly lower than recorded across England and Wales (33.8%) (Ref. 212). Conversely, a lower proportion of usual residents aged 16 and over hold no qualifications in North Kesteven (16.2%) compared to the East Midlands region (19.5%) and England and Wales (18.2%).
- 13.4.8 The broad industrial groups that employ the most people are the manufacturing (15.0%) and health (11.2%) sectors. Additionally, the mining, quarrying and utilities broad industrial group (which includes employment from the generation of energy) represents 1.1% of employment by number of jobs (approximately 450 jobs) (Ref. 212).
- 13.4.9 The economic activity rate (defined as proportion of all usual residents aged 16 and over, excluding full-time students) in North Kesteven at the time of the 2021 Census was 58.6%, which is marginally greater than recorded in the East Midlands region (57.5%) and across England and Wales (58.3%) (Ref. 210).
- 13.4.10 The Site area is mostly used for agricultural purposes, being characterised by large scale regular-shaped arable fields across a number of land-holdings.
- 13.4.11 In respect of recreational routes, there is a network of numerous PRow which traverse the Site area and provide pedestrian connectivity between adjacent settlements. There are also a number of PRow which could be impacted by the Grid Connection Corridor Options. More information on each of these routes is provided in Chapter 14. More information on each of these routes is provided in **Chapter 14: Traffic and Transport**.

## 13.5 Potential Effects and Mitigation

- 13.5.1 The Proposed Development may generate a range of socio-economic effects, some of which would be temporary, whilst others would be permanent. For the purposes of the ES, due consideration will be given to the following:
- Temporary employment during the construction and decommissioning phases;

- Gross Value Added during the construction and decommissioning phases;
- Creation of long-term employment opportunities once the Proposed Development is operational including consideration of any existing employment uses on-site (principally related to agricultural land uses); and
- The change of land use within the Site boundary and any impacts that occur due to this. Likely impacts are anticipated to arise from the displacement of agricultural land uses for the duration of the Proposed Development. Consideration will also be given to impacts experienced by users of recreational facilities, open space (including PRoW), community facilities and development land.

## 13.6 Assessment Methodology

### Baseline

- 13.6.1 Relevant policy will be reviewed at the local, regional and national levels to identify the key issues of relevance to the Proposed Development. This will include Local Plans, any relevant SPPG, NPS and NPPF measures.
- 13.6.2 A baseline assessment will be undertaken using a range of sources to provide a description of the socio-economic conditions within the local area and at local authority level, including employment and the economy. This will be done using established statistical sources as presented in Section 13.4 above.
- 13.6.3 As described below, an ALC soil survey will be undertaken for the land parcels within the Site boundary, as deemed necessary.

### Assessment of effects (including significance)

- 13.6.4 An assessment of effects will be undertaken to assess the impact of the Proposed Development on the baseline socio-economic conditions. The methodology for assessing socio-economic impacts will follow standard EIA guidance and will entail:
- Assessment of the likely scale, permanence and significance of effects associated with socio-economic receptors; and
  - An assessment of the potential cumulative effects with other schemes within the surrounding area.
- 13.6.5 The assessment of potential socio-economic effects will use policy thresholds and expert judgment to assess the scale and nature of the effects of the Proposed Development against baseline conditions. For socio-economics there is no accepted definition of what constitutes a significant (or not significant) socio-economic effect. It is however recognised that effects are categorised based on the relationship between the scale (or magnitude) of effect and the sensitivity (or value) of the affected resource or receptor.
- 13.6.6 As such, the socio-economic effects will be assessed on the basis of:
- Consideration of sensitivity to effects: specific values in terms of sensitivity are not attributed to socio-economic resources/receptors due to their

diverse nature and scale, however the assessment takes account of the qualitative (rather than quantitative) 'sensitivity' of each receptor and, in particular, their ability to respond to change based on recent rates of change and turnover (if appropriate);

- Scale of effect: this entails consideration of the size of the effect on people or business in the context of the area in which effects will be experienced; and
- Scope for adjustment or mitigation: the socio-economic study is concerned in part with economies. These adjust themselves continually to changes in supply and demand, and the scope for the changes brought about by the Proposed Development to be accommodated by market adjustment will therefore be a criterion in assessing significance.

13.6.7 The assessment aims to be objective and quantifies effects as far as possible. However, some effects can only be evaluated on a qualitative basis. Effects are defined as follows:

- Beneficial classifications of effect indicate an advantageous or beneficial effect on an area, which may be minor, moderate, or major in effect;
- Negligible classifications of effect indicative imperceptible effects on an area;
- Adverse classifications of effect indicate a disadvantageous or adverse effect on an area, which may be minor, moderate or major in effect; and
- No effect classifications indicate that there are no effects on an area.

13.6.8 Based on consideration of the above, where an effect is assessed as being beneficial or adverse, the scale of the effect has been assigned using the below criteria:

- Minor: a small number of receptors are beneficially or adversely affected. The effect will make a small measurable positive or negative difference on receptors at the relevant area(s) of effect;
- Moderate: a noticeable number of receptors are beneficially or adversely affected. The effect will make a measurable positive or negative difference on receptors at the relevant area(S) of effect; and
- Major: all or a large number of receptors are beneficially or adversely affected. The effect will make a measurable positive or negative difference on receptors at the relevant area(s) of effect.

13.6.9 Those effects which are found to be moderate or major are considered to be 'significant' and those which are minor or negligible are 'not significant'.

13.6.10 Duration of effect is also considered, with more weight given to reversible long-term or permanent changes than to temporary ones. Temporary effects are considered to be those associated with the construction works. Long-term reversible effects are generally those associated with the completed and operational development. For the purposes of this assessment, short term effects are considered to be of one year or less, medium term effects of one to four years, and long-term effects of five or more years.

- 13.6.11 Employment and GVA effects will consider the temporary and permanent impact on a principal economic area defined based on consideration of local authority area boundaries and a typical travel time from the Site. Homes and Communities guidance on additionality will be applied to assess direct, indirect and induced impacts (Ref. 214).
- 13.6.12 As part of this chapter the likely effects on land-use that could result from the construction and operation of the Proposed Development will be considered.
- 13.6.13 The assessment of effects on agricultural land-use will consider the impacts that could result from the construction operation and decommissioning of the Proposed Development, arising from the change to the dominant land-use within the Site, from its current use for arable cultivation, to that of energy generation using solar PV. To inform this, an ALC survey of the Solar and Energy Storage Park will be undertaken with reference to the Natural England guidance (Ref. 215).
- 13.6.14 The assessment will be undertaken with reference to the ALC survey result. It is not currently confirmed how the land will be managed under and around the solar PV modules. There is potential for continued agricultural use of the land through grazing and the proposals relating to this will be presented in the ES to inform the assessment.
- 13.6.15 There are no defined thresholds for assessing the effects of non-agricultural development on agricultural assets. The NPPF states that *'planning policies and decisions should contribute to and enhance the natural and local environment by...recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland'* (Ref. 209).
- 13.6.16 The assessment of effects on recreational facilities, including PRow, and community facilities will consider direct impacts arising from any closures and loss of and/or diversions. Effects on development land will consider direct (land-take) and indirect (access) impacts on any of the delivery of development proposals or allocations both within and adjacent to the Site.

## 13.7 Elements Scoped Out

- 13.7.1 It is proposed that impacts on Mineral Safeguarding Areas are scoped out of the socio-economic and land use assessment. Although the Site boundary is in proximity to the extent of 'MS04-LT: Swinderby Airfield, Witham St Hughs' and 'MS05-LT: Norton Bottoms Quarry, Stapleford' allocations of sand and gravel resource (Ref. 215), the extent of the Site does not include these allocations and therefore the Proposed Development is unlikely to have any impact on the mineral resources in this location.

## 13.8 Assumptions, Limitations and Uncertainties

Information on current land use from landowners on the Site will be required to determine existing employment generated within the existing Site. In the

absence of this information, good practice guidance and professional judgment will be applied.



# 14. Traffic and Transport

## 14.1 Introduction

- 14.1.1 This section outlines the anticipated Traffic and Transport EIA. The PEIR will be informed by an Initial Access Study and Transport Scoping Note or Presentation which will be used to set out and agree the proposed scope for assessment with the Local Highway Authority. An Outline CTMP will also be prepared to inform the DCO submission.
- 14.1.2 Although the Site is located solely in Lincolnshire, it also falls within proximity to the Nottinghamshire border (circa. 3.3km south-west). Parts of the Site sit (and directly border) both sides of the A46 Trunk Road which is managed by National Highways (NH). Therefore, Lincolnshire County Council (LCC), Nottinghamshire County Council (NCC) and NH will be consulted to determine, and seek agreement on, the Scope and approach for the traffic and transport deliverables.

## 14.2 Planning Policy Context and Guidance

- 14.2.1 Planning policy and guidance relating to traffic and transport, and pertinent to the Proposed Development comprises:

### National Planning Policy

#### National Policy Statement for Energy, EN-1 (March 2023, draft for consultation)

- 14.2.2 NPS EN-1 (Ref. 6) was published in 2011 and provides the basis for decisions regarding nationally significant energy infrastructure. Section 5.13 outlines the Planning Policy for Traffic and Transport, including guidance on undertaking relevant parts of the EIA. The most relevant paragraphs for this purpose are 5.13.3 to 5.13.5 which deal with the Applicant's assessment, as follows:
- Paragraph 5.13.3, which states that if a project is likely to have significant transport implications, a Transport Assessment should be included with the ES;
  - Paragraph 5.13.4, which states that where appropriate, a Travel Plan to include demand management measures to mitigate transport impacts should be prepared; and
  - Paragraph 5.13.5, which highlights that where additional transport infrastructure is proposed, this should be discussed with the relevant network providers (in terms of the possibility of co-funding by Government for any third-party benefits).
- 14.2.3 Section 3.1 relates to the decision making which includes the following:

- Paragraph 3.1.1: *“the UK needs all the types of energy infrastructure covered by this NPS in order to achieve energy security at the same time as dramatically reducing greenhouse gas emissions”*;
- Paragraph 3.1.2: *“it is for industry to propose new energy infrastructure projects within the strategic framework set by Government. The Government does not consider it appropriate for planning policy to set targets for or limits on different technologies”*;
- Paragraph 3.1.3: the decision maker should therefore *“assess all applications for development consent for the types of infrastructure covered by the energy NPSs on the basis that the Government has demonstrated that there is a need for those types of infrastructure and that the scale and urgency of that need is as described for each of them in this Part”*; and
- Paragraph 3.1.4, the decision maker should *“give substantial weight to the contribution which projects would make towards satisfying this need when considering applications for development consent under the Planning Act 2008”*.

14.2.4 The document is currently under review and an updated Draft was published for consultation in March 2023 (Ref. 92). Section 5.14 outlines the Planning Policy for Traffic and Transport, including guidance on undertaking relevant parts of the EIA. The most relevant paragraphs for this purpose are Paragraphs 5.14.5 to 5.14.21 as follows:

- Paragraph 5.14.5, which states that if a project is likely to have significant transport implications, a Transport Appraisal should be included with the ES (with reference to the Department for Transport’s Transport Analysis Guidance (TAG));
- Paragraph 5.14.6, which sets out that applicants should consult National Highways and Highways Authorities as appropriate to agree the assessment and mitigations;
- Paragraph 5.14.7, which states that *“where appropriate, a Travel Plan to include demand management measures to mitigate transport impacts. The applicant should also provide details of proposed measures to improve access by active, public and shared transport to: reduce the need for parking associated with the proposal; contribute to decarbonisation of the local network; and reduce the need to travel and secure modal shifts to mitigate transport impacts”*;
- Paragraph 5.14.8, which also highlights that the assessment should consider any possible disruption to services and infrastructure (such as road, rail and airports);
- Paragraph 5.14.9, which states if additional transport infrastructure is needed or proposed, it should always include good quality walking, wheeling and cycle routes, and associated facilities (changing/storage etc) needed to enhance active transport provision;

- Paragraph 5.14.10, which discusses that applicants should discuss with network providers the possibility of co-funding by government for any third-party benefits. Guidance has been issued which explains the circumstances where this may be possible, although the government cannot guarantee in advance that funding will be available for any given uncommitted scheme at any specified time;
- Paragraph 5.14.13, which informs that regard should always be given to the needs of freight at all stages in the construction and operation of the development including the need to provide appropriate facilities for HGV drivers as appropriate;
- Paragraph 5.14.14, which states the Secretary of State (SoS) may attach requirements to a consent where there is likely to be substantial HGV traffic;
- Paragraph 5.14.16, directs that applicants should consider the DfT policy guidance “*Water Preferred Policy Guidelines for the movement of abnormal indivisible loads*” when preparing their application;
- Paragraph 5.14.18, which states a new energy NSIP may give rise to substantial impacts on the surrounding transport infrastructure and the SoS should therefore ensure that the applicant has sought to mitigate these impacts, including during the construction phase of the development and by enhancing active, public and shared transport provision and accessibility
- Paragraph 5.14.19, highlights where the proposed mitigation measures are insufficient to reduce the impact on the transport infrastructure to acceptable levels, the SoS should consider requirements to mitigate adverse impacts on transport networks arising from the development;
- Paragraph 5.14.21, which states that the SoS should only consider preventing or refusing development on highways grounds if there would be an unacceptable impact on highway safety, or residual cumulative impacts on the road network would be severe.

### **National Policy Statement for Renewable Energy Infrastructure, EN-3 (September 2011)**

- NPS EN-3 (Ref. 39) was published in 2011 and sets out the policies relating to electricity generation from renewable sources of energy, to be considered in conjunction with NPS EN-1. It should however be noted that solar farms are not explicitly included within the document.
- The document is currently under review and an updated draft was published for consultation in March 2023 (Ref. 216). The most relevant paragraphs of the draft NPS EN-3 are as follows:
- Paragraph 3.10.20, which discusses the importance of assessing various potential routes to the site for the delivery of materials and components during the construction and operation of the Proposed Development with the former likely to raise more issues;

- Paragraph 3.10.21, which considers the suitability of access for the delivery of solar arrays and the associated infrastructure during construction can be a significant consideration for solar farm siting;
- Paragraph 3.10.24, which considers applications to include the full extent of the access routes necessary for operation and maintenance and an assessment of their effects;
- Paragraph 3.10.26, which states public rights of way may need to be temporarily stopped to enable construction, however, applicants should keep, as far as is practicable and safe, all public rights of way that cross the proposed development site open during construction and protect users where a public right of way borders or crosses the site;
- Paragraph 3.10.27, which highlights that applicants are encouraged to design the layout and appearance of the site to ensure continued recreational use of public rights of way, where possible during construction, and in particular during operation of the site;
- Paragraph 3.10.29, which states applicants should consider and maximise opportunities to facilitate enhancements to the public rights of way and the adoption of new public rights of way through site layout and design of access;
- Paragraph 3.10.30, which informs that applicants should set out detail on how public rights of way would be managed to ensure they are safe to use is set out in an outline Public Rights of Way Management Plan;
- Paragraph 3.10.114, which states applicants should assess the various potential routes to the site for delivery of materials and components where the source of the materials is known at the time of the application and select the route that is the most appropriate;
- Paragraph 3.10.116, which states applicants should ensure all sections of roads and bridges on the proposed delivery route can accommodate the weight and volume of the loads and width of vehicles. Although unlikely, where modifications to roads and/or bridges are required, these should be identified, and potential effects addressed in the ES; and,
- Paragraph 3.10.117, which discusses that where a cumulative impact is likely because multiple energy infrastructure developments are proposing to use a common port and/or access route and pass through the same towns and villages, applicants should include a cumulative transport assessment as part of the ES. This should consider the impacts of abnormal traffic movements relating to the project in question in combination with those from any other relevant development. Consultation with the relevant local highways authorities is likely to be necessary.

### **National Policy Statement for Electricity Networks Infrastructure (NPS EN-5)**

- NPS EN-5 (Ref. 5) was published in 2011 and sets out the policies relating to electricity generation and its infrastructure, for consideration in

conjunction with NPS EN-1. The document is currently under review and an updated draft was published for consultation in March 2023 (Ref. 92).

### **National Planning Policy Framework (July 2021)**

14.2.5 The most relevant paragraphs of the NPPF in the context of transport are set out, as follows (Ref. 61):

- Paragraph 104 outlines that *“transport issues should be considered from the earliest of stages of plan-making and development proposals”*;
- Paragraph 110 outlines the key considerations when assessing sites to be allocated for development in plans or specific development applications;
- Paragraph 111 states that development should only be prevented or refused on highways grounds where there would be an unacceptable impact on highway safety, or the residual cumulative impacts of development on the road network would be severe;
- Paragraph 112 highlights that applications for development should give priority first to pedestrian and cycle movements and then, as far as possible, to facilitating access to high quality public transport; and
- Paragraph 113 outlines that all developments that generate significant amounts of movement should be required to provide a Travel Plan, and the application should be supported by a Transport Statement or TA so that the likely impacts of the proposal can be assessed.

## **National Guidance**

### **National Planning Practice Guidance**

14.2.6 Travel Plans, Transport Assessments and Statements (2014) (Ref. 73) provides advice on when TAs and Transport Statements are required, and what they should contain. The most relevant paragraphs are summarised below:

- Paragraph 002: assessing and mitigating the negative transport impacts of a development in order to promote sustainable development;
- Paragraphs 004 and 005: evaluating the potential transport impacts of a development proposal and proposing mitigation measures where these are necessary to avoid unacceptable or ‘severe’ impacts to promote sustainable development;
- Paragraph 006: positively contributing to encouraging sustainable travel, reducing traffic generation and detrimental impacts, reducing carbon emissions and climate impacts, creating accessible, connected and inclusive communities, improving health outcomes and quality of life, improving road safety and reducing the need for new development to increase existing road capacity of providing new roads;
- Paragraph 007: discusses early-stage consultation and, tailored to local circumstances, collaborative ongoing working between the local planning authority/transport authority, transport operators, rail network operators,

as well as National Highways where there may be implications for the strategic road network and other relevant bodies; and

- Paragraphs 013 to 015 discuss the potential scope and establishes what information should be included.

## Local Planning Policy

### Lincoln Transport Strategy 2020 to 2036 (2020)

14.2.7 The new Lincoln Transport Strategy (Ref. 218) has been developed by LCC, City of Lincoln Council, North Kesteven District Council and West Lindsey District Council. It aims to provide a clear vision for the future of transport across the Lincoln area up to 2036, the strategy includes:

- Enhancing connectivity across the network for all modes;
- Increasing the capacity of the network and supporting the reduction in traffic in the urban area; and
- Rebalancing movement towards walking and cycling.

### Adopted Central Lincolnshire Local Plan (April 2023)

14.2.8 The Central Lincolnshire Local Plan 2020-2040 (Ref. 195) has been prepared by the Central Lincolnshire Joint Strategic Planning Committee (hereby referred to as the 'Joint Committee') and was adopted in April 2023, superseding the previously adopted version (April 2017).

14.2.9 Policy S14: Renewable Energy, states that *“Joint Committee is committed to supporting the transition to a net zero future and will seek to maximise appropriately located renewable energy generated in Central Lincolnshire. Proposals for renewable energy schemes, including ancillary development, will be supported where the direct, indirect, individual and cumulative impacts on the following considerations are, or will be made, acceptable. To determine whether it is acceptable, the following tests will have to be met:*

- *The impacts are acceptable having considered the scale, siting and design, and the consequent impacts on landscape character; visual amenity; biodiversity; geodiversity; flood risk; townscape; heritage assets, their settings and the historic landscape; as well as highway safety and rail safety;*
- *The impacts are acceptable on aviation and defence navigation system/communications; and,*
- *The impacts are acceptable on the amenity of sensitive neighbouring uses (including local residents) by virtue of matters such as noise, dust, odour, shadow flicker, air quality and traffic.”*

14.2.10 Policy S45: Strategic Infrastructure Requirements states that *“new developments should be supported by, and have good access to infrastructure:*

- *Planning permission will only be granted if it can be demonstrated that there is, or will be, sufficient infrastructure capacity to support and meet all*

*the necessary requirements arising from the proposed development. Development proposals must consider all of the infrastructure implications of a scheme; not just those on the site or in its immediate vicinity. Conditions or planning obligations, as part of a package or combination of infrastructure delivery measures, are likely to be required for many proposals to ensure that new development meets this principle; and,*

- *Consideration must be given to the likely timing of infrastructure provision. As such, development may need to be phased. Conditions or a planning obligation may be used to secure this phasing arrangement.”*

14.2.11 Policy S46: Safeguarded Land for Future Key Infrastructure states that *“development proposals on, or near to, the preferred route of the North Hykeham Relief Road, as indicated on the Policies Map, which will prejudice the efficient and effective delivery of the project will be refused.”*

14.2.12 Policy S47: Accessibility and Transport states that *“development proposals which contribute towards an efficient and safe transport network that offer a range of transport choices for the movement of people and goods will be supported. Similarly, all development should demonstrate, where appropriate, that they have a regard to the following criteria:*

- *Located where travel can be minimised and the use of sustainable transport modes are maximised;*
- *Minimise additional travel demand through the use of measures such as travel planning, safe and convenient public transport, car clubs, walking and cycling links and integration with existing infrastructure; and,*
- *Making allowance for low and ultra-low emission vehicle refuelling infrastructure.”*

14.2.13 Policy S48: Walking and Cycling Infrastructure states that *“development proposals should facilitate active travel by incorporating appropriate measures from the design stage. Plans and evidence accompanying applications should demonstrate how the ability to travel by foot or cycle will be actively encouraged by the delivery of well designed, safe and convenient access for all both into and through the site. Priority should be given to the needs of pedestrians, cyclists, people with impaired mobility and users of public transport by providing a network of high-quality pedestrian and cycle routes and green corridors, linking to existing routes and public rights of way where opportunities exist, that provide easy access and permeability to adjacent areas. Proposals will:*

- *Protect, maintain and improve existing infrastructure, including closing gaps or deficiencies in the network and connecting communities and facilities;*
- *Provide high quality attractive routes that are safe, direct, legible and pleasant and are integrated into the wider network;*
- *Ensure the provision of appropriate information, including signposting and way-finding to encourage the safe use of the network;*

- Encourage the use of supporting facilities, especially along principle cycle routes;
- Make provision for secure cycle parking facilities in new developments and in areas with high visitor numbers across Central Lincolnshire; and
- Consider the needs of all users through inclusive design.”

14.2.14 Policy S49: Parking Provision states that *“parking provisions for non-residential development should incorporate a level of car parking that is suitable for the proposed development taking into account its location, size, proposed use, expected number of employees and visitors. Infrastructure relating to electric vehicle charging points should be provided in accordance with Policy NS18.”*

### **Fifth Lincolnshire Local Transport Plan**

14.2.15 Lincolnshire County Council’s Fifth Local Transport Plan (Ref. 219) is a statutory duty for Local Highway Authorities and is designed to cover the short-term (2022-2026), medium-term (to 2034) and long-term (to 2050) horizons for transport and highways for the whole county. **Chapter 2: Description of the Proposed Development** discusses the proposed themes related to the integrated transport strategy which include:

- Theme 1: Supporting economic growth;
- Theme 2: Future ready, green transport;
- Theme 3: Promoting thriving environments;
- Theme 4: Supporting safety, security and a healthy lifestyle;
- Theme 5: Promoting high aspirations; and,
- Theme 6: Improve quality of life.

14.2.16 Theme 2 focuses on introducing low-carbon technologies which reduce the reliance on fossil fuels as well as delivering sustainable development by ensuring new developments are designed in a way such that reduce the need to travel, minimise car use and support the use of more sustainable modes.

14.2.17 Policy Green 2 states that the Local Transport Plan supports the commitments of the Green Master Plan to achieve net-zero alongside a thriving natural environment.

14.2.18 Policy Green 4 states *“We will use the local and strategic development management processes to ensure that development is planned, delivered and managed to reduce the need to travel and support the delivery of sustainable transport modes. We will support the provision of improved walking, cycling and public transport services and facilities as part of new developments and actively encourage innovative solutions such as car clubs, mobility hubs, active travel plans and other sustainable solutions as opposed to single occupancy car use”*.



### **Nottinghamshire Local Transport Plan 2011-2026 (March 2011)**

14.2.19 The Nottinghamshire Local Transport Plan (LTP) (Ref. 220) sets out Nottinghamshire's Transport Strategy and outlines a programme of measures to be delivered over the short, medium and long-term. The strategy covers all types of transport including public transport, walking, cycling, cars and freight.

## **Industry Guidance**

### **Institute of Environmental Management and Assessment Guidelines (1993)**

14.2.20 IEMA Guidelines for the Environmental Assessment of Road Traffic (1993) (Ref. 221), provides guidance on examining the environmental impacts of developments in terms of traffic and transportation.

### **Construction Logistics and Community Safety (CLOCS, August 2022)**

14.2.21 The CLOCS guidance (Ref. 222) draws upon evolving best practice, standards, policies and codes of practice, providing a standard which planning authorities, developers and contractors can implement and providing a coherent set of guidelines which can be adhered to, with the primary goals of achieving:

- Zero collisions between construction vehicles and the community;
- Improved air quality and reduced emissions;
- Fewer vehicle journeys; and
- Reduced reputational risk.

## **Summary**

14.2.22 The Applicant will seek to adhere to the relevant policies and document requirements set out above which are deemed as applicable for the Proposed Development. The DCO submission will be supported by several transport deliverables which will be agreed and discussed with the relevant consultees, these are likely to include the following;

- Transport Assessment (TA) – this will either be a standalone TA or within a separate chapter of the PEIR and ES Traffic and Transport chapters to minimise duplication across multiple reports given the assessment focus on the construction phase – approach and scope to be agreed with the Local Highway Authority;
- Outline CTMP – proposed as a standalone report which will form an appendix to the PEIR and ES Traffic and Transport chapters which will identify key mitigations and management measures to be implemented during the construction phase of the Proposed Development - scope to be agreed with the local authority;
- Travel Plan – at this stage it is not proposed for a standalone Travel Plan to be produced as part of the DCO submission (therefore it has been Scoped out). However, certain aspects of a Travel Plan related to

mitigations and measures for construction staff will be implemented and included as part of the Outline CTMP – approach to be agreed with the Local Highway Authority;

- PRow Management Plan – is proposed to be incorporated within the DCO submission to set out the details on how public rights of way would be managed during the construction phase (as per NPS EN-3, paragraph 3.10.30) – scope to be agreed with the Local Highway Authority.

## 14.3 Baseline Conditions

14.3.1 Baseline conditions for the land within the study area will be described in detail in the PEIR, however for the purposes of this EIA Scoping Report, they have been summarised in the following sections.

### Existing Local Highway Network

#### Solar and Energy Storage Park

14.3.2 The Site encompasses a large area of predominantly agricultural land located to the north and south of the strategic trunk A-road, the A46, which runs in a northeast-southwest alignment through the Site. To the north-east, the A46 provides access to Lincoln as well as further connections with the A57, A15 and A158. To the south-west the A46 provides links to Newark-on-Trent as well as further connections with the A1, A17 and A617.

14.3.3 Within the vicinity of the Solar and Energy Storage Park, the highways are mostly local rural roads, namely:

- Fosse Lane (north-east extent of the Site) - local route between Thorpe-on-the-Hill in the north and the A46 in the south (as well as joining with Haddington Lane in the south);
- Haddington Lane (eastern extent of the Site) - local road between Haddington and Thurlby, connecting with Fosse Lane in the north and running along the A46 overbridge;
- Moor Lane (running through the centre of the Site) - local highway to the west of Thurlby and south of Witham-St-Hughes. The road connects with an unnamed road in the west which connects with the A46 at the Halfway House Roundabout (in the north); and,
- Bassingham Road (running through the eastern edge of the Site) - local road split into two sections; the first of these is to the south of Thurlby, routing towards Bassingham in the south (west of the River Witham). The second section runs to the south of Aourn, running towards Bassingham in the south (east of the River Witham). The two sections are connected by a circa. 1.2km section of Lincoln Road which is a two-way single carriageway highway in the vicinity of the Site boundary.

14.3.4 All of the mentioned rural routes are single carriageway roads with a single lane in each direction. Speed limits on the routes vary from between derestricted (60mph) to 30mph when they pass through settlements, often featuring footway provision and street lighting within the settlements.

14.3.5 Within the study area there are a number of other minor roads which run through, alongside or in the vicinity of the Solar and Energy Storage Park. These include:

- The Avenue/ Morton Lane (western extent of the Site), a no-through single track road to the east of Morton, accessed from Halfway House Lane to the north of the Halfway House Roundabout;
- Stone Lane (central extent of the Site), a no-through road single lane track (with passing places) to the southeast of A46, accessed via Haddington Lane;
- Clay Lane (south-west extent of the Site), a narrow single lane highway with passing places, to the west of Bassingham, connecting with Bassingham Road to the south of Thurlby and running towards Norton Disney in the west; and,
- Fen Lane (south-east extent of the Site), a no-through single lane track to the northwest of Bassingham, west of River Brant, accessed via Lincoln Road.

14.3.6 At the stage of writing, the details related to the sourcing and origin of the relevant materials for the Solar and Energy Storage Park (such as solar arrays) have not yet been confirmed. However, it is likely, based on our experience that these would be transported from one of the local ports. As part of the PEIR Stage, an initial access feasibility assessment will be undertaken to determine the potential access route(s) for delivering these components to the Solar and Energy Storage Park via the Strategic Road Network (SRN) and local roads.

14.3.7 It is acknowledged that due to the rural nature of the surrounding area within the vicinity of the Site a number of the local roads are subject to restrictions (such as weight restrictions of below 7.5 tonnes). These factors will be considered when reviewing potential routes to minimise the impact of the Proposed Development on local roads.

### **Grid Connection Corridor Options**

14.3.8 There are a number of Grid Connection Corridor options under consideration. Broadly the route is planned to run in a southeast direction from the Solar and Energy Storage Park, crossing the River Brant, Broughton Lane and the A607, proceeding across agricultural land to the new National Grid Substation which is proposed to be located in the Navenby area. The National Grid Substation itself is not included as part of this DCO submission.

14.3.9 Three potential corridors are currently being explored for the grid connection. Depending on the final routing of the Grid Connection Corridor, the route will potentially cross several local rural roads in the vicinity of Harmston, Coleby, Navenby and Wellingore, these include (listed from west to east):

- Northern Grid Connection Corridor Option – in the vicinity of Harmston (running between Harmston in the north and Coleby in the south) – the Grid Connection Corridor could cross the following roads; Health Road, B1202 Heath Lane and Green Man Road;

- Middle Grid Connection Corridor Option – in the vicinity of Coleby (running between Coleby in the north and Boothby Graffoe in the south) – the Grid Connection Corridor could cross the following roads; Hill Rise, High Dyke, B1202 Heath Lane and Green Man Road; and,
- Southern Grid Connection Corridor Option – in the vicinity of Wellingore (to the south of Wellingore) – the Grid Connection Corridor could cross the following roads; Castle Lane, Church Lane, Parson Lane, Skinnand Lane, Carr Lane, Cross Lane, Pottergate Road, High Dyke, Gorse Hill Lane, an unnamed road to the south of Green Man Road and Green Man Road.

14.3.10 The majority of the roads identified above are narrow, derestricted single-track roads with no pedestrian facilities or street lighting etc and which it is understood are relatively / very lightly trafficked.

14.3.11 The Site boundary for the Grid Connection Corridor Options also includes a section of the A15 to the east of the proposed National Grid substation location. However, it is assumed at this stage that the Grid Connection Corridor for any of the three options highlighted above would not cross the A15 at any point.

## Existing Walking Facilities

### Solar and Energy Storage Park

14.3.12 Due to the location of the Solar and Energy Storage Park in rural Lincolnshire, there is limited footway provision in the surrounding area. Footways are limited to the settlements that surround the Solar and Energy Storage Park, these include, but are not limited, to the following;

- Fosse Lane – footway provision along the northbound lane;
- Bassingham Road – footway provision along the southbound lane to the south of Thurlby; and,
- Footway provision around Bassingham, to the southeast of the Solar and Energy Storage Park including on Thurlby Road, Lincoln Road, Croft Lane, Linga Lane. This provision is largely within the extent of residential areas on these roads.

14.3.13 There are a number of Public Rights of Way (PRoW) within, or in close proximity to, the Solar and Energy Storage Park, these include;

14.3.14 PRoW located within the Site boundary of the Solar and Energy Storage Park, namely:

- **LL|TOTH|6/1** – A footpath which runs through the field to the west of Fosse Lane from Main Street, Thorpe-on-the-Hill in the north, through the fields and within the Site boundary. The footway is approximately 955m in length, running in a north – south-west direction, joining with LL|TOTH|6A/1 and LL|TOTH|6/2 within the northern extent of the Site boundary

- **LL|TOTH|7/2#1** - A footpath routing through the field to the west of Station Road/ Lincoln Lane, Thorpe-on-the-Hill, within the Site boundary. The footway is approximately 1,470m in length, running in a west-east direction, joining with PRoW LL|TOTH|7/1 and LL|TOTH|5/1 in the east and PRoW LL|TOTH|21/1, LL|TOTH|7/3 and LL|TOTH|15/1 to the east of Tunman Woods, within the northern extent of the Site boundary.
- **LL|TOTH|15/1** - A footpath which links through the field to the west of Station Road / Lincoln Lane, Thorpe-on-the-Hill, within the Site boundary. The footway is approximately 1,080m in length, running in a west-east direction, joining with PRoW LL|TOTH|21/1, LL|TOTH|7/3 and LL|TOTH|7/2#1 to the east of Tunman Woods, within the northern extent of the Site boundary.
- **LL|TOTH|7/3** - A footpath which runs through the field to the west of Station Road / Lincoln Lane, Thorpe-on-the-Hill, within the Site boundary. The footway is approximately 422m in length, running in a west-east direction, joining with PRoW LL|TOTH|21/1, LL|TOTH|15/1 and LL|TOTH|7/2#1, to the east of Tunman Woods, within the northern extent of the Site boundary and with PRoW LL|TOTH|13/2 and LL|TOTH|13/1 to the west of Tunman Woods along the Site boundary.
- **LL|TOTH|21/1** – A footpath routing through the field to the east of Tunman Woods, within the Site boundary. The footway is approximately 170m in length, running in a north-south direction, in the north joining with PRoW LL|TOTH|7/3, LL|TOTH|7/2#1 and LL|TOTH|15/1 and in the south joining with LL|TOTH|6/2, within the northern extent of the Site boundary.
- **LL|TOTH|6/2** - A footpath which runs through the field to the west of Fosse Lane within the Site boundary. The footway is approximately 455m in length, running in a west-east direction, joining with PRoW LL|TOTH|6/1 and LL|TOTH|6A/1 in the east and PRoW LL|TOTH|21/1 and LL|TOTH|6/3#1 in the west, within the northern extent of the Site boundary.
- **LL|TOTH|6/3#1** - A footpath linking through the field to the east of Tunman Woods, within the Site boundary. The footway is approximately 220m in length, running in a north-south direction, in the north joining with PRoW LL|TOTH|21/1 and LL|TOTH|6/2, within the northern extent of the Site boundary.
- **LL|TOTH|13/1** – A footpath which runs through the field to the south of Eagle Lane, to the east of Tunman Woods. The footway is approximately 830m in length, running in a north-south direction, in the north joining with PRoW LL|Eag|11/1 and LL|TOTH|16/1 and in the south, along the Site boundary joining with LL|TOTH|7/3 and LL|TOTH|13/1, within the northern extent of the Site boundary.
- **LL|TOTH|6A/1** – A footpath running through the field to the west of Fosse Lane within the Site boundary. The footway is approximately 665m in length, running in a north- south-west direction, joining with

LL|TOTH|6/1 and LL|TOTH|6/2 within the northern extent of the Site boundary.

- **LL|TOTH|11/1** – A footway which routes through the field to the east of Marton Lane within the Site boundary. The footway is approximately 560m in length, running in a west-east direction, in the west joining with LL|TOTH|11/2, within the northern extent of the Site boundary.
- **LL|TOTH|12/3** – A bridleway which runs to the north of Marton Lane, Marton. The bridleway is approximately 1,125m in length, running in a north-south direction, within the Site boundary, in the north joining with PRoW LL|Eag|1058 and in the south joining with PRoW LL|TOTH|12/2 and LL|Swdb|4/1 (joining just outside of the Site boundary), within the northern extent of the Site boundary.
- **LL|Aubo|12/2** – A footpath which runs between the Site boundary in the west and Haddington Lane in the east. The footway is approximately 950m in length, running in a west-east direction, in the west joining with PRoW LL|ThuN|4/1 along the border of the Site boundary, within the central extent of the Site boundary.
- **LL|Aubo|11/2** - A footpath routing from Haddington Lane towards River Witham in the east through the fields. The footway is approximately 655m in length, running in a west-north-east direction, in the north-east joining with PRoW LL|Aubo|13/2, LL|Aubo|12/1, LL|Aubo|11/1 and LL|Aubo|13/1 just outside of the Site boundary, within the central extent of the Site boundary.
- **LL|Aubo|13/1** – A restricted byway which links across River Witham. The byway is approximately 635m in length, running in a west-east direction, in the west joining with PRoW LL|Aubo|11/2, LL|Aubo|12/1, LL|Aubo|11/1 and LL|Aubo|13/2 and in the east joining with LL|Aubo|9/1 to the west of Bassingham Road along the Site boundary, within the central extent of the Site boundary.
- **LL|Aubo|10/1** - A footpath which runs through the field to the west of Bassingham Road. The footway is approximately 780m in length, running in a north-south direction, in the south joining with PRoW LL|Bass|4/2 along the eastern extent of the Site boundary.
- **LL|Aubo|8/1** - A restricted byway routing through the field to the east of Bassingham Road. The byway is approximately 415m in length, running in a north-south direction, within the Site boundary, in the south joining with PRoW LL|Bass|21/3 along the eastern extent of the Site boundary.
- **LL|Aubo|3/1** - A footpath which runs along Moor Lane to the south of Harmston Road. The footway is approximately 1,960m in length, running in a north-south direction, along the southern extent of the Site boundary.
- **LL|Bass|23/1** - A footpath which routing via the field to the east of Fen Lane. The footway is approximately 890m in length, running in an east-west direction, within the southern extent of the Site boundary, between Fen Road in the west and the River Brant in the east, along the southern extent of the Site boundary.

- **LL|ThuN|2/1** - A footpath running through the field to the south of Moor Lane. The footway is approximately 920m in length, running in a north-west-south-east alignment within the southern extents of the Site boundary between Moor Lane in the north and Bassingham Road to the east, south of Thurlby.
- **LL|ThuN|1/1** - A footpath running through the field to the east and north of Bassingham Road. The footway is approximately 375m in length, running in a north-south alignment within the southern extents of the Site boundary to the west of River Witham, northwest of Bassingham.
- **LL|ThuN|5/1** - A footpath running through the field to the east of Clay Lane. The footway is approximately 380m in length, running in a north-south alignment within the southern extents of the Site boundary to the west of River Witham, west of Bassingham, in the south joining with PRow LL|NoDi|4/1.
- **LL|NoDi|4/1** - A footpath running through the field to the east of Clay Lane. The footway is approximately 310m in length, running in a north-south alignment within the southern extents of the Site boundary to the west of River Witham, west of Bassingham. In the north the PRow joins with PRow LL|ThuN|5/1 and in the south with PRow LL|NoDi|1/1 and LL|NoDi|1/2, along the southern extent of the Site boundary.

14.3.15 PRow which run alongside the boundary or within close proximity to the Site boundary of the Solar and Energy Storage Park are as follows:

- LL|TOTH|18/3, LL|TOTH|18/2, LL|TOTH|18/1, LL|TOTH|7/1, LL|TOTH|5/1, LL|TOTH|13/2, LL|TOTH|12/2, LL|TOTH|12/1, LL|TOTH|11/2, LL|Swdb|5/1, LL|Swdb|4/1, LL|ThuN|4/1, LL|Aubo|13/2, LL|Aubo|12/1, LL|Aubo|11/1, LL|Aubo|9/1, LL|Bass|4/2, LL|Bass|21/3, LL|Bass|20/1, LL|Bass|21/2, LL|Bass|22/1, LL|Bass|21/1, LL|ThuN|3/1, LL|NoDi|1/1, LL|NoDi|1/2

### **Potential Grid Connection Corridor**

14.3.16 Sections of footway exist in the vicinity of Harmston, Coleby, Navenby and Boothby Graffoe. Navenby and Boothby Graffoe are the two nearest local settlements situated circa 1km to the west of the proposed National Grid substation locations, however there are no other formal footway provisions in this part of the study area.

14.3.17 There are a number of PRow which could be impacted by the Grid Connection Corridor (once the route is confirmed). These are:

### **Northern Grid Connection Corridor Option**

- LL|Harm|7/1, LL|Harm|6/2, LL|Harm|1044/1 and LL|Cole|1/2

### **Middle Grid Connection Corridor Option**

- LL|Cole|4/1, LL|Cole|3/1, LL|Cole|1/2 and LL|BooG|2/2

## **Southern Grid Connection Corridor Option**

- LL|Wlgr|7/4, LL|Wlgr|10/3, LL|Wlgr|10/2, LL|Wlgr|9/2, LL|Wlgr|8/3, LL|Wlgr|8/2, LL|Wlgr|1/1, LL|Wlgr|2/2, LL|Wlgr|2/1, LL|Wlgr|4/1, LL|Wlgr|4/2, LL|Wlgr|2/3, LL|Wlgr|3/1, LL|Wlgr|3/2, LL|Wlgr|2/4, LL|Temp|2/1, LL|AshL|4/1 and LL|Nave|14/1.

14.3.18 Additionally, there are a number of PRow located to the east of the A15; however, these have not been listed as it is assumed these would not be impacted by the Grid Connection Corridor based on the route options under consideration.

14.3.19 All of the PRow potentially impacted by the Grid Connection Corridor works will be reviewed to establish their use where possible, and to identify whether they will need to be temporarily diverted to ensure safe access for members of the public during the construction and operation phases. These will be further discussed as part of the Outline CTMP and the PRow Management Plan (PRow MP). A more detailed assessment of the chosen Grid Connection Corridor will be undertaken once a preferred option has been identified.

## **Existing Cycling Facilities**

### **Solar and Energy Storage Park**

14.3.20 There are no on or off-road dedicated / marked cycling facilities within the immediate vicinity of the Solar and Energy Storage Park. However, the surrounding rural local roads may be attractive to some cyclists as they are understood to be relatively lightly trafficked. The Solar and Energy Storage Park could potentially be accessed by cyclists from local settlements within a 2.5km cycle distance, including Thorpe-on-the-Hill, Haddington, Aubourn, Witham-St-Hughs, Norton Disney and Bassingham.

14.3.21 The nearest National Cycle Network (NCN) route to the Site is NCN Route 64 (between Harby and Lincoln) which is located approximately 3km to the north of the Site boundary. An existing NCN link route also runs in the vicinity of the southern extents of the Site boundary, which runs between Bassingham and Carlton-le-Moorland.

### **Grid Connection Corridor Options**

14.3.22 There are no on or off-road dedicated / marked cycling facilities within the immediate vicinity of the proposed Grid Connection Corridor options. However, a number of the minor roads in this area are understood to be lightly trafficked and may therefore be attractive to some cyclists. These areas could be potentially accessed by cyclists from Harmston, Coleby, Boothby Graffoe, Navenby and Wellingore as they are all within a 2.5km cycle distance.

## **Existing Equestrian Facilities**

### **Solar and Energy Storage Park**

14.3.23 There are no formal equestrian facilities (i.e. Bridleways) within the Solar and Energy Storage Park. There are however a few Bridleways in the vicinity of Marton, within the northern extent of the Site boundary and a few Restricted



Byways within the eastern extents of the Site boundary. In addition, some of the surrounding roads are generally lightly trafficked which may encourage equestrian usage.

### **Grid Connection Corridor Options**

14.3.24 There are no formal equestrian facilities (i.e. Bridleways) in the vicinity of the potential Grid Connection Corridor options. However, the narrow single-track roads in the vicinity of the Grid Connection Corridor may be appealing to equestrians given that these are understood to be lightly trafficked.

## **Existing Public Transport Facilities**

### **Solar and Energy Storage Park**

#### **Bus**

14.3.25 Within the vicinity of the proposed Solar and Energy Storage Park and / or Site boundary there are a number of bus routes which pass through surrounding local settlements, these include:

- Bus Route 1 – running through the local settlements of Bassingham, Haddington, Aubourn, Thorpe-on-the-Hill and Witham-St-Hughs.
- Bus Route 16 – running through the local settlements of Bassingham and Witham-St-Hughs.
- Bus Route 46 – running through Bassingham.
- Bus Route 47 – running through the local settlements of Bassingham, Haddington and Aubourn.
- Bus Route 48 – running through the local settlements of Thorpe-on-the-Hill and Witham-St-Hughs.
- Bus Route 49 – running through the local settlements of Bassingham, Thorpe-on-the-Hill and Witham-St-Hughs.
- Bus Route B3 – running through Witham-St-Hughs.
- Bus Route SLE5 – running through Bassingham.
- Bus Route SLE9 – running through the local settlements of Haddington, Aubourn, Witham-St-Hughs and Thurlby.

#### **Rail**

14.3.26 Swinderby railway station is located approximately 2km to the west of the northern extent of the Site boundary, and is managed by East Midlands Railway. This is the nearest station to the proposed Site and provides access to services between Nottingham and Lincoln, and Leicester and Grimsby, with one service per hour.

14.3.27 Collingham railway station is situated approximately 6km to the west of the Site boundary and Hykeham railway station is located approximately 6km to the east. Both stations are managed by East Midlands Railway and are served by the same lines and services as Swinderby railway station.

## Grid Connection Corridor Options

### Bus

14.3.28 Within the vicinity of the proposed Grid Connection Corridor options and/ or Site boundary there are a number of bus routes which pass through surrounding local settlements, these include;

- Bus Route 1 (Black Cat Travel) – running through the local settlements of Navenby, Coleby and Harmston.
- Bus Route 1 (Interconnect) (Stagecoach East Midlands) – running between Grantham and Lincoln, and through the local settlements of Navenby, Wellingore, Coleby and Harmston.
- Bus Route 644 (Stagecoach East Midlands) – running through the local settlements of Navenby, Wellingore and Harmston.
- Bus Route 6531 (PC Coaches) – running between Wellingore and North Hykeham, and through the local settlements of Navenby, Coleby and Harmston.
- Bus Route SLE9 (Sleafordian Coaches) – running between Witham St Hughs and Sleaford, including through the local settlements of Navenby, Wellingore, Coleby and Harmston.

### Rail

14.3.29 The nearest railway stations to the potential Grid Connection Corridor options are the same stations as those previously mentioned for the Solar and Energy Storage Park, albeit these are all situated further afield from the Grid Connection Corridor than the Solar and Energy Storage Park.

## 14.4 Potential Effects and Mitigation

14.4.1 The nature of the Proposed Development is such that the greatest impact is likely to occur during the construction and decommissioning phases and this will therefore form the focus of the assessment of transport effects presented in the PEIR and ES.

14.4.2 The main considerations and potential effects as a result of the Proposed Development during the construction and decommissioning phases are:

- Increase in HGV movements;
- Abnormal loads (Abnormal Indivisible Loads);
- Travel to and from site by construction workers;
- Increase in delay to vehicles, pedestrians, cyclists and equestrians due to increase in HGV movements; and
- Change in route connections and amenity for pedestrians, cyclists and equestrians due to construction of the Proposed Development.

14.4.3 Although the Solar and Energy Storage Park extent of the Site is located close to a number of small villages / settlements including Thorpe-on-the-Hill,

Haddington and Bassingham, there is not expected to be a significant portion of visitors (given the nature of the Site) to the Site during the construction, operational or decommissioning phases.

- 14.4.4 In terms of construction staff, whilst some workers residing within larger settlements nearby (such as Lincoln and Newark) may travel by public transport or bicycle (the distance is considered too far to walk), these modes are not expected to constitute a significant proportion of trips to the Site.
- 14.4.5 Consideration will also be given to those users of local facilities / amenities which could be impacted by the construction phase works and distributions along the local network as a result of the Proposed Development.

### Vehicle Access

14.4.6 The main points of vehicular access for the Solar and Energy Storage Park are currently anticipated to be taken via the following locations, as set out within **Figure 14-1**. The proposed vehicle access points to the Solar and Energy Storage Park will be subject to review as the access strategy work is developed further and following scoping discussions with the local highway authority:

- Access 1 – The Avenue/ Morton Lane (eastern side);
- Access 2 – Fosse Lane, south (western side);
- Access 3 – Fosse Lane, north (eastern side);
- Access 4 – Haddington Lane, north (western side);
- Access 5 – Stone Lane, both sides (to be used as a managed vehicle ‘crossover’ only, no direct access from Stone Lane itself);
- Access 6 – Haddington Lane, south (western side);
- Access 7 – Haddington Lane, south (eastern side);
- Access 8 – Bassingham Road, south (eastern side);
- Access 9 – Bassingham Road, north (western side); and
- Access 10 – Moor Lane (southern side).

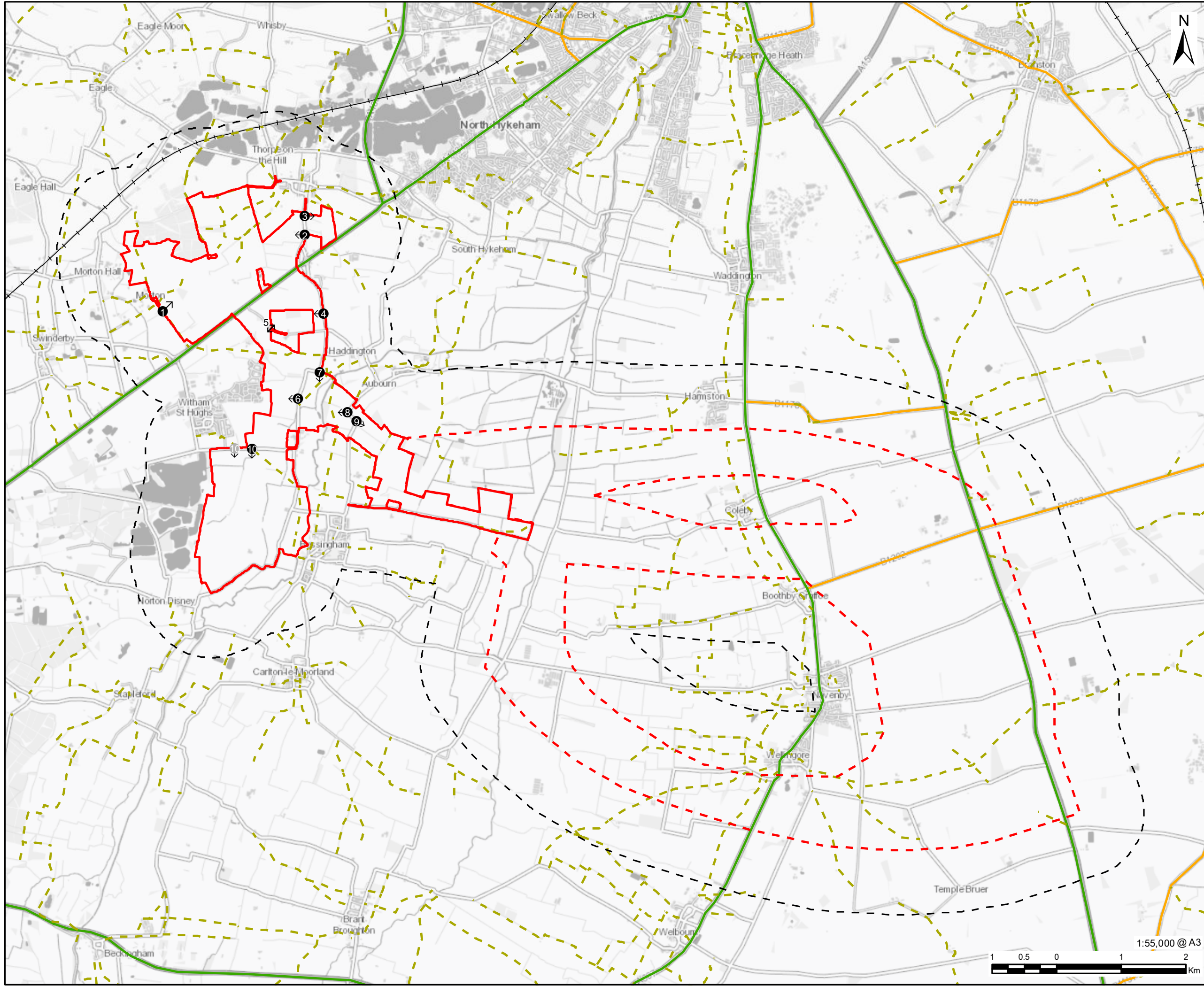
14.4.7 At this stage, it is expected that the above access points will be used during the construction, operation and decommissioning phases of the Proposed Development, although this will be confirmed when the PEIR is prepared.

14.4.8 Further detail on proposed access points to the Site will be included within the PEIR and the ES, which will be submitted with the DCO submission.

### Construction and Decommissioning

14.4.9 The shortest expected construction programme will be 24 months, which will offer a worst-case approach in terms of monthly (and therefore daily) construction vehicle trips.

- 14.4.10 At this stage it is anticipated that, as a worst-case during the peak construction period (currently assumed to be 2032), there could be up to 600 construction staff on site per day. The numbers of vehicles and workers will be determined after scoping stage, once the Proposed Development parameters are better defined. It is currently the expectation that during construction phase there will be in the order of around 50 HGVs per day across the regional road network attributed to the Solar and Energy Storage Park and another 15 HGVs for the Grid Connection Corridor. These vehicles will be distributed across the local road network.
- 14.4.11 The proposed numbers of movements of construction vehicles and construction staff during the peak phase of construction will be reviewed and confirmed during the PEIR and ES stage once the worst-case, peak phase of construction is confirmed by the Project Team.



**LEGEND**

- Solar and Energy Storage Park
- Grid Connection Corridor Options
- 1km Site Boundary
- A Road
- B Road
- Public Rights of Way
- Railway Line

**Potential Indicative Construction Access Locations**

- Access point
- Alternative access point
- Cross over access

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**ISSUE PURPOSE**  
EIA Scoping Report

**PROJECT NUMBER**  
60664324

**FIGURE TITLE**  
Existing Highway Network and Proposed Access Points

**FIGURE NUMBER**  
Figure 14-1



14.4.12 The potential mitigation measures, which could be implemented during the construction and decommissioning phases, include:

- Restriction of HGV movements to certain routes, days of the week and times of the day;
- Upgrading of routes where considered necessary to cater for the additional and / or larger vehicles;
- Positioning of suitably qualified banksmen and/ or other temporary traffic management at the site access points, to allow all vehicle arrivals and departures to be safely controlled during the construction period;
- Providing road signs and/ or markings to increase awareness of the site access points during the construction phase and undertaking vegetation clearance in the vicinity of the site access points;
- Encouraging local construction staff to car share, to reduce single occupancy car trips, by promoting the benefits of car sharing such as reduced fuel costs and by providing dedicated parking spaces for those who car share, nearer to the compound;
- Implementing a shuttlebus service to transfer non-local staff to / from local worker accommodation, to reduce vehicle trips on the surrounding highway network;
- Implementing a Delivery Management System to control the bookings of HGV deliveries from the start of the construction period i.e. to regulate the arrival times of HGVs via timed delivery slots, as well as to monitor compliance of HGV routing;
- Maintaining access to PRow during the construction phase, or otherwise providing temporary diversion routes if required.

14.4.13 Potential impacts during the construction phase are typically considered as medium-term, as defined in **Chapter 6: Environmental Impact Assessment Methodology**. Potential impacts during the decommissioning phase are typically considered as short-term, as these activities are expected to endure for up to 12 months.

14.4.15 The PEIR will consider the impact of any other committed developments and / or highways improvement schemes in the vicinity which may be considered to have a cumulative impact during the construction of the Site.

## Operation

14.4.16 During the operational phase, the Site will be manned by a nominal amount of staff across the Site (up to four permanent staff per day), predominantly undertaking day-to-day maintenance tasks. In addition, there is expected to be around two visitors per week. Staff vehicles and those used for maintenance will primarily be four wheeled drive vehicles and vans, with HGVs rarely accessing the site during this phase.

14.4.17 Furthermore, it is anticipated there will be additional staff attending the Site when required for maintenance, the replacement of solar infrastructure and cleaning; up to a total of 20 staff per day (in addition to the four permanent staff undertaking day-to-day maintenance).

14.4.18 Therefore, due to the low level of trips likely to be generated within this phase, and specifically within the network peak hours of this phase, it is proposed to exclude operational phase transport effects from the EIA. Further details of the operational stage transport arrangements will be set out in the PEIR and ES to support this approach.

## 14.5 Assessment Methodology

### Sources of Baseline Information, Scenarios and Consultation

14.5.1 To inform the assessment of the Proposed Development, information from a number of sources will be collected. The sources which will be used are set out as follows:

- Local travel and network information from various sources including local rail and bus operators;
- Personal Injury Collision (PIC) data from LCC (and NCC if applicable);
- OS Base Mapping to ascertain an accurate geographical representation of the areas in the vicinity of the Site;
- Highway boundary information from LCC;
- Mode share data from the 2011 Census (or 2021 data if available and considered appropriate given the context of COVID-19);
- Industry information from the 2021 Census to identify the number of existing residents who work in the construction industry and live within a defined catchment area of the Site, to inform the construction worker trip distribution;
- Various traffic count and speed survey data where required (see further below);
- Traffic growth factors by applying National Transport Model adjustments to National Road Traffic Forecast growth factors within the Trip Ends Model Program (TEMPRO), utilising the latest National Trip Ends Model dataset; and
- Route planning software, such as Google Maps, will be used to inform the review of the most direct and functional routes to the Proposed Development (in combination with the above).

14.5.2 Peak hour traffic flows will be identified from historic data held by the Local Highway Authority or traffic survey company databases if available. In addition, traffic counts will be undertaken, if considered necessary at locations in the vicinity of the Site to determine the baseline traffic conditions of the surrounding highway network. The extent of the traffic data and scope for any

traffic surveys that may be required will be agreed with the county Highways Authorities, as statutory consultees, where possible.

- 14.5.3 To determine the impact of the Site, the following scenarios will be considered to inform the assessment of the peak construction phase;
- Baseline (2023) – AM, PM and Daily; and
  - Peak construction Year (2032) With and Without Development – AM, PM and Daily.
- 14.5.4 The peak construction year of 2032 is considered appropriate at this stage as it corresponds with the anticipated peak construction year for the purpose of the EIA, as described in **Chapter 6: Environmental Impact Assessment Methodology**, of this Scoping Report.
- 14.5.5 For the purposes of the EIA, the decommissioning assessment year is considered to be 2073 (40 years from opening). This year will not be considered in the PEIR or ES in terms of the highway impact assessment or any junction assessments as it is considered too far into the future to be able to accurately forecast traffic flows or junction forms. Therefore, it is proposed to adopt the assessment of the construction phase to determine the anticipated impact of the Proposed Development during its decommissioning phase.
- 14.5.6 A Transport Scoping Note / Presentation will be formally presented to LCC, NCC and NH as statutory consultees in order to seek agreement on the scope of the PEIR and ES. It is possible that some junction capacity analysis will be required, and this will be discussed and agreed with the relevant authorities where necessary.

## Impact Assessment Methodology

- 14.5.7 In accordance with the IEMA Guidance for assessing the environmental impacts of road traffic (Ref. 227), the following criteria will be considered in this assessment.
- Severance;
  - Driver delay;
  - Pedestrian delay;
  - Pedestrian and cyclist amenity;
  - Fear and Intimidation;
  - Accidents and safety; and
  - Hazardous loads.
- 14.5.8 The significance of effect is determined through consideration of two elements, the magnitude of the impact and the sensitivity of the receptor. The following sections outline the approach that would be used to determine these factors.



14.5.9 The overall effect will be determined by measuring the magnitude of the impact following mitigation measures (where applicable) against criteria including the number of activities of the population affected; the type and sensitivity of the receptor and the type of impact. Effects are defined as beneficial or adverse, with effects further defined using the following classifications:

- **Minor** – slight, very short, or highly localised impact of no significant consequence;
- **Moderate** – limited impact (by extent, duration or magnitude) which may be considered significant; and
- **Major** – considerable impact (by extent, duration or magnitude) of more than local significance, or in breach of recognised acceptability, legislation, policy or standards.

14.5.10 The IEMA guidelines (Ref. 227) state that the magnitude of each impact should be determined as the predicted deviation from the baseline conditions. This will be undertaken for the construction and decommissioning phases.

14.5.11 IEMA (Ref. 227) sets out a number of criteria by which the magnitude of impact can be measured. Many of the criteria do not provide specific thresholds by which such impacts can be assessed, and as a result will be measured qualitatively where necessary. These are described in the following paragraphs.

14.5.12 Irrespective of the proportional increase in traffic flows, it is proposed to categorise an increase of fewer than 30 additional vehicle trips per hour during each of the development peak hours as a very low magnitude of change. This threshold has been determined based on professional judgement, as it is considered that an increase of less than one vehicle every two minutes would be immaterial and will not result in any significant effects.

14.5.13 **Severance** is defined in the IEMA guidelines (Ref. 227) as the “*perceived division that can occur with a community when it becomes separated by a major traffic artery*”. The term is used to describe a complex series of factors that separate people from places and other people. Severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself. It can also relate to quite minor traffic flows if they impeded pedestrian access to essential facilities. IEMA guidelines suggest that a 30%, 60% and 90% increase in traffic flows will result in a low, medium, and high change in severance respectively.

14.5.14 **Driver Delay** will be determined through the analysis of any junction capacity assessments contained within the PEIR and ES, which will be measured in terms of change in delay per vehicle (in seconds) from the baseline situation. This criterion is considered to be applicable to all modes of transport using the public highway, namely cars, motorcycles, pedal cycles and buses. It is expected that the impact will be negligible for any junctions where junction capacity assessments are not required by the local highway authorities. A review of forecast proportional increases in traffic flows will nonetheless be carried out for these junctions within the study area (where baseline data is

available) to support this expectation in terms of potential additional delay to road users across the network.

14.5.15 **Pedestrian Delay** is considered to be affected by the changes in volume, composition or speed of traffic, in terms of their respective impacts on the ability of pedestrians to cross roads. In general, increases in traffic levels and / or traffic speeds are likely to lead to greater increases in pedestrian delay.

14.5.16 **Pedestrian and Cycle Amenity** is broadly defined as “*the relative pleasantness of a journey and is considered to be affected by traffic flow, traffic composition and pavement width/separation from traffic*”. The Guidance suggests that a tentative threshold for judging the significance of changes in pedestrian and cycle amenity would be where the traffic flow is halved or doubled.

14.5.17 **Fear and Intimidation** is “*dependent on the volume of traffic, its HGV composition, and its proximity to people or the lack of protection caused by such factors as narrow pavement widths*”.

14.5.18 An assessment of **Accidents and Safety** will be carried out by examining PIC data for the most recent five-year period available (excluding any periods affected by Covid-19 restrictions). During the PEIR stage, an assessment of the PIC| data will be carried out for the highway network in the vicinity of the Solar and Energy Storage Park. The highway network in the vicinity of the Grid Connection Corridor will also be reviewed in the instance that a preferred option has been identified. The ES will subsequently include a full review of PIC data including the likely impacted section of highway network in the vicinity of the full Grid Connection Corridor extent. This analysis will be undertaken to highlight if there are any existing safety issues on the local road network which may be exacerbated by the Proposed Development.

14.5.19 With regards to **Hazardous and Dangerous Loads**, the Guidance indicates that “*the Statement should include a risk or catastrophe analysis to illustrate the potential for an accident to happen and the likely effect of such an event.*” There are not expected to be any Hazardous and Dangerous Loads (such as vehicles transporting explosives, oxidising / toxic substances, radioactive material or corrosive substances) associated with the Proposed Development. Whilst there will be a requirement for abnormal loads, a Police escort will be arranged to assist with traffic control. An Outline CTMP will be secured as part of the DCO which will include measures to ensure the safe vehicular transport of components to and from the Solar and Energy Storage Park.

14.5.20 In view of the above, it is concluded that the impacts of Hazardous and Dangerous Loads do not warrant further consideration in the preparation of the PEIR or ES, and that this will not therefore be assessed beyond an estimation of the likely number and composition of loads required and the measures which will be implemented to safely transport components to and from the Solar and Energy Storage Park.

14.5.21 The IEMA guidelines set out two rules in identifying potential links for analysis:

- **Rule 1:** include highway links where traffic flows will increase by more than 30% (or the number of HGVs will increase by more than 30%); and
- **Rule 2:** include any other specifically sensitive areas (such as accident black spots, conservation areas, hospitals, links with high pedestrian flows etc.) where traffic flows have increased by 10% or more.

14.5.22 Based on this, links will be assessed where traffic flows are forecast to increase by 30% or more during the peak hours of the peak construction phase (2032). However, it is proposed to exclude any links where there is expected to be a less than a 30% increase in traffic flows as a result of the Proposed Development, unless any specifically sensitive areas are identified. In addition, it is proposed to assign a very low magnitude of change where there is forecast to be fewer than 30 additional vehicle trips per hour during each of the development peak hours as a result of the Proposed Development, irrespective of the proportional increase in traffic flows.

14.5.23 In terms of **Severance, Pedestrian Delay, Pedestrian / Cycle Amenity** and **Fear and Intimidation**, the links within reasonable walking / cycling distance of the Solar and Energy Storage Park will be used as receptors as well as any road links which are expected to provide a main vehicular route to/ from the Solar and Energy Storage Park and contain pedestrian / cycle facilities. A review of any internal routes and road links within a reasonable walking / cycling distance of the Grid Connection Corridor will be carried as part of the PEIR and/ or ES Chapter once the preferred option has been confirmed.

14.5.24 For the construction impacts, the sensitivity of pedestrian routes and cycle routes is based on a qualitative assessment of the 2023 baseline scenario, taking into consideration the importance and attractiveness of the routes and the destinations served. The thresholds have been defined based on professional judgement and experience of other Solar Farm / Energy Park DCO submissions and are as follows:

- **Very Low Sensitivity:** Rural road with no pedestrian / cycle facilities provided;
- **Low Sensitivity:** Strategic vehicular route in a rural setting with pedestrian / cycle facilities;
- **Medium Sensitivity:** Main vehicular route with pedestrian / cycle facilities provided in a built up area; and
- **High Sensitivity:** Lightly trafficked route provided in town centre setting.

14.5.25 In terms of **Driver Delay** and **Accidents and Safety**, the impacts of the Proposed Development, both during construction and decommissioning will be assessed at junction level. The sensitivity of these receptors will be expressed in terms of Ratio to Flow Capacity (RFC) or Degree of Saturation (DoS). The worst-case peak hour junction assessments from the ES for the 2032 With and Without Proposed Development scenarios will be assessed, for the junctions agreed with the Local Highway Authorities.

14.5.26 The thresholds for sensitivity of junctions have been defined as:

- **Low Sensitivity:** RFC / DoS below 90%
- **Medium Sensitivity:** RFC / DoS between 90% and 95%
- **High Sensitivity:** RFC / DoS above 95%

14.5.27 In the instance that no junction capacity assessments are carried out, a high-level review of the forecast proportional increase in traffic flows at junctions will be undertaken to support the expectation that no adverse impacts are envisaged.

14.5.28 In terms of **Driver Delay**, the receptor sensitivity of junctions will be based on queue lengths measured as part as of the traffic surveys where this data is available. In terms of **Accidents and Safety**, receptor sensitivity will be based on the number of recorded collisions at a given location, with a higher level of sensitivity attributed to any accident cluster sites.

14.5.29 In order to determine the effect on specific receptors, both the sensitivity of receptors and the magnitude of impact, as outlined above, will be considered. Table 6-1 of **Chapter 6: Environmental Impact Assessment Methodology** shows the matrix that has been used to determine the effect category. Effects which are classified as major or moderate are considered to be significant.

## 14.6 Elements Scoped Out

14.6.1 There are not expected to be any hazardous and dangerous loads associated with the Proposed Development and it is therefore proposed to exclude an assessment of these. Whilst there will be a requirement for abnormal loads, a Police escort will be arranged to assist with traffic control. An Outline CTMP will also be secured as part of the DCO which will include measures to ensure the safe vehicular transport of components to and from the Solar and Energy Storage Park.

14.6.2 At this stage, it is proposed to exclude an assessment of the Operational phase from the PEIR and ES due to the low level of trips likely to be generated along the local network within the network peak hours as a result of the Proposed Development.

14.6.3 As part of the DCO Submission, it is proposed to scope out a standalone Travel Plan at this stage. However, details related to the mitigations and management of construction staff will be included as part of the Outline CTMP - this will be discussed and agreed with the Local Highway Authority.

14.6.4 In terms of the Decommissioning phase which is assumed to be 2073 (40 years from opening), this is considered to be too far into the future to accurately forecast traffic flows or junction forms. Therefore, it is proposed to adopt the assessment of the construction phase to determine the anticipated impact of the Proposed Development during its decommissioning phase.

## 14.7 Assumptions, Limitations and Uncertainties

14.7.1 At this stage the exact extent of the study area cannot be confirmed in terms of traffic and transport, as detailed discussions have not yet taken place with

the respective Highway Authorities. The area proposed as part of this EIA Scoping Report is determined by AECOM's understanding of the highway network and where the likely impacts will be. However, it is anticipated that this will be formally agreed with LCC, NCC and NH. Any additional assessment scope required will be assessed as part of both the PEIR and the ES.

# 15. Other Environmental Topics

## 15.1 Introduction

- 15.1.1 This aim of the scoping stage is to focus the EIA on those environmental aspects that may be significantly affected by the Proposed Development. The following section provides a summary of other environmental topics which have been considered during the preparation of this Scoping Report. It is proposed that these topics can be addressed relatively briefly, without requiring individual standalone chapters. The Other Environmental Issues chapter of the ES will include a brief assessment of each the topics identified below, supported by a technical note that will be appended to the ES that will contain further information that evidences the ES section conclusion. The EIA methodology set out in **Chapter 6: Environmental Impact Assessment Methodology**, of this Scoping Report, will not apply to this chapter; it may not be necessary for example, to outline an assessment methodology or baseline conditions if a preliminary or screening assessment identifies that the impacts will be none or negligible.
- 15.1.2 For clarity, these topics are not scoped out of the EIA. Rather, they are addressed proportionately within the ES in relation to the likelihood for significant effects based on the scoping work undertaken to date.

## 15.2 Air Quality

- 15.2.1 NKDC undertakes ongoing monitoring of ambient air quality monitoring as part of their Local Air Quality Management (LAQM) responsibilities under Part IV of the Environment Act 1995, as amended by the Environment Act 2021 (Ref. 105).
- 15.2.2 NKDC did not carry out any automatic (continuous) monitoring for any pollutants during 2021 (the latest year for which data are publicly available), hence there are no available measurements of particulate matter (Ref. 234).
- 15.2.3 All existing nitrogen dioxide (NO<sub>2</sub>) diffusion tube monitoring sites operated by NKDC (a total of 22 locations) recorded concentrations below the relevant annual mean objective of 40 micrograms per cubic metre (µg/m<sup>3</sup>) in 2021. There are no Air Quality Management Areas declared in NKDC.
- 15.2.4 Five of the NO<sub>2</sub> diffusion tube monitoring locations are situated within 1km of the Site.
- 15.2.5 Background concentrations of NO<sub>2</sub> and fine particulate matter (PM<sub>10</sub>) are considered to be low across the District (Ref. 235), which is rural with no large conurbations.
- 15.2.6 The potential air quality impacts of the Proposed Development are considered to be:

- Impacts of dust arising during the construction and decommissioning phases of the Proposed Development; and
- Impacts of vehicle and plant emissions during the construction and decommissioning phases of the Proposed Development;
- Impacts during the operation of the Proposed Development due to changes in vehicle emissions.

15.2.7 The potential impacts from dust emissions arising from activities during the construction and decommissioning phases of the Proposed Development will be considered as part of the ES using an approach based on the Institute of Air Quality Management's (IAQM) guidance (2014) (Ref. 236) for assessing impacts from such activities. This is a screening assessment and risk-based qualitative assessment approach and is applied for air quality assessments throughout the UK. Mitigation measures will be identified and incorporated into the Outline CEMP, which will accompany the DCO Application.

15.2.8 As part of this assessment, potential sensitive receptors (with regard to both human health and those of ecological sensitivity) will be identified for the construction and decommissioning of the Proposed Development. This will be based upon a review of aerial photography, Defra's Magic Map Application (Ref. 111), the Air Pollution Information System database (Ref. 237), construction and decommissioning phasing plans and OS mapping, and with consideration to current guidance, including:

- IAQM (2014) Guidance on the Assessment of Dust from Demolition and Construction (Ref. 236);
- Defra (2022) Local Air Quality Management Technical Guidance (TG22) (Ref. 238);
- IAQM (2020) A guide to the assessment of air quality impacts on designated nature conservation sites (Ref. 239);
- Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations (NEA001) (2018) (Ref. 240).

15.2.9 Construction and decommissioning related plant emissions are anticipated to represent a small source of emissions relative to ambient local conditions in the vicinity of the Site boundary based on the scale of construction that will occur and the number of plant vehicles that will be required. However, suitable mitigation measures for plant and motorised equipment will be recommended based on advice prescribed in the IAQM (2014) (Ref. 236) guidance and incorporated into the Outline CEMP.

15.2.10 The anticipated number of vehicles that will be required during the construction and decommissioning phases of the Proposed Development have been considered in the context of the guidance published by Environmental Protection UK (EPUK) / IAQM (2017) (Ref. 241), IAQM (2014) (Ref. 236) and EPUK (2010) (Ref. 242).

15.2.11 The latter sets out the criteria to establish the need for an air quality assessment for the construction phase of a development as being "Large,

*long-term construction sites that would generate large HGV flows (>200 movements per day) over a period of a year or more.” As such, the predicted construction flows are well below the criteria and are not expected to adversely affect air quality. It is therefore proposed that construction traffic is scoped out.*

15.2.12 No effects are anticipated during operation due to the low number of anticipated vehicle movements and nature of the Proposed Development.

15.2.13 Following construction, the Proposed Development is expected to result in minimal alteration to the baseline situation in respect of air quality. No emissions are anticipated from the on-site infrastructure, and there will be minimal vehicle movements to and from the Site, limited to maintenance vehicles. Therefore, consideration of air quality impacts during the operational phase is proposed to be scoped out of the EIA.

15.2.14 Incorporating air quality mitigation measures into the Outline CEMP will negate the need for a specific air quality chapter in the ES.

## 15.3 Glint and Glare

15.3.1 Glint and glare in this context is the effect of reflected sunlight causing harm or discomfort to a sensitive receptor. Solar panels are designed to absorb as much of the sunlight that illuminates them as possible. Notwithstanding this, a proportion of the incoming sunlight is reflected by the solar panels. These reflections are often referred to in more technical terms as “glint” and “glare”. A glint can be defined as the momentary receipt of a bright light and a glare can be defined as the receipt of a bright light over an extended or continuous period of time (Ref. 244). Reflected sunlight from solar panels can, under certain circumstances, be directed towards a location that will make it noticeable to an observer. This effect can be a nuisance, e.g. if it is experienced within a residential dwelling, or a safety hazard, e.g. if it presents a distraction to the driver of motor vehicle on a busy road.

15.3.2 There are no published guidelines setting out a particular methodological approach to assessment, but the receptors of interest are specified in the guidance issued by the DCLG (Ref. 69) which states:

*“Particular factors a local planning authority will need to consider include.. the effect on landscape of glint and glare and on neighbouring uses and aircraft safety.”*

15.3.3 Aviation receptors identified in the wider area are listed below:

- RAF Waddington, approximately 6km east of the Solar and Energy Storage Park;
- RAF Cranwell, approximately 13km south east of the Solar and Energy Storage Park;
- Grassthorpe Grange Airfield, approximately 9km west of the Solar and Energy Storage Park;
- Cauntton Airfield, approximately 15km west of the Solar and Energy Storage Park;



- 15.3.4 Other receptors include nearby motorists, residential dwellings, railways, and PRow.
- 15.3.5 Construction and decommissioning activities will be undertaken in accordance with a CEMP/DEMP, respectively. This will include information on how reflective surfaces are to be treated during construction and decommissioning phases with a view toward their final placement across the Site. It is expected that avoidance of the effects of glint and glare will be considered as part of construction and decommissioning planning. Further, the scale of the Site is such that the full areas will not be occupied for the duration of these phase activities and the movement of reflective surfaces will be temporarily localised to smaller areas on a rolling basis until works are complete. Based on the nature of the activities, the distances to receptors and the implementation of the CEMP, construction and decommissioning effects are proposed to be scoped out of the assessment.
- 15.3.6 Operational effects are considered to be fixed and will last for the duration of the Proposed Development. The interaction of PV panels with locations such as vehicular junctions or pedestrian crossings on roads is primarily influenced by their position, siting and choice of materials, where more reflective, or specular surfaces create a higher chance of creating distraction through glare.
- 15.3.7 The setback mounting of PV panels within the Site from its boundaries combined with the distance to potential receptors will contribute to limiting how and where potential occurrences of glare could be created. Further, a dark colour and a matt material finish of the solar PV panels helps to minimise potential occurrences of reflected light, reducing the likelihood that glare conditions could be created from the panels themselves.
- 15.3.8 Based on the implementation of design measures such as those described above, along with the potential for screening and distance to sensitive receptors, significant effects are not considered likely. Nevertheless, as the design develops, consideration will be given to the potential for solar reflections to impact on sensitive receptors. This will include undertaking calculations to determine if glare could occur at the identified receptor locations and whether it is likely to be a significant nuisance or hazard. If it is likely to be a nuisance or hazard, mitigation will be proposed.
- 15.3.9 The results and recommendations of the glint and glare calculations will be incorporated into the Proposed Development design and presented as a technical appendix to the ES. It is considered that this will negate the need for a specific glint and glare chapter in the ES.

## 15.4 Ground Conditions

- 15.4.1 The Environment Agency's Land Contamination Risk Management guidance (Ref. 243) identifies that the first step, known as Stage 1, Tier 1, in evaluating land contamination risks is a Preliminary Risk Assessment (PRA). The objective of the PRA is to identify and evaluate potential land quality risks and development constraints associated with the Proposed Development and to construct an initial conceptual site model that can be used to inform future

decision making and the design of future ground investigation and / or mitigation, should it be required.

15.4.2 A PRA report is being prepared, covering land within the Site. The DBA report will be presented as a technical appendix to the ES.

15.4.3 The PRA will include the following:

- Details of land within the Site and surrounding area including development history, geology, hydrogeology, hydrology, soil and groundwater quality and environmental setting;
- A review of the environmental data report provided by Landmark Information Group or Groundsure;
- Details of land designated for Mineral Safeguarding;
- Details of any available site investigation, risk assessment, remediation, validation reports for land within the Site or asbestos surveys for any properties within the Site;
- Details from a site walkover documenting:
  - The existing layout, current operations and condition of land within the Site, the property boundaries and immediately surrounding land;
  - The visual inspection of any potential indicators of any land contamination, for e.g.: spillages, disturbed ground; and
  - The visual inspection of any geohazards or ground conditions constraints.
- A conceptual site model and an evaluation of potential contamination linkages; and
- Conclusions and recommendations based on the findings.

15.4.4 Based upon the PRA, a number of environmental design and management measures will be employed as standard best practice to minimise impacts to both human health and controlled waters during the construction and decommissioning phases of the Proposed Development. These will be incorporated into the Outline CEMP which will be provided alongside the ES as part of the DCO application. The Outline CEMP will be developed into a Detailed CEMP prior to construction and implemented.

15.4.5 Potential environmental impacts that will be avoided, prevented, reduced or offset through the implementation of these mitigation measures include:

- Human exposure through direct contact/inhalation/dermal uptake of contaminants potentially present in soil and groundwater;
- Creation of preferential pathways and mobilisation of contamination;
- Contamination of natural soils, driving of contamination into an aquifer during piling, contamination of groundwater with concrete, paste or grout;
- Pollution and degradation of water quality of any underlying aquifer;

- Infiltration and / or runoff into the local drainage / sewerage network - pollution of drainage and sewerage network and any adjacent surface water features;
- Run-off and infiltration of contaminants from material stockpiles;
- Contamination of drainage and sewerage network and/or groundwater; and
- Spread of nuisance dusts and soils to the wider environment and local roads.

15.4.6 There is the potential for past quarrying activity in the vicinity to lead to unstable ground conditions. The PRA will include consideration on ground stability and (if needed) will recommend actions to ascertain that the Site is and will remain stable or can be made stable as part of its development.

15.4.7 On-site activities when the Proposed Development is complete and operational will be limited to the maintenance of the infrastructure. During maintenance activities there may be the need to use oils, grease, fuels, lubricants or cleaning agents on-site. There is a small risk of chemical pollution arising from accidental spillages during these operations. An OEMP will be prepared following grant of DCO to address all operational related issues. This will include a spillage Emergency Response Plan (ERP), which maintenance staff will be required to have read and understood. On-site provisions will be made to contain a serious spill or leak through the use of booms, bunding and absorbent material. Operational activities are proposed to be scoped out of the assessment.

15.4.8 It is anticipated that the results and recommendations of the PRA report, once incorporated into the Outline CEMP, along with the environmental design and management measures above, for the construction, operation and decommissioning phases, will negate the need for a specific ground conditions chapter in the ES. This approach will be explained under Other Environmental Topics chapter of the ES.

## 15.5 Major Accidents or Disasters

15.5.1 The EIA Regulations (Ref. 1) has introduced a requirement to consider major accidents or disasters. It is considered likely that the original changes to the EIA Directive (Ref. 94) to consider major accidents or disasters were made in order to bring certain other statutory requirements, mainly other EU Directives, within the overall 'wrapper' of EIA and the ES. The Directive and domestic Regulations cite two specific directives as examples of risk assessments to be brought within EIA, these are Directive 2012/18/EU of the European Parliament and of the European Council (which deals with major accident hazard registered sites) (Ref. 95) and Council Directive 2009/71/Euratom (which deals with nuclear sites) (Ref. 96). Neither of these Directives are relevant to the Proposed Development.

15.5.2 'Accidents' are considered to be an occurrence resulting from uncontrolled developments in the course of construction and operation of a development (e.g. major emission, fire or explosion). They are defined by the Control of

Major Accidents Hazard (COMAH) Regulations, 2015, as “an occurrence such as a major emission, fire, or explosion resulting from uncontrolled development, leading to serious danger to human health or the environment (whether immediate or delayed) inside or outside the establishment, an involving one or more dangerous substances” (Ref. 97).

- 15.5.3 ‘Disasters’ are considered to be naturally occurring extreme weather events or ground related hazard events (e.g. subsidence, landslide, earthquake). They are defined as “a sudden calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community’s or society’s ability to cope using its own resources. Though often caused by nature, disasters can have human origins.” (Ref. 98).
- 15.5.4 In the absence of established guidance on this topic, the following methodology has been adopted. In general, major accidents or disasters, as they relate to the Proposed Development, fall into three categories:
- Events that could not realistically occur, due to the nature of the Proposed Development or its location;
  - Events that could realistically occur, but for which the Proposed Development, and associated receptors, are no more vulnerable than any other development; and
  - Events that could occur, and to which the Proposed Development is particularly vulnerable, or which the Proposed Development has a particular capacity to exacerbate.
- 15.5.5 An initial scoping exercise has been undertaken to identify all possible major accidents or disasters that could be relevant to the Proposed Development. This list was drawn from a number of sources, including the UK Government’s Risk Register of Civil Emergencies (Ref. 99). Major accidents or disasters with little relevance in the UK were not included. The long list of major accidents or disasters is presented in Appendix B: Long List of Major Accidents or Disasters of this Scoping Report.
- 15.5.6 This long list was then screened to identify the third group of major accidents or disasters listed above, to form a shortlist of events to be taken forward for further consideration.
- 15.5.7 Although the majority of the major accidents or disasters on the long list are already considered under other legislative or design requirements, this is not considered to be sufficient reason to automatically eliminate the major accident or disaster from any further consideration. This is consistent with the approach for other topics, for example that the need to comply with nature conservation legislation does not mean that ecology and nature conservation do not need to be considered in EIA. However, where it is concluded that the need for compliance is so fundamental, and the risk of any receptors being affected differently so remote, major accidents or disasters on the long list are not included on the shortlist.

15.5.8 Likewise, it is considered reasonable and proportionate to exclude certain receptor groups from the outset. Construction workers, as a receptor, can be excluded from the assessment, because existing legal protection is considered to be sufficient to minimise any risk from major accidents or disasters to a reasonable level. Legislation in force to ensure the protection of workers in the workplace includes:

- Health and Safety at Work etc. Act 1974 (Ref. 100);
- The Management of Health and Safety at Work Regulations 1999 (Ref. 101);
- The Workplace (Health, Safety and Welfare) Regulations 1992 (Ref. 102); and
- Construction (Design and Management) (CDM) 2015 Regulations (Ref. 103).

15.5.9 Table 15-1 presents a short list of major accidents or disasters that are considered to need further consideration. Where the major accidents and disasters identified are not already being considered within the scope of existing technical assessments, they will continue to be reviewed with the design team to ensure the risks are understood and addressed through design as necessary. However, it is considered highly likely that as the design of the Proposed Development evolves in preparation of the DCO application, it will become clear that there is no real risk or serious possibility of the event interacting with the Proposed Development. In that eventuality, we would propose to scope out from the ES the assessment of such major accidents or disasters. The ES would note and explain where this approach has been taken.

**Table 15-1 Major Accidents or Disasters Shortlisted for Further Consideration**

Major accident or disaster	Potential receptor	Comments
Floods	Property and people in areas of increased flood risk.	Both the vulnerability of the Proposed Development to flooding, and its potential to exacerbate flooding, will be covered in the Flood Risk Assessment (FRA) both in terms of the risk to the Proposed Development and increased risk caused by the Proposed Development, to ensure that the Proposed Development is safe from water ingress for its lifetime in the event of flooding, without increasing flood risk elsewhere.
Fire	Local residents, habitats and species.	There may be some potential for fire as a result of the battery storage element. However, the battery energy storage system will include cooling systems, which are designed to regulate temperatures to within safe conditions to minimise the risk of fire
Road accidents	Aquatic environment  Road users	The risk of road collisions and accidents caused by an increase of traffic on public highways during both construction and operation as well as by glint and glare will be addressed in the Transport Assessment.  The risk posed by spillage from hazardous loads as a result of a road traffic accident during construction or

Major accident or disaster	Potential receptor	Comments
		decommissioning will be considered in the Flood Risk, Drainage and Water Resources chapter of the ES.
		The potential for glint and glare to affect road users will be considered within a technical appendix to the ES if any risks are identified. Mitigation will be considered and, where necessary, incorporated into the Proposed Development design.
Rail accidents	Rail users	No rail lines pass through the Site with the nearest being 500m north-west of the Site. Given the distance, adverse effects on rail users is not expected.
Aircraft disasters	Pilots and aircraft	The potential for glint and glare to affect aircraft will be considered within a technical appendix to the ES if any risks are identified. Mitigation will be considered and, where necessary, incorporated into the Proposed Development design.
Flood defence failure	Employees	This will be covered in the Flood Risk Assessment and will also be reported in the ES, both in terms of the risk to the Proposed Development and increased risk caused by the Proposed Development.
Utilities failure (gas, electricity, water, sewage, oil, communications)	Employees and local residents	The Proposed Development has the potential to affect existing utility infrastructure above and below ground. To identify any existing infrastructure constraints, both consultation and a desk based study will be undertaken. It is known that there is an overhead electricity line located within the Site.
Plant disease	Habitats and species	New planting may be susceptible to biosecurity issues, such as the increased prevalence of pests and diseases, due to climate change. The planting design will take account of biosecurity risks through a wider mix of species including some non-natives.

15.5.10 Where further design mitigation is unable to remove the potential interaction between a major accident or disaster and a particular topic, the relevant ES chapter will identify the potential consequence for receptors covered by the topic and give a qualitative evaluation of the potential for the significance of the reported effect to be increased as result of a major accident or disaster.

15.5.11 The potential receptors of effects resulting from major accidents or disasters will be reported in the relevant topic chapter, and as such it is considered that this will negate the need for a specific major accidents or disasters topic chapter in the ES. Nevertheless, there will be signposting of major accident or disaster impacts in the ES to enable these to be identified.

## 15.6 Waste

15.6.1 The Proposed Development is likely to generate waste during the construction, operation, and decommissioning phases.

15.6.2 The types of waste generated during construction are likely to comprise:

- General waste from site offices and welfare facilities;
  - Small quantities of waste from the maintenance of construction vehicles;
  - Packaging waste from incoming materials; and
  - Other waste from construction of fencing, access roads and other supporting infrastructure.
- 15.6.3 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.
- 15.6.4 Large-scale earthworks are not expected, and therefore, there is not expected to be either a surplus or shortfall of fill material requiring either export or import.
- 15.6.5 A Site Waste Management Plan (SWMP) will be prepared as part of the CEMP, which will set out:
- The waste streams that will be generated;
  - How the waste hierarchy will be applied to these wastes;
  - Good practice measures for managing waste; and
  - Roles and responsibilities for waste management.
- 15.6.6 All management of waste will be in accordance with the relevant regulations and waste will be transported by licenced hauliers to waste management sites which hold the necessary regulatory authorisation and/or permits for those wastes consigned to them.
- 15.6.7 During operation, waste generation is expected to be negligible, since PV panels do not generate any waste as part of the energy production process.
- 15.6.8 At the end of the Proposed Development's operational life, it will be decommissioned. As this expected to be at least 40 years in the future, it is not possible to identify at this stage the waste management routes or specific facilities that would be used.
- 15.6.9 However, an outline DEMP will be prepared as part of the ES, that will set out the general principles to be followed in the Detailed Decommissioning Plan that will be prepared prior to decommissioning occurring.
- 15.6.10 Considering the above, it is concluded that significant waste impacts are not expected during either construction, operation or decommissioning, and hence the need for a separate waste chapter has been scoped out the EIA.
- 15.6.11 Furthermore, with respect to land quality, it is expected that good practice mitigation would break any linkage pathway between effects on ground conditions and a human health impact.

## 16. Structure of the Environmental Statement

- 16.1.1 The ES will consist of three volumes and a Non-Technical Summary (NTS). This section provides a summary of each document that will form the ES.
- 16.1.2 **ES Volume 1: Main Report** – this will form the main body of the ES, detailing the results of the environmental assessment, likely significant effects arising from the Proposed Development, and the proposed mitigation measures. The ES will also identify opportunities for social and economic benefits and environmental enhancement. The ES will be divided into a number of background and technical chapters, each being supported with figures and tabular information. ES Volume 1 will consider the environmental effects associated with a number of identified topics, which may receive significant environmental effects. Each topic will be assigned a separate technical chapter in the ES as follows:
- Chapter 7: Climate Change;
  - Chapter 8: Cultural Heritage;
  - Chapter 9: Ecology and Biodiversity;
  - Chapter 10: Water Environment;
  - Chapter 11: Landscape and Visual Amenity;
  - Chapter 12: Noise and Vibration;
  - Chapter 13: Socio-Economics and Land Use;
  - Chapter 14: Transport and Access; and
  - Chapter 15: Other Environmental Topics.
- 16.1.3 In addition to the above, the following chapters will be produced as part of the ES:
- Chapter 1: Introduction;
  - Chapter 2: The Proposed Development;
  - Chapter 3: Site Description
  - Chapter 4: Alternatives and Design Evolution;
  - Chapter 5: Consultation;
  - Chapter 6: Environmental Impact Assessment Methodology;
  - Chapter 16: Cumulative Effects and Interactions; and
  - Chapter 17: Summary of Environmental Effects.
- 16.1.4 **ES Volume 2: Figures** – A complete set of figures will be provided for reference which support the assessments in ES Volume 1.



- 16.1.5 **ES Volume 3: Technical Appendices** – A complete set of appendices will be provided for reference. These comprise of background data, technical reports, tables, figures and surveys which support the assessments in ES Volume 1.
- 16.1.6 **ES Non-Technical Summary (NTS)** – The NTS will be presented in a separate document and provides a concise description of the Proposed Development, the considered alternatives, baseline, assessment methodology, potential environmental effects and mitigation measures. The NTS will be designed to provide information in an accessible format which can be understood by a wide audience and to assist interested parties with their familiarisation of the project.

## 17. Summary and Conclusions

- 17.1.1 This Scoping Report represents notification under Regulation 8(1)(b) of the EIA Regulations (Ref. 1) that the Applicant will undertake an EIA in respect of the Proposed Development and produce an ES to report the findings of the EIA.
- 17.1.2 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. This report has identified the environmental effects that are considered to have the potential to be significant and proposes the approach to be used in assessments 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 within the statutory 42 day time period.
- 17.1.3 For clarity, **Table 17-1** presents a summary of the proposed scope of the technical topics as well as which elements of these topics that are to be scoped out and the rationale behind this decision.

**Table 17-1: Scope of Technical Topics and Elements to be Scoped Out**

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
Climate Change	Assessment of GHG emissions during construction, operation, and decommissioning. A statement on resilience of the Proposed Development to future climate changes will be provided.	In-combination impacts of temperature, sea level rise, precipitation change, and changes in wind patterns are proposed to be scoped out of the in combination climate impact assessment. Sea level rise is proposed to be scoped out of the climate change resilience review.	The Site is not located in an area that is susceptible to sea level change, and no on combination effects with other environmental disciplines is predicted.
Cultural Heritage	It is proposed to undertake an assessment of impact on both physical effects on heritage assets, and effects on their setting including changes to visual intrusion, noise, air quality, severance, access and amenity. Further archaeological work may be required, the	None	N/A

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
	<p>extent and scope of which will be determined following completion of a cultural heritage archaeological desk-based assessment, and in consultation with Historic England and the County Archaeologist for Lincolnshire.</p>		
Ecology	<p>The EclA will include consideration of designated sites and protected and/or notable habitats and species. Effects considered include habitat loss, disturbance and indirect impacts such as watercourse pollution during construction. Operational effects include disturbance during maintenance, security lighting and management of on-site and adjacent habitats. A habitat conditions assessment will also be carried out on land within the Site in order to perform a biodiversity net gain assessment. Effects of connection to the National Grid Substation on ecological receptors during operation will also be assessed should an over-ground option be taken forward.</p>	None	N/A
Flood Risk, Drainage and Surface Water	<p>Qualitative assessment of the effects of the Proposed Development, considering the risk to surface and groundwater bodies</p>	None	N/A

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
	<p>resulting from construction or decommissioning works or future operation activity using a source-pathway-receptor approach and development of mitigation to control potential effects. The assessment criteria will follow those outlined in the Design Manual for Roads and Bridges (DMRB) LA113 Road Drainage and the Water Environment, as a robust and well tested method for scoping the assessment and predicting the significance of effects of development projects. A Preliminary WFD assessment will be undertaken. A Surface Water Drainage Strategy and FRA will be prepared.</p>		
Landscape and Visual Amenity	<p>Assessment of likely effects on landscape features and character, and views and visual amenity during construction, operation and decommissioning.</p> <p>Photomontages from key viewpoints will be prepared for both year 1 and year 15 of operation.</p>	None	N/A
Noise and Vibration	<p>Baseline noise monitoring will be undertaken at locations representative of surrounding noise-sensitive receptors. An assessment of construction and</p>	<p>Ground-borne vibration from the construction, operation and decommissioning of the Proposed Development.</p>	<p>No major vibration sources are envisaged to be introduced as part of the Proposed Development and as such there will be no associated vibration effects. It is proposed that ground-borne</p>

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
	decommissioning plant noise, and operational plant will be undertaken. Road traffic noise during the construction and operational phases of the Proposed Development.		vibration is scoped out of any further assessment
		Operational noise effects associated with the Grid Connection Corridor	It is not anticipated that the cabling will produce any operational noise emissions.
Socio-Economics and Land Use	<p>Assessment of effects including temporary employment during construction and decommissioning, and gross value added, creation of long term employment opportunities during the operational phase including consideration of any existing uses on-site, and change of land use including displacement of agricultural land and impacts on recreation, open space (including PRoW) and community facilities.</p> <p>An ALC survey of the Site boundary is being undertaken with reference to Natural England.</p>	None	N/A
Transport and Access	<p>Construction 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 severance, driver delay, pedestrian delay, pedestrian and cyclist amenity, fear and intimidation and road safety. Criteria/</p>	<p>Operational vehicle movements due to low numbers of vehicles.</p> <p>Hazardous loads</p> <p>Assessments for the decommissioning phase due to uncertainties in</p>	<p>Scoped out due to low vehicle numbers.</p> <p>There are no nearby road features which suggest that the transfer of materials poses a risk beyond that which would be expected on the general highway network.</p> <p>Scoped out due to uncertainties in relation to future traffic flows and transport</p>

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
	<p>requirements for the above assessments to be considered and discussed with the LHA given these will be temporary construction impacts. Any mitigation measures to be recommended.</p>	<p>relation to future traffic flows and transport infrastructure.</p>	
<p>Cumulative and Combined Effects</p>	<p>Cumulative and combined effects will be considered and assessed within the ES for each technical discipline scoped into the EIA. This will be in accordance with the methodology set out in Section 6.6.</p>	<p>None</p>	<p>N/A</p>
<p>Telecommunications, Television Reception and Utilities</p>	<p>N/A</p>	<p>An assessment of telecommunications, television reception and utilities is proposed to be scoped out of the EIA.</p>	<p>Solar farms have the potential to affect existing utility infrastructure below ground, but are not at a height to affect above ground telecommunications. To identify any existing infrastructure constraints, both consultation and a desk-based study will be undertaken. Consultation with relevant telecommunication and utilities providers is a routine part of development and consultees will include water, gas and electricity utilities providers and telecommunications providers as appropriate. Information obtained from consultation will be used to inform the design and appropriate protective provisions will be included in the DCO to ensure the protection of apparatus. Relevant measures will be captured within the design, therefore a separate utilities ES</p>

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
			chapter is not considered to be required.
Human Health	<p>It is considered that human health as a result of the Proposed Development will be covered through the assessment findings undertaken for other technical chapters of the EIA, namely:</p> <ul style="list-style-type: none"> <li>-Landscape and visual</li> <li>-Noise and vibration</li> <li>-Traffic and transport</li> <li>-Air quality</li> </ul> <p>A standalone assessment of human health is not proposed.</p>	A standalone assessment of Human Health is proposed to be scoped out of the EIA.	The technical chapters of the PEIR and ES will consider the potential effects of human health within their own assessments. There are not expected to be any significant human health effects beyond those identified for these assessments. A detailed assessment is therefore not proposed.

17.1.4 **Table 17-2** summarises the approach taken to the topics discussed in **Chapter 15: Other Environmental Topics**, of this Scoping Report.

**Table 17-2: Scope of Approach to Other Environmental Topics**

Environmental Topic	Proposed Approach
Air Quality	Qualitative dust assessment to identify measures to be included in an Outline CEMP. Suitable mitigation measures for construction and decommissioning plant and motorised equipment will be included in the Outline CEMP. Effect of Proposed Development operation and operational traffic on air quality is proposed to be scoped out.
Glint and Glare	An assessment will be undertaken to identify the potential for solar reflections to impact on sensitive receptors for both orientation options to inform design development.
Ground Conditions	A PRA will be included in the ES and the results and recommendations of this will be incorporated into the Outline CEMP. Maintenance activities during the operational phase will be managed through an Operational Environmental Management Plan and are proposed to be scoped out of the assessment.
Major Accidents and Disasters	Where the major accidents and disasters identified are not already being considered within the scope of existing technical assessments, they will continue to be reviewed with the design team to ensure the risks are understood and addressed through design as necessary. However, it is considered highly likely that as the design of the Proposed Development evolves in preparation of the DCO application, it will become clear that there is no real risk or serious possibility of the event interacting with the Proposed Development. In that eventuality, we would propose to scope out from the ES the

**Environmental Topic**

**Proposed Approach**

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	assessment of such major accidents or disasters. The ES would note and explain where this approach has been taken.
Waste	Description of the potential streams of construction, operation and decommissioning waste and estimated volumes will be described within the description of development chapter of the ES.



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## 19. Glossary

Air Quality Management Area (AQMA)	Places where air quality objectives are not likely to be achieved. Where an AQMA is declared, the local authority is obliged to produce an Action Plan in pursuit of the achievement of the air quality objectives.
Baseline conditions	The conditions against which potential effects arising from the Proposed Development are identified and evaluated.
Battery energy storage system	Proposed Development of a battery storage installation and associated development to allow for the storage, importation and exportation of energy to the National Grid.
Cables	The cables, which transmit electricity from the transformers to the project substation.
Construction Environmental Management Plan (CEMP)	A site specific plan developed to ensure that appropriate environmental management practices are followed during the construction phase of a project.
Cumulative Effects	Effects upon the environment that result from the incremental impact of an action when added to other past, present or reasonably foreseeable actions.  Each impact by itself may not be significant but can become a significant effect when combined with other impacts.
Energy Park	Proposed generating station comprised of solar PV modules mounted on racks and connected via associated infrastructure to the national grid.
Environmental Impact Assessment (EIA)	A process by which information about environmental effects of a Proposed Development is collected, assessed and used to inform decision making. For certain projects, EIA is a statutory requirement.
Environmental effect	The consequence of an action (impact) upon the environment such as the decline of a breeding bird population as a result of the removal of hedgerows and trees.
Environmental impact	The change in the environment from a development such as the removal of a hedgerow.
Environmental Statement	A document produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations to report the results of an EIA.
Preliminary Ecological Appraisal (PEA)	Comprises a desk study, Phase 1 Habitat Survey (which categorises habitats to a broad level using the methodologies set out by JNCC (1993 as amended) guidelines) and Protected Species Scoping survey (which includes preliminary survey work to identify the presence or potential presence of legally protected species).

Flood Zone 3	This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
Flood Zone 2	This zone comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year.
Flood Zone 1	This is land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1% Annual Exceedance Probability (AEP)).
Geophysical survey	Geophysical survey is a non-intrusive pre-construction archaeological evaluation technique that exploits a variety of physical or chemical characteristics of rocks and soils etc, in an attempt to locate underground features of archaeological interest. Types of geophysical survey include magnetometer survey, magnetic susceptibility survey and resistivity survey.
Grid Connection Corridor Options	Corridor options which represent the maximum extent of land within which the cable route would be located.
Heavy Goods Vehicle (HGV)	Vehicles with 3 axles (articulated) or 4 or more axles (rigid and articulated).
Historic Environment Record	The record of archaeological and built heritage features in a county or district, usually held and maintained by the relevant County Council.
Inverter	Inverters convert the direct current (DC) electricity collected by the PV modules into alternating current (AC), which allows the electricity generated to be exported to the National Grid. BESS also use inverters to convert between DC and AC. The batteries function in DC and electricity must be converted to AC to pass into or from the grid.
Mitigation	Measures including any process, activity, or design to avoid, prevent, reduce, or, if possible, offset any identified significant adverse effects on the environment.
NPS	National Policy Statement. National Policy Statements are produced by government. They comprise the government’s central policy documents for the development of nationally significant infrastructure.
Nationally Significant Infrastructure Projects (NSIP)	NSIPs are large scale developments such as certain new harbours, power generating stations (including wind farms), highways developments and electricity transmission lines, which require a type of consent known as ‘development consent’ under procedures governed by the Planning Act 2008 (and amended by the Localism Act 2011).
On-site substation	A compound containing electrical equipment to enable connection to the National Grid.
Preliminary Environmental Information (PEI)	PEI is defined in the EIA Regulations as: <i>“information referred to in Regulation 14(2) which – (a) has been compiled by the applicant; and</i>

*(b) is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development (and of any associated development)."*

Preliminary Risk Assessment	Report that presents a summary of readily-available information on the geotechnical and/or geo-environmental characteristics of the site and provides a qualitative assessment of geo-environmental and/or geotechnical risks in relation to the proposed development.
Principal Aquifer	These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.
Receptor	A component of the natural or man-made environment that is affected by an impact, including people.
Proposed Development	Fosse Green Energy comprises solar PV and battery storage and associated development for connection to the national transmission system via Grid Connection, for which options are to be assessed and determined.
Setting	The surroundings within which a heritage asset is experienced and any element, which contributes to the understanding of its significance.
Site / Site Boundary	The maximum extent of land potentially required temporarily and/or permanently for the construction, operation and maintenance of the Proposed Development.
Source Protection Zone (SPZ)	SPZs show the risk of contamination from any activities that might cause pollution to groundwater sources such as wells, boreholes and springs used for public water supplies. The closer the activity, the greater the risk. SPZs can comprise of up to three main zones (inner, outer and total catchment). A fourth zone of special interest can also occasionally be applied to a groundwater source.
Sustainable drainage systems (SUDS)	Surface water drainage systems developed in line with the ideals of sustainable development (e.g. swales, ponds, basins, filtration flow control, etc).
Transformers	Transformers control the voltage of the electricity generated across the site before it reaches the electrical infrastructure.
Visual receptors	People with views of the development or associated activities. These are located within the visual envelope and are typically residents, motorists, pedestrians, recreational users in residential areas on publicly accessible roads, footpaths and open spaces.
Water Framework Directive	<p>The Water Framework Directive ("WFD") introduced a new system for monitoring and classifying the quality of surface and ground waters.</p> <p>The Directive requires that Environmental Objectives be set for all surface waters and groundwater to enable them to achieve Good Ecological Potential/Status by a defined date.</p>



**Zone of Theoretical Visibility**    The zone within which views of a Proposed Development may be experienced, as determined by analysis of OS data and field survey. It is influenced by many factors including topography and intermediate visual intrusions, such as blocks of woodland and buildings.

## 20. Abbreviations

AC	Alternating Current
COMAH	Control Of Major Accidents Hazard
HDD	Horizontal Directional Drilling
LTP	Local Transport Plan
WHO	World Health Organization
agl	Above Ground Level
AOD	Above Ordnance Datum
ALC	Agricultural Land Classification
AQMA	Air Quality Management Area
AEP	Annual Exceedance Probability
AGLV	Area Of Great Landscape Value
AONB	Area Of Outstanding Natural Beauty
BCT	Bat Conservation Trust
BESS	Battery Energy Storage Systems
BMV	Best And Most Versatile
BPM	Best Practicable Means
BOD	Biochemical Oxygen Demand
BAP	Biodiversity Action Plan
BNG	Biodiversity Net Gain
BGS	British Geological Survey

BS	British Standard
BRE	Building Research Establishment
CO <sub>2</sub>	Carbon Dioxide
CLJSPC	Central Lincolnshire Joint Strategic Planning Committee
CIfA	Chartered Institute for Archaeologists
CIEEM	Chartered Institute for Ecology and Environmental Management
CCC	Climate Change Committee
CCR	Climate Change Resilience
CCTV	Closed Circuit Television
CDM	Construction (Design and Management
CEMP	Construction Environmental Management Plan
CIRIA	Construction Industry Research and Information Association
CLOCS	Construction Logistics and Community Safety
CTMP	Construction Traffic Management Plan
DEMP	Decommissioning Environmental Management Plan
DoS	Degree Of Saturation
DEFRA	Department For Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges
DCO	Development Consent Order
DC	Direct Current
DC	Direct Current

EclA	Ecological Impact Assessment
ERP	Emergency Response Plan
EIA	Environmental Impact Assessment
EPUK	Environmental Protection UK
ES	Environmental Statement
EC	European Commission
EEA	European Economic Association
EPS	European Protected Species
EU	European Union
EU	European Union
FRA	Flood Risk Assessment
GB	Great Britain
GHG	Greenhouse Gas
GVA	Gross Value Added
GLVIA	Guidelines For Landscape and Visual Impact Assessment
GLVIA3	Guidelines For Landscape and Visual Impact Assessment, Third Edition
HSI	Habitat Suitability Index
HRA	Habitats Regulations Assessment
HUDU	Healthy Urban Development Unit
HGV	Heavy Goods Vehicles
ha	Hectare

HMSO	Her Majesty's Stationery Office
HER	Historic Environmental Record
HFCs	Hydrofluorocarbons
ICCI	In-Combination Climate Change Impacts
IPC	Infrastructure Planning Commission
IAQM	Institute Of Air Quality Management's
IHBC	Institute Of Historic Building Conservation
ISO	International Organisation for Standardisation
IAS	Invasive Alien Species
ICE	Inventory Of Carbon and Energy
JNCC	Joint Nature County Council
km	Kilometre
kV	Kilovolt
LVIA	Landscape And Visual Impact Assessment
LCA	Landscape Character Areas
LCT	Landscape Character Types
LEMP	Landscape Environmental Management Plan
LFA	Lead Flood Authority
LLFA	Lead Local Flood Authority
LLFA	Lead Local Flood Authority
LGV	Light Goods Vehicles

LSE	Likely Significant Effects
LSE	Likely Significant Effects
LCC	Lincolnshire County Council
LHER	Lincolnshire Historic Environment Record
LAQM	Local Air Quality Management
LLCA	Local Landscape Character Areas
LNR	Local Nature Reserves
LPA	Local Parish Authorities
LWS	Local Wildlife Sites
LSOA	Lower Super Output Areas
LOAEL	Lowest Observed Adverse Effect Level
MW	Megawatts
CH <sub>4</sub>	Methane
MHCLG	Ministry Of Housing, Communities and Local Government
MAGIC	Multi-Agency Geographic Information for The Countryside
NCA	National Character Area
NCN	National Cycle Network
NGR	National Grid Reference
NHLE	National Heritage List for England
NH	National Highways
NPPF	National Planning Policy Framework

NPS	National Policy Statement
NDC	Nationally Determined Contribution
NSIP	Nationally Significant Infrastructure Project
NSIP	Nationally Significant Infrastructure Projects
NERC	Natural Environment and Rural Communities
NVZ	Nitrate Vulnerable Zone
NO <sub>2</sub>	Nitrogen Dioxide
NF <sub>3</sub>	Nitrogen Trifluoride
N <sub>2</sub> O	Nitrous Oxide
NPSE	Noise Policy Statement for England
NTS	Non-Technical Summary
NKDC	North Kesteven District Council
NCC	Nottinghamshire County Council
IEMA	Institute Of Environmental Management and Assessment
ONS	Office For National Statistics
OEMP	Operational Environmental Management Plan
OS	Ordnance Survey
PM <sub>10</sub>	Particulate Matter
PID	Passive Infra-Red Detector
PPV	Peak Particle Velocity
PFCs	Perfluorocarbons

PFOS	Perfluorooctane Sulphonate
PIC	Personal Injury Collision
PV	Photovoltaic
PINS	Planning Inspectorate
PPG	Planning Practice Guidance
PBDE	Polybrominated Diphenyl Ethers
PEA	Preliminary Ecological Appraisal
EPI	Preliminary Environmental Information
PEI	Preliminary Environmental Information
PEIR	Preliminary Environmental Information Report
PRA	Preliminary Risk Assessment
PRoW	Public Right of Ways
RFC	Ratio To Flow Capacity
RPG	Registered Park and Garden
RCP	Representative Concentration Pathways
RBMP	River Basin Management Plans
RAF	Royal Air Force
SoS	Secretary Of State
SOAEL	Significant Observed Adverse Effect Level
SWMP	Site Waste Management Plan
SSSI	Sites Of Special Scientific Interest



SPZ	Source Protection Zones
SAC	Special Areas of Conservation
SPA	Special Protection Areas
SPI	Species Of Principal Importance
SOCC	Statement Of Community Consultation
SRN	Strategic Road Network
SF <sub>6</sub>	Sulphur Hexafluoride
SPD	Supplementary Planning Documents
SPG	Supplementary Planning Guidance
SuDS	Sustainable Drainage System
tCO <sub>2e</sub>	Tonnes Of Carbon Dioxide Equivalent
TAG	Transport Analysis Guidance
TA	Transport Assessment
TRL	Transport Research Laboratory
TEMPRO	Trip Ends Model Program
UKBAP	UK Biodiversity Action Plan
UKCP18	UK Climate Projections 2018
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change
WFD	Water Framework Directive
W	Watts

WLDC	West Lindsey District Council
WCA	Wildlife And Countryside Act
ZOI	Zone Of Influence
ZTV	Zone Of Theoretical Visibility

# 21. Appendices

# Appendix A: Transboundary Effects Screening Matrix

Regulation 32 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (Ref. 1) requires the consideration of any likely significant effects on the environment of European Economic Association (EEA) States.

Guidance upon the consideration of transboundary effects is provided in the Planning Inspectorate’s Advice Note 12: Development with significant transboundary impacts consultation (Ref. 89).

The following screening matrix provides the consideration of transboundary effects for the Proposed Development, taking guidance from Advice Note 12 (Annex).

**Table A1: Screening Matrix for Possible Substantial Effects on the Environment of EEA States**

Criteria and Relevant Considerations	Commentary with Regard to the Proposed Development
Characteristics of the development Size of the development: Use of natural resources Production of waste Pollution and nuisance Risk of accidents Use of technologies	The resources required for the construction of the Proposed Development are likely to be obtained from the global market but it is envisaged that materials would be obtained locally wherever possible. No waste, nuisances or accidents are likely to extend beyond the border of the UK. No novel technologies are proposed that have potential for transboundary effects.
Location of development (including existing use) and Geographical area: What is the existing use? What is the distance to another EEA state? (Name EEA state)? What is the extent of the area of a likely impact under the jurisdiction of another EEA state?	The Proposed Development’s closest EEA boundary is France, located approximately 300km to the south-east.  No impacts are likely to extend beyond the jurisdiction of the UK, with the exception of potential GHG emissions. The latter is expected to be minimal given the nature of the Proposed Development, which will not emit GHG emissions during its operation (except for any emissions associated with maintenance vehicles and repair works).
Environmental importance: Are particular environmental values (e.g. protected areas – name them) likely to be affected? Capacity of the natural environment. Wetlands, coastal zones, mountain and forest areas, nature reserves and parks, Natura 2000 sites, areas where environmental quality standards already exceeded, densely populated areas, landscapes of historical, cultural or archaeological significance.	There are no European statutory designated nature conservation sites within 10km of the Proposed Development. It is not anticipated that there is potential for transboundary effects (and therefore any effects on important environmental receptors beyond the UK).

Criteria and Relevant Considerations	Commentary with Regard to the Proposed Development
<p>Potential impacts and carrier By what means could impacts be spread (i.e. what pathways)?</p>	<p>The only potential transboundary environmental impact which is considered likely is from GHG emissions. These emissions would be spread by atmospheric processes and are anticipated to be minimal given the nature of the Proposed Development. The Proposed Development is expected to offset GHG emissions through the generation of clean electricity, that otherwise would have been generated from a typical fuel mix comprising technologies such as gas fired power stations for example.</p>
<p>Extent What is the likely extent of the impact (geographical area and size of the affected population)?</p>	<p>The only potential transboundary environmental impact which is considered likely is from GHG emissions, which are known to contribute to changes on climate on a global scale.</p>
<p>Magnitude What will the likely magnitude of the change in relevant variables relative to the status quo, taking into account the sensitivity of the variable?</p>	<p>The impact of GHG emissions is considered irreversible within human lifetimes, however as above, the emissions are expected to be minimal during construction and decommissioning (in the order of one to three years) and is expected to lead to a beneficial contribution to UK GHG emissions during operation (assumed to be 40 years). The temporal pattern of GHG emissions is likely to be relatively constant during the construction and decommissioning phases.</p>
<p>Probability What is the degree of probability of the impact? Is the impact likely to occur as a consequence of normal conditions or exceptional situations, such as accidents?</p>	<p>It is proposed to calculate the likely GHG emissions as part of the EIA. GHG impacts will be put into context in terms of their impact on the UK's five year carbon budgets which set legally binding targets for greenhouse gas emissions. The GHG emissions offset through the production of cleaner electricity during the operational phase will be accounted for within the GHG emissions calculations.</p>
<p>Duration Is the impact likely to be temporary, short-term or long-term? Is the impact likely to relate to the construction, operation or decommissioning phase of the activity?</p>	<p>In any event, the global nature of GHG impacts means that it is not possible to apportion or identify any impact in GHG emissions in terms of environmental effects on any particular country or state. It follows that there is no potential for significant effects on the environment of any EEA State or group of EEA States resulting from GHG emissions from the Proposed Development, as the environmental receptor in this regard is the global atmosphere, rather than the environment of any country or state or group of countries or states. The GHG emissions are considered at a global level, and so are captured by the assessment in any event.</p>
<p>Frequency What is likely to be the temporal pattern of the impact?</p>	
<p>Reversibility Is the impact likely to be reversible or irreversible?</p>	
<p>Cumulative impacts Are other major developments close by?</p>	<p>Other developments within close proximity to the Proposed Development will be taken into consideration in the cumulative assessment as part of the EIA. However, it is not anticipated that there is potential for significant cumulative transboundary effects.</p>

# Appendix B: Long List of Major Accidents or Disasters

	Major accident or disaster	Relevant for long list?	Why? (note if risk to the project, or project exacerbates risk)	Potential Receptors	Covered already in proposed ES? If so, where?
<b>1</b>	<b>Geological disasters</b>				
1.1	Landslides	No	The risk of landslides will be considered as part of the geotechnical design, ensuring that the risk is designed out, both in terms of the vulnerability of the Proposed Development to these types of event; however given the flat nature of the land this risk is considered minimal. The Proposed Development is not anticipated to increase the risk of landslip happening onsite or elsewhere; it will not significantly change the erosion potential of the soil or stability of the land.	N/A	N/A
1.2	Earthquakes	No	The Proposed Development is not located in a geologically active area and as such earthquakes are not considered to be a real risk or serious possibility.	N/A	N/A

	Major accident or disaster	Relevant for long list?	Why? (note if risk to the project, or project exacerbates risk)	Potential Receptors	Covered already in proposed ES? If so, where?
1.3	Sinkholes	No	The risk of sinkholes will be considered as part of the geotechnical design, ensuring that the risk is designed out, both in terms of the vulnerability of the Proposed Development to these types of event, and also in terms of the potential for the Proposed Development to increase the risk of such an event happening.	N/A	N/A
<b>2</b>	<b>Hydrological disasters</b>				
2.1	Floods	Yes	Both the vulnerability of the Proposed Development to flooding, and its potential to exacerbate flooding, will be covered in the Flood Risk Assessment, and also reported in the ES (both in terms of the risk to the Proposed Development and increased risk caused by the Proposed Development).	Property and people in areas of increased flood risk.	Chapter 10: Water Environment Mitigation will be considered and, where necessary, incorporated into the Proposed Development design.
2.2	Limnic eruptions	No	Not applicable as there are no lakes nearby.	N/A	N/A
2.3	Tsunami/Storm surge	No	Not applicable as the Proposed Development is not in a coastal location.	N/A	N/A
<b>3</b>	<b>Meteorological disasters</b>				

	Major accident or disaster	Relevant for long list?	Why? (note if risk to the project, or project exacerbates risk)	Potential Receptors	Covered already in proposed ES? If so, where?
3.1	Blizzards	No	The Proposed Development is considered to be no more vulnerable than any other development.	N/A	N/A
3.2	Cyclonic storms	No	Although there are storms in the UK, their destructive force tends to be much less than in other parts of the world and the Proposed Development is not particularly vulnerable to any potential effects.	N/A	N/A
3.3	Droughts	No	Droughts are only considered as a disaster due to water shortages for essential services and where there are indirect impacts on food production, loss of soils etc. The Proposed Development is not considered to be vulnerable to drought.	N/A	N/A
3.4	Thunderstorms	No	As the Proposed Development includes metal components, there is a risk of lightning strikes. However, these risks will be removed or reduced through inbuilt control systems and can be scoped out at this stage.	N/A	N/A



	<b>Major accident or disaster</b>	<b>Relevant for long list?</b>	<b>Why? (note if risk to the project, or project exacerbates risk)</b>	<b>Potential Receptors</b>	<b>Covered already in proposed ES? If so, where?</b>
3.5	Hailstorms	No	The Proposed Development is considered to be no more vulnerable than any other development.	N/A	N/A
3.6	Heat waves	No	While impacts are expected as a result of projected temperature increases (due to climate change), these temperature increases are not expected to have a significant impact on the Proposed Development. It is anticipated that the cooling systems for the battery energy storage systems, will regulate temperatures to within safe conditions.	N/A	No
3.7	Tornadoes	No	Although there are tornadoes in the UK, their destructive force tends to be much less than in other parts of the world and the Proposed Development is not particularly vulnerable to any potential effects.	N/A	No

	<b>Major accident or disaster</b>	<b>Relevant for long list?</b>	<b>Why? (note if risk to the project, or project exacerbates risk)</b>	<b>Potential Receptors</b>	<b>Covered already in proposed ES? If so, where?</b>
3.8	Fires	Yes	There may be some potential for fire as a result of the battery storage element of the Proposed Development. However, the battery energy storage system will include cooling systems, which are designed to regulate temperatures to within safe conditions to minimise the risk of fire. In addition, the Proposed Development design will include adequate separation between battery banks to ensure that an isolated fire would not become widespread and lead to a major incident. Fire detection and suppression features would be installed to detect (e.g. multispectrum infrared flame detectors) and suppress fire (e.g. water base suppression systems) to minimise the effect of any fire.	Local residents, habitats and species.	Chapter 3: The Proposed Development

	Major accident or disaster	Relevant for long list?	Why? (note if risk to the project, or project exacerbates risk)	Potential Receptors	Covered already in proposed ES? If so, where?
3.9	Air Quality Events	No	<p>The Proposed Development is not located within any Air Quality Management Areas (AQMA) and there are no AQMAs within the NKDC's local authority area.</p> <p>Although there are likely to be emissions during construction and decommissioning of the Proposed Development, it is considered that these can be managed through the implementation of a Construction Environmental Management Plan. Good practice measures will be set out in an Outline Construction Environmental Management Plan to be appended to the ES.</p>	N/A	N/A

**4 Transport**

	Major accident or disaster	Relevant for long list?	Why? (note if risk to the project, or project exacerbates risk)	Potential Receptors	Covered already in proposed ES? If so, where?
4.1	Road Accidents	Yes	The risk posed by spillage from hazardous loads as a result of a road traffic accident during construction or decommissioning will be considered in the Flood Risk, Drainage and Water Resources chapter of the ES. The potential for glint and glare to affect road users will be considered within a technical appendix to the ES if any risks are identified.	Aquatic environment Road users	Chapter 10: Water Environment Glint and Glare Study Mitigation will be considered and, where necessary, incorporated into the Proposed Development design.
4.2	Rail Accidents	No	No rail lines pass through the Site or are in close proximity, so no effects on rail receptors are anticipated.	N/A	N/A
4.3	Aircraft Disasters	Yes	The potential for glint and glare to affect aircraft will be considered within a technical appendix to the ES if any risks are identified, including the potential to exacerbate 'birdstrike' (collision between a bird and an aircraft).	Pilots and aircraft	Chapter 9: Ecology and Biodiversity Glint and Glare Assessment Mitigation will be considered and, where necessary, incorporated into the Proposed Development design.
<b>5</b>	<b>Engineering Accidents/Failures</b>				
5.1	Bridge Failure	No	None nearby that would affect the Proposed Development.	N/A	N/A
5.2	Tunnel Failure or Fire	No	None nearby.	N/A	N/A

	<b>Major accident or disaster</b>	<b>Relevant for long list?</b>	<b>Why? (note if risk to the project, or project exacerbates risk)</b>	<b>Potential Receptors</b>	<b>Covered already in proposed ES? If so, where?</b>
5.3	Dam Failure	No	The Site is not at risk from reservoir flooding.	N/A	N/A
5.4	Flood Defence Failure	Yes	This will be covered in the Flood Risk Assessment and will also be reported in ES, both in terms of the risk to the Proposed Development and increased risk caused by the Proposed Development.	Property and people in areas of increased flood risk.	Chapter 10: Water Environment Mitigation will be considered and, where necessary, incorporated into the Proposed Development design.
5.5	Mast and Tower Collapse	No	Not applicable as there are no masts or towers nearby.	N/A	N/A
5.6	Building failure or fire	No	None nearby that would affect the Proposed Development.	N/A	N/A
5.7	Utilities failure (gas, electricity, water, sewage, oil, communications)	Yes	The Proposed Development has the potential to affect existing utility infrastructure above and below ground. To identify any existing infrastructure constraints, both consultation and a desk based study will be undertaken. It is known that there is an overhead electricity lines located close to the Site.	Employees and local residents.	No, however, consultation with relevant utilities providers is a routine part of solar development and consultees will include water, gas and electricity utilities providers and telecommunications providers as appropriate. Information obtained from consultation will be used to inform the layout design.
<b>6</b>	<b>Industrial Accidents</b>				
6.1	Defence industry	No	Not applicable as there is no defence manufacturing nearby.	N/A	N/A

	Major accident or disaster	Relevant for long list?	Why? (note if risk to the project, or project exacerbates risk)	Potential Receptors	Covered already in proposed ES? If so, where?
6.2	Energy Industry (fossil fuel)	No	Not applicable as there are no fossil fuel power stations nearby.	N/A	N/A
6.3	Nuclear Power	No	Not applicable as there are no nuclear power stations nearby.	N/A	N/A
6.4	Oil and gas refinery/storage	No	Not applicable as there is no relevant industry nearby.	N/A	N/A
6.5	Food Industry	No	Not applicable as there is no relevant industry nearby.	N/A	N/A
6.6	Chemical Industry	No	Not applicable as there no relevant industry nearby.	N/A	N/A
6.7	Manufacturing Industry	No	Not applicable as there no relevant industry nearby.	N/A	N/A
6.8	Mining / Extractive Industry	No	Not applicable as there no relevant industry nearby.	N/A	N/A
<b>7</b>	<b>Terrorism/Crime/Civil unrest</b>	No	The Proposed Development is unlikely to be more of a target for these types of incident due to its rural location and low number of exposed targets.	N/A	N/A
<b>8</b>	<b>War</b>	No	The Proposed Development is no more vulnerable than any other infrastructure.	N/A	N/A
<b>9</b>	<b>Disease</b>				
9.1	Human disease	No	The Proposed Development is considered no more vulnerable than any other infrastructure.	N/A	N/A

	<b>Major accident or disaster</b>	<b>Relevant for long list?</b>	<b>Why? (note if risk to the project, or project exacerbates risk)</b>	<b>Potential Receptors</b>	<b>Covered already in proposed ES? If so, where?</b>
9.2	Animal disease	No	The Proposed Development is considered no more vulnerable than any other infrastructure.	N/A	N/A
9.3	Plant disease	Yes	New planting may be susceptible to biosecurity issues, such as the increased prevalence of pests and diseases, due to climate change.	Habitats and species	Chapter 11: Landscape and Visual Amenity (including Biodiversity and Landscape Management Plan) The planting design will take account of biosecurity risks through a wider mix of species including some non-natives.

# Appendix C: Gazetteer of Known Heritage Assets



## Designated Heritage Assets

Reference	Designation	Grid Reference	Period	Heritage Asset	Search Area
NHLE 1317567	Grade II* listed building	SK 96994 62141	Post-medieval	Harmston Hall Hospital	Within the Site
NHLE 1164892	Grade II* listed building	SK 97271 62275	Medieval and post-medieval	All Saints Parish Church	Within the Site
NHLE 1005015	Scheduled	SK 95393 58787	Medieval	Somerton Castle	Within 3km of the Site
NHLE 1013082	Scheduled	SK 90866 61712	Medieval	Churchyard Cross, St Germain's Churchyard	Within 3km of the Site
NHLE 1009216	Scheduled	SK 87563 53761	Medieval	Churchyard Cross, All Saints Churchyard	Within 3km of the Site
NHLE 1009214	Scheduled	SK 98381 56794	Medieval	Wellingore Village Cross	Within 3km of the Site
NHLE 1007686	Scheduled	TF 00840 53714	Medieval	Remains of Preceptory Church, Temple Bruer	Within 3km of the Site
NHLE 1021080	Scheduled	SK 87563 53761	Medieval	Hall Close: a medieval and post-medieval hall complex south of Dovecote Lane, with dovecote, gardens, fishponds, churchyard and cultivation remains	Within 3km of the Site
NHLE 1020436	Scheduled	SK 96812 54323	Medieval	Castle Hill Ringwork Castle Hill Ringwork	
NHLE 1000973	Grade II RPG	SK 97438 60800	Post-medieval	Coleby Hall	Within 3km of the Site
NHLE 1360515	Grade I listed building	SK 97508 60936	Post-medieval	Temple at Coleby Hall	Within 3km of the Site
NHLE 1164829	Grade I listed building	SK 97520 60589	Medieval and post-medieval	Church of All Saints	Within 3km of the Site
NHLE 1061974	Grade I listed building	SK 95431 58760	Medieval and post-medieval	Somerton Castle and Outbuilding to North-West	Within 3km of the Site
NHLE 1360511	Grade I listed building	SK 95460 58828	Medieval	Orchard Outbuilding at Somerton Castle	Within 3km of the Site
NHLE 1147458	Grade I listed building	SK 98650 57843	Medieval and post-medieval	Church of St Peter	Within 3km of the Site

Reference	Designation	Grid Reference	Period	Heritage Asset	Search Area
NHLE 1164612	Grade I listed building	SK 89992 70083	Post-medieval	Doddington Hall	Within 3km of the Site
NHLE 1061955	Grade I listed building	SK 92654 62853	Post-medieval	Aubourn Hall	Within 3km of the Site
NHLE 1345036	Grade I listed building	TF 00851 53709	Medieval	Church Tower to the North of Temple Farmhouse	Within 3km of the Site
NHLE 1061852	Grade I listed building	SK 96868 54510	Medieval and post-medieval	Church of St Chad	Within 3km of the Site
NHLE 1360553	Grade I listed building	SK 90809 57895	Medieval and post-medieval	Church of St Mary	Within 3km of the Site
NHLE 1360541	Grade II* listed building	SK 92767 62787	Medieval and post-medieval	Church of St Peter	Within 3km of the Site
NHLE 1061972	Grade II* listed building	SK 90895 61713	Medieval and post-medieval	Church of St Germain	Within 3km of the Site
NHLE 1061923	Grade II* listed building	SK 90806 59732	Medieval and post-medieval	The Church of St Michael and All Angels	Within 3km of the Site
NHLE 1061979	Grade II* listed building	SK 97322 60768	Post-medieval	Coleby Hall	Within 3km of the Site
NHLE 1147748	Grade II* listed building	SK 98312 56533	Post-medieval	Wellingore Hall and Attached RC Church of St Augustine	Within 3km of the Site
NHLE 1360567	Grade II* listed building	SK 96637 53982	Medieval and post-medieval	Welbourne Manor	Within 3km of the Site
NHLE 1307159	Grade II* listed building	TF 05510 54754	Medieval and post-medieval	Church of St Hybald	Within 3km of the Site
NHLE 1165316	Grade II* listed building	SK 86902 63179	Medieval and post-medieval	Church of All Saints	Within 3km of the Site

Reference	Designation	Grid Reference	Period	Heritage Asset	Search Area
NHLE 192453	Grade II* listed building			Church of St Swithin	Within 3km of the Site
NHLE 1005018	Scheduled	SK 8595760244	Roman	Roman Villa West of Holt Hill Farm	Within 5km of the Site
NHLE 1018397	Scheduled	TF 04708 52563	Medieval	Brauncewell Medieval Village	Within 5km of the Site
NHLE 1018395	Scheduled	TF 04008 51343	Medieval	Dunsby Medieval Village	Within 5km of the Site
NHLE 1000975	Grade II* RPG	SK 89782 70152	Post-medieval	Doddington Hall	Within 5km of the Site
NHLE 1000984	Grade II RPG	SK 94447 69453	Post-medieval	Hartsholme Park	Within 5km of the Site
NHLE 1261473	Grade I listed building	TF 06461 53776	Medieval and post-medieval	Church of St Mary	Within 5km of the Site
NHLE 1061958	Grade I listed building	SK 90075 70123	Medieval and post-medieval	Church of St Peter	Within 5km of the Site
NHLE 1147497	Grade I listed building	SK 91544 53899	Medieval and post-medieval	Church of St Helen	Within 5km of the Site
NHLE 1062005	Grade I listed building	SK 84821 66737	Medieval and post-medieval	Church of All Saints	Within 5km of the Site
NHLE 1061877	Grade II* listed building	SK 94936 51823	Post-medieval and modern	Leadenham House	Within 5km of the Site
NHLE 1061998	Grade II* listed building	SK 88336 68599	Post medieval	Folly facade to The Jungle	Within 5km of the Site
NHLE 1061959	Grade II* listed building	SK 89943 70086	Post-medieval	Walls and Gates to Doddington Hall	Within 5km of the Site
NHLE 1360505	Grade II* listed building	SK 90054 70080	Post-medieval	Gatehouse to Doddington Hall	Within 5km of the Site
NHLE 1064285	Grade II* listed building	TF 06826 60003	Medieval and post-medieval	Church of St Oswald	Within 5km of the Site

Reference	Designation	Grid Reference	Period	Heritage Asset	Search Area
NHLE 1064299	Grade II* listed building	TF 06985 58056	Medieval and post-medieval	Church of the Holy Cross	Within 5km of the Site
NHLE 1061869	Grade II* listed building	SK 95184 52501	Post-medieval	The Old Hall	Within 5km of the Site
NHLE 1360527	Grade II* listed building	SK 91535 54027	Post-medieval	The Priory, Gates and Gatepiers	Within 5km of the Site
NHLE 1061928	Grade II* listed building	SK 91535 54027	Post-medieval	Lister Place, Gates and Gatepiers	Within 5km of the Site
NHLE 1061898	Grade II* listed building	SK 91653 54219	Post-medieval	Brant Broughton Quaker Meeting House and attached stable	Within 5km of the Site

## Non-designated Heritage Assets

HER Number	Asset Name	Period
MLI115946	Boothby Graffoe War Memorial	Modern
MLI116045	Coleby War Memorial	Modern
MLI116280	Dutch Barns, Former Flax Factory, Metheringham	Modern
MLI116281	Former Flax Factory, Metheringham	Modern
MLI116282	Flax Retting Tanks, Metheringham	Modern
MLI116283	Dutch Barns, Former Flax Factory, Metheringham	Modern
MLI116318	Prehistoric Flint Flake, Wellingore	Prehistoric
MLI116319	Bronze Scrap Fragments, Wellingore	Medieval
MLI116473	Probable Post-Medieval Ditch, Metheringham Heath Lane	Post-Medieval
MLI116474	Undated Linear Feature and Pits, Metheringham Heath Lane	Undated
MLI116567	Unnamed farmstead, Coleby	Post-Medieval
MLI116571	Unnamed farmstead, Coleby	Post-Medieval
MLI116957	(Danker Farm), Aubourn with Haddington	Post-Medieval
MLI116959	Cross Ways Farm, Aubourn with Haddington	Post-Medieval
MLI119634	Harmston Field, Harmston	Post-Medieval
MLI119636	Unnamed farmstead, Harmston	Post-Medieval
MLI119637	Blackmoor Farm, Aubourn with Haddington	Post-Medieval
MLI119639	Unnamed farmstead, Aubourn with Haddington	Post-Medieval
MLI119648	(Glebe Farm), Thorpe on the Hill	Post-Medieval
MLI119649	Unnamed farmstead, Thorpe on the Hill	Post-Medieval
MLI119669	Crossing Farm, Eagle and Swinethorpe	Post-Medieval
MLI119673	(Whitewell Farm), Eagle and Swinethorpe	Post-Medieval

HER Number	Asset Name	Period
MLI119724	Unnamed farmstead, Bassingham	Post-Medieval
MLI119726	Unnamed farmstead, Bassingham	Post-Medieval
MLI119729	Unnamed farmstead, Bassingham	Post-Medieval
MLI119756	(Firholt Farm), Witham St. Hughs	Post-Medieval
MLI119762	Greengate Farm (Green Gate Farm), Thurlby	Post-Medieval
MLI119763	Lakeside House, Thurlby	Post-Medieval
MLI119767	Moor Lane Farm, Thurlby	Post-Medieval
MLI119768	River Farm, Thurlby	Post-Medieval
MLI119769	Church Farm, Thurlby	Post-Medieval
MLI119775	Bledisloe, Norton Disney	Post-Medieval
MLI119776	Field House, Norton Disney	Post-Medieval
MLI119777	Fir Tree Farm, Norton Disney	Post-Medieval
MLI120657	Unnamed farmstead (Heath House), Metheringham	Post-Medieval
MLI120658	Heath Farm, Metheringham	Post-Medieval
MLI120964	Boothby Heath Farm, Boothby Graffoe	Post-Medieval
MLI120966	Boothby Heath Farm, Boothby Graffoe	Post-Medieval
MLI120967	Unnamed farmstead, Boothby Graffoe	Post-Medieval
MLI120972	Lowfields Farm House, Boothby Graffoe	Post-Medieval
MLI120974	Vine House Farm (Vine House), Navenby	Post-Medieval
MLI120981	Unnamed farmstead, Navenby	Post-Medieval
MLI120982	Unnamed farmstead (Poplar House), Navenby	Post-Medieval
MLI120983	Barn Farm, Navenby	Post-Medieval
MLI120984	Ivy House Farm (Skinnand), Navenby	Post-Medieval

HER Number	Asset Name	Period
MLI120988	Heath Farm, Wellingore	Post-Medieval
MLI120993	Unnamed farmstead, Wellingore	Post-Medieval
MLI124811	Unnamed farmstead, Coleby	Post-Medieval
MLI124812	Unnamed farmstead, Coleby	Post-Medieval
MLI124887	Site of a Dovecote, Dovecote Lane, Coleby	Post-Medieval
MLI125038	Pillbox, RAF Digby	Modern
MLI125140	Pillbox, RAF Wellingore	Modern
MLI125141	Pillbox, RAF Wellingore	Modern
MLI125142	Pillbox, RAF Wellingore	Modern
MLI125143	Pillbox, RAF Wellingore	Modern
MLI125144	Pillbox, RAF Wellingore	Modern
MLI125145	Battle Headquarters, RAF Wellingore	Modern
MLI125146	Defensible Shelter, RAF Wellingore	Modern
MLI125147	Defensible Shelter, RAF Wellingore	Modern
MLI125148	Defensible Shelter, RAF Wellingore	Modern
MLI125149	Defensible Shelter, RAF Wellingore	Modern
MLI125150	Defensible Shelter, RAF Wellingore	Modern
MLI125151	Defensible Shelter, RAF Wellingore	Modern
MLI125152	Former Pillbox, RAF Coleby Grange	Modern
MLI125153	Pillbox, RAF Coleby Grange	Modern
MLI125154	Defensible Shelter, RAF Coleby Grange	Modern
MLI125191	Royal Observer Corps Post, Navenby	Modern
MLI125322	Temple Bruer with Temple High Grange War Memorial	Modern

HER Number	Asset Name	Period
MLI125331	Wellingore War Memorial	Modern
MLI125485	Morton Manor, Swinderby	Post-Medieval
MLI125567	Battle Headquarters, RAF Swinderby	Modern
MLI125628	Churchyard, Church of St Peter, Norton Disney	Medieval
MLI125629	Ridge and Furrow, Norton Disney	Medieval
MLI125630	Ridge and Furrow, Norton Disney	Medieval
MLI125631	Manor House Farm, Norton Disney	Post-Medieval
MLI125640	Outbuilding, Manor House Farm, Norton Disney	Post-Medieval
MLI125807	Prehistoric Flint Flake, Cross Ways Farm	Prehistoric
MLI125907	Milestone, Grantham Road, Navenby	Post-Medieval
MLI125943	Iron Age Ditches and Pits, Walnut Tree Field, Wellingore	Iron Age
MLI125944	Romano-British Ditches, Walnut Tree Field, Wellingore	Roman
MLI125945	Late Saxon Features, Walnut Tree Field, Wellingore	Early Medieval
MLI125966	Medieval Surface, Land off 46 High Street, Navenby	Medieval
MLI125967	Former Dwellings, Land Adjacent to Walnut House, Maidenwell Lane, Navenby	Post-Medieval
MLI125968	Undated Pit, Land Adjacent to Walnut House, Maidenwell Lane, Navenby	Undated
MLI125969	Medieval Activity, Land Adjacent to Walnut House, Maidenwell Lane, Navenby	Medieval
MLI126018	Defensible Shelter, RAF Wellingore	Modern
MLI126019	Defensible Shelter, RAF Wellingore	Modern
MLI126020	Defensible Shelter, RAF Wellingore	Modern
MLI126021	Former Pillbox, RAF Wellingore	Modern
MLI126084	Churchyard, Church of St Michael and All Angels, Bassingham	Early Medieval



HER Number	Asset Name	Period
MLI126096	Housham Grange, Thorpe on the Hill	Post-Medieval
MLI60266	Cropmark of possible moated site or farmstead, Ashby Lodge, Ashby de la Launde	
MLI60271	Possible moated site to the west of Boothby Graffoe	Medieval
MLI60284	Medieval Moated Site, Norton Disney	Medieval
MLI60368	Possible Romano-British cemetery, north of Chapel Lane, Navenby	Roman
MLI60381	Possible medieval grange at Temple High Grange	Medieval
MLI60385	Anglo-Saxon Stonework, Church of St Michael and All Angels, Bassingham	Early Medieval
MLI60405	Late Anglo-Saxon grave cover, located ay Coleby Hall	Early Medieval
MLI60412	Fragment of Anglo-Saxon grave cover, St Germain's church, Thurlby	Early Medieval
MLI60415	Hawdin's and Norton Big Woods, Norton Disney	Medieval
MLI60416	Tunman and Housham Woods, Thorpe on the Hill	Medieval
MLI60501	Roman pottery found in a garden, Newark Road, Bassingham	Roman
MLI60515	Two Palaeolithic handaxes from west of Thorpe on the Hill	Palaeolithic
MLI60522	Short cross penny, north of Bassingham	Medieval
MLI60523	Elizabethan coin, north of Bassingham	Post-Medieval
MLI60524	Medieval brooch from south of Bassingham	Medieval
MLI60525	Medieval finds, Norton Disney	Medieval
MLI60527	Ploughed-out mound and possible cropmarks, Norton Disney	Early Medieval
MLI60537	Roman Settlement, Ermine Street, Navenby	Roman
MLI60538	Flint scatter, Chapel Heath, Navenby	Prehistoric
MLI60554	Possible Moat, Thurlby	Medieval
MLI60557	Iron Age settlement, Navenby	Iron Age
MLI60562	Early medieval remains, Church Lane, Harmston	Early Medieval

HER Number	Asset Name	Period
MLI60576	Roman remains from Hall Field, Water Lane, Bassingham	Roman
MLI60577	Anglo-Saxon pottery from Hall Field, Water Lane, Bassingham	Early Medieval
MLI60578	Medieval and post medieval manor at Hall Field, Water Lane, Bassingham	Medieval
MLI60581	Post-Roman Settlement of Navenby	Early Medieval
MLI60603	Romano-British artefact scatter, from near New South Farm, Thurlby	Roman
MLI60611	Settlement of Bassingham	Early Medieval
MLI60619	Two Palaeolithic handaxes from Redlands Aggregates pit	Palaeolithic
MLI60620	RAF Coleby Grange	Modern
MLI60621	RAF Digby	Modern
MLI60622	RAF Wellingore	Modern
MLI60634	Park and woodland at Coleby Hall, Coleby	Post-Medieval
MLI60638	Ermine Street, North and South Kesteven	Roman
MLI60640	Roman pottery, Norton Disney	Roman
MLI60641	Prehistoric flint, Norton Disney	Prehistoric
MLI60653	Undated Ditch, Main Street, Norton Disney	Undated
MLI60654	Twin Tree Farm, Norton Disney	Post-Medieval
MLI60701	Undated finds from Newark Road, Bassingham	Undated
MLI60705	Roman pottery sherd from Newark Road, Bassingham	Roman
MLI60757	Middle Saxon coin and bead, Wellingore	Early Medieval
MLI60759	Late Neolithic polished stone axehead, Ashby de la Launde and Bloxholm	Neolithic
MLI60770	Fourth century coin from Halfway House Pub	Roman
MLI60773	Medieval settlement of Skinnand	Medieval
MLI60774	Settlement of Boothby Graffoe	Early Medieval

HER Number	Asset Name	Period
MLI60776	Settlement of Coleby	Early Medieval
MLI60777	Settlement of Harmston	Early Medieval
MLI60785	Romano-British pottery scatter, south of Wellingore	Roman
MLI60787	Post medieval quarries and pits, Water Lane, Bassingham	Post-Medieval
MLI60789	Pre-Enclosure Field Boundary, Standacre Farm, Bassingham	Medieval
MLI60791	Edward VI shilling, Norton Disney	Medieval
MLI60793	Undated pit at the western end of Church Lane	Undated
MLI60916	Roman coin from Navenby Heath	Roman
MLI60917	Medieval buckle from Navenby Heath	Medieval
MLI60919	Medieval buckle from Navenby Heath	Medieval
MLI60943	The Fosse Way	Roman
MLI80311	Ridge and furrow, between Witham House and the river, Bassingham	Medieval
MLI80454	Potential cropmark warping drain, west of Tunman Woods	Post-Medieval
MLI80479	Undated cropmarks, east of Eagle Hall Wood	Undated
MLI80560	Ridge and Furrow, Norton Big Wood	Medieval
MLI80604	Bronze Age cremation, south of Chapel Lane	Bronze Age
MLI80605	Anglo-Saxon Inhumations, Navenby	Early Medieval
MLI80606	Undated cremation burials, south of Chapel Lane	Undated
MLI80757	Two undated ditches, Westcliffe Court	Undated
MLI80893	Roman finds from field to north west of the old mill	Roman
MLI80905	Worsdell's Mill, Waddington	Post-Medieval
MLI81137	Ridge and furrow, Witham Farm, Bassingham	Medieval
MLI81142	Post-medieval extractive pits, Ermine Street, Navenby	Post-Medieval

HER Number	Asset Name	Period
MLI81143	Probable post-medieval metalled surface, near Ermine Street, Navenby	Post-Medieval
MLI81207	Medieval ridge and furrow, Tonge's Farm	Medieval
MLI81208	Undated probable post-medieval drainage ditches, Tonge's Farm	Undated
MLI81209	Undated enclosure, possibly geological in origin, Tonge's Farm	Undated
MLI81437	Roman finds from north of White Lane (Plot 1)	Roman
MLI81439	Medieval finds from north of White Lane (Plot 1)	Medieval
MLI81440	One flint flake from north of White Lane (Plot 1)	Prehistoric
MLI81442	Iron Age/Romano-British finds from north of White Lane (Plot 2)	Iron Age
MLI81443	Medieval and post medieval finds, north of White Lane (Plot 2)	Medieval
MLI81445	Five pieces of worked flint, north of White Lane (Plot 2)	Prehistoric
MLI81446	Two flint flakes from east of Grantham Road (Plot 3)	Neolithic
MLI81447	One sherd of medieval pottery, east of Grantham Road (Plot 3)	Medieval
MLI81448	Roman finds from east of Grantham Road (Plot 4)	Roman
MLI81449	One sherd of medieval/post med pottery, east of Grantham Road (Plot 4)	Medieval
MLI81450	Four pieces of worked flint, east of Grantham Road (Plot 4)	Neolithic
MLI81460	Quarry pit, east of Grantham Road (northern part of Plot 6)	Post-Medieval
MLI81461	Quarry pit, east of Grantham Road (southern part of Plot 7)	Post-Medieval
MLI81472	Worked flint from east of Grantham Road (Plot 9)	Prehistoric
MLI81473	Roman-post medieval pottery, east of Grantham Road (Plot 9)	Roman
MLI81668	A late Bronze Age/Iron Age scraper, west of Ermine Street, Navenby	Bronze Age
MLI81669	A late Bronze Age/Iron Age scraper, west of Ermine Street, Navenby	Bronze Age
MLI81672	Possible early Neolithic settlement features and finds west of Ermine Street, Navenby	Neolithic
MLI81675	Undated quarry pit, west of Ermine Street, Navenby	Undated

HER Number	Asset Name	Period
MLI81737	Medieval shelly ware pot sherd, Wellingore Low Fields	Medieval
MLI81738	Rim sherd of Roman pottery, Wellingore Low Fields	Roman
MLI81739	Several small sherds of Romano-British pottery, Wellingore Low Fields	Roman
MLI81740	Several small sherds of medieval pottery, Wellingore Low Fields	Medieval
MLI81950	Dunston Pillar	Post-Medieval
MLI81978	Old gravel pit, east of Branston Lane	Post-Medieval
MLI81986	Possible prehistoric boundary, Harmston Heath	Prehistoric
MLI81989	Romano-British pottery, Harmston Low Fields	Roman
MLI81990	Flint arrowhead and flakes, west of Oak Holt	Bronze Age
MLI81991	Romano-British pottery from north of School Lane	Roman
MLI81992	Coin of Faustina II, west of Oak Holt	Roman
MLI81993	Two sherds of Romano-British pottery, Harmston Heath	Roman
MLI81994	Two Roman coins from east of High Dike	Roman
MLI81995	Two small flint scrapers, from east of High Dike	Neolithic
MLI81999	Fragment of medieval pottery, Coleby Low Fields	Medieval
MLI82000	Perforated Stone Adze, All Saints' Church, Harmston	Bronze Age
MLI82002	Roman finds from Harmston Heath	Roman
MLI82003	Undated blue glass bead from Harmston Heath	Undated
MLI82005	A small silver Saxon sceat, Harmston Heath	Early Medieval
MLI82019	Old gravel pit, Harmston Heath	Post-Medieval
MLI82020	Old quarry, Harmston Heath	Post-Medieval
MLI82021	Harmston railway station, Station Road	Post-Medieval
MLI82022	Possible brickworks at Brickyard Plantation	Post-Medieval

HER Number	Asset Name	Period
MLI82027	Medieval ridge and furrow, east of Lansdale House	Medieval
MLI82028	Undated cropmark boundary, north and south of White Lane	Undated
MLI82029	Possible prehistoric cropmark boundary, Harmston Heath	Prehistoric
MLI82030	Possible prehistoric enclosure, Harmston Heath	Prehistoric
MLI82031	Medieval earthwork ridge and furrow, Harmston Low Fields	Medieval
MLI82032	Possible round barrow, Harmston Heath	Prehistoric
MLI82078	The settlement of Aubourn	Early Medieval
MLI82088	Possible blacksmith's workshop, Aubourn	Post-Medieval
MLI82089	Medieval Watermill, Aubourn	Medieval
MLI82090	Medieval Fishery, Haddington	Medieval
MLI82104	Anglo-Saxon cemetery, Coleby Park	Early Medieval
MLI82135	Probable Roman Settlement Site, Coleby	Roman
MLI82349	A medieval spur, west of Ermine Street, Navenby	Medieval
MLI82433	Sherd of Torksey ware pottery, west of Coleby	Early Medieval
MLI82438	Base of medieval handle, Coleby low Fields	Medieval
MLI82441	Roman Brooch, Ermine Street, Coleby	Roman
MLI82442	Circular spread of stone, south east of Lodge Farm	Undated
MLI82443	Coleby mill and associated buildings, Coleby Heath	Post-Medieval
MLI82445	Roman coin from High Street, Coleby	Roman
MLI82446	Possible prehistoric cropmarks, Coleby Heath	Prehistoric
MLI82447	Nineteenth century school, Church Lane	Post-Medieval
MLI82450	Disused quarry, south of Coleby	Post-Medieval
MLI82451	Disused quarry to the south of Coleby (west of larger quarry)	Post-Medieval

HER Number	Asset Name	Period
MLI82453	Former Metheringham Heath Primitive Methodist Chapel, Dunston Heath	Post-Medieval
MLI82513	Medieval dagger and possible foundations, Metheringham Heath	Medieval
MLI82579	Probable medieval cropmark enclosure, Metheringham Heath	Medieval
MLI82586	Probable prehistoric cropmarks, in the area of Green Man Wood	Prehistoric
MLI82607	Flint button scraper, from a field west of Sleaford Road	Neolithic
MLI82720	Possible Romano-British Cist Burial, Navenby Methodist Church	Roman
MLI82739	Prehistoric enclosures/boundaries, Blankney Heath	Prehistoric
MLI82782	'Old quarry' located near Green Man Wood, west of A15	Post-Medieval
MLI82783	'Old quarry' located near Green Man Wood, east of A15	Post-Medieval
MLI82784	'Old quarry', west of A15, Blankney Heath	Post-Medieval
MLI83011	Settlement of Thorpe on the Hill	Early Medieval
MLI83017	Barbed and tanged arrowhead, Morton Hall area	Bronze Age
MLI83019	Small polished axe found near the church	Neolithic
MLI83020	Stone axe found east of Fosse Lane	Neolithic
MLI83022	Bronze Age food vessel from Morton Hall Borstal, Thorpe on the Hill	Bronze Age
MLI83023	Anglo-Saxon brooch found west of Tunman Wood	Early Medieval
MLI83033	Thorpe railway station, Station Road	Post-Medieval
MLI83034	Site of former Wesleyan Methodist Chapel, south of Middle Lane/ Main Street	Post-Medieval
MLI83035	Site of former Free United Methodist Chapel, north of Main Street/High Street	Post-Medieval
MLI83036	School, School Lane	Post-Medieval
MLI83037	Pinfold, Lincoln Lane, Thorpe on the Hill	Post-Medieval
MLI83038	Roman pot sherd found during work at The Farm (Westcliffe Lane)	Roman

HER Number	Asset Name	Period
MLI83039	Roman pot sherd found at The Farm (Westcliffe Lane)	Roman
MLI83040	Ridge and furrow field system, east of Tunman Wood	Medieval
MLI83041	The settlement of Morton	Medieval
MLI83042	Romano-British Pottery, Hykeham Roundabout	Roman
MLI83043	Romano-British Pottery, Thorpe on the Hill	Roman
MLI83068	Possible burials found during works on Swinderby Lane	Undated
MLI83152	RAF Swinderby airfield	Modern
MLI83164	Morton Grange, possibly a medieval monastic grange	Medieval
MLI83384	Undated, possibly Romano-British, pits and postholes, Hall Wath, Bassingham	Undated
MLI83386	Undated clay object, Hall Wath, Bassingham	Undated
MLI83395	Settlement of Haddington	Early Medieval
MLI83402	Bronze Age flint scraper, south of Haddington	Bronze Age
MLI83403	Pagan Saxon pottery from area of Hall Close moated complex	Early Medieval
MLI83404	Romano-British pottery, north of Bassingham Road	Roman
MLI83405	Romano-British pottery from area of Hall Close moated complex	Roman
MLI83407	Haddington Hall and Gardens	Medieval
MLI83416	Possible Mesolithic flint core and bone pin from River Witham	Mesolithic
MLI83417	Roman pottery waster fragment, from west of River Brant	Roman
MLI83419	Pewter spoon, from near Aubourn Mill	Post-Medieval
MLI83420	Medieval chapel of St Nicholas	Medieval
MLI83421	Site of former Wesleyan Methodist Chapel, Chapel Lane, Aubourn	Post-Medieval
MLI83422	Aubourn Bridge	Post-Medieval
MLI83423	Possible village remains at Malborough	Medieval



HER Number	Asset Name	Period
MLI83432	Housham Farmhouse, Fosse Way, Thorpe on the Hill	Post-Medieval
MLI83438	Medieval ridge and furrow, west of Haddington	Medieval
MLI83439	Ridge and furrow, south of High Walks Farm	Medieval
MLI83440	Medieval ridge and furrow, adjacent to A46	Medieval
MLI83443	Manor Farm, Aubourn	Post-Medieval
MLI83446	Hop Hill Farm, Aubourn	Post-Medieval
MLI83898	An early Anglo-Saxon burial, off Pottergate Road, Wellingore	Early Medieval
MLI83987	Early Roman Coin, Scotwater Bridge	Roman
MLI84015	An early Anglo-Saxon potsherd off Water Lane, Bassingham	Early Medieval
MLI84044	Settlement of Norton Disney	Early Medieval
MLI84045	Romano-British pottery from south east of Scotwater Bridge, Carlton-Le-Moorland	Roman
MLI84046	Roman Artefacts, Main Street, Norton Disney	Roman
MLI84060	Polished Stone Axe, Norton Disney	Neolithic
MLI84089	Former Wesleyan Methodist Chapel, Main Street, Norton Disney	Post-Medieval
MLI84520	Roman oil lamp, Ashby de la Launde and Bloxholm	Roman
MLI85662	Wellingore Mill	Post-Medieval
MLI85689	Settlement of Welbourn	Early Medieval
MLI85718	Neolithic Flint, Bassingham	Neolithic
MLI85719	Silver penny of Henry III, Bassingham	Medieval
MLI85720	Lead bale seal, River close, Bassingham	Medieval
MLI85721	Stone axe, Bassingham	Bronze Age
MLI85722	Dupondius of Domitian, Bassingham	Roman
MLI85725	Neolithic Antler Pick, Bassingham	Neolithic

HER Number	Asset Name	Period
MLI85726	Site of Methodist chapel, Carlton Road, Bassingham	Post-Medieval
MLI85729	War Memorial, Lincoln Road, Bassingham	Modern
MLI85730	Site of blacksmiths shop, Bassingham	Post-Medieval
MLI85732	Site of Primitive Methodist Church, Eastgate, Bassingham	Post-Medieval
MLI85734	Flour Mill, Lincoln Road, Bassingham	Post-Medieval
MLI85740	Ridge and furrow, Bassingham	Medieval
MLI85746	Searchlight battery, Bassingham	Modern
MLI85747	Earthwork ridge and furrow, Bassingham	Medieval
MLI85763	Site of windmill, Carlton-Le-Moorland	Medieval
MLI85878	Settlement of Thurlby	Early Medieval
MLI85882	Roman Bronze Pin, Thurlby	Roman
MLI85883	Medieval Field System, Thurlby	Medieval
MLI85884	Ridge and Furrow, Thurlby	Medieval
MLI85885	Zoomorphic Brooch, Thurlby	Roman
MLI85886	Roman fibula from east of the River Witham, Bassingham	Roman
MLI85887	Fibula and coins, from east of the River Witham, Bassingham	Roman
MLI85888	Former Smithy, Thurlby	Post-Medieval
MLI85889	Medieval Ridge and Furrow, Thurlby	Medieval
MLI85917	Small Anglian vessel, from south east of Scotwater Bridge, Carlton-Le-Moorland	Early Medieval
MLI85918	Romano-British pottery scatter, south of Norton Disney Road, Carlton-Le-Moorland	Roman
MLI85935	Medieval earthwork ridge and furrow, north of Carlton-Le-Moorland	Medieval
MLI85936	Medieval earthwork ridge and furrow, north of Carlton-Le-Moorland	Medieval

HER Number	Asset Name	Period
MLI85940	Romano-British pottery scatter, south of Norton Disney Road, Carlton-Le-Moorland	Roman
MLI86044	Housham Wood Farm, Thorpe on the Hill	Post-Medieval
MLI86071	Romano-British Enclosure, Tonge's Farm, Norton Disney	Roman
MLI86078	Undated ditches on land north of Tonge's Farm, Norton Disney	Undated
MLI86083	Medieval or post-medieval plough furrows, Tonge's Farm, Norton Disney	Medieval
MLI86085	Possible post medieval ditches Tonge's Farm, Norton Disney	Medieval
MLI86166	Prehistoric flints, Coleby Low Fields	Prehistoric
MLI86179	Settlement of Somerton	Early Medieval
MLI86189	Fourth Century Coin, Ermine Street, Boothby Graffoe	Roman
MLI86190	Burial of child, near Far End, Boothby Graffoe	Undated
MLI86192	Coin of Constantine I, east of Boothby Graffoe	Roman
MLI86195	Coin of Constantine I, Main Street, Boothby Graffoe	Roman
MLI86196	Prehistoric flints, north of Castle Lane, Boothby Graffoe	Prehistoric
MLI86197	Sherd of Thetford ware pottery, north of Castle Lane, Boothby Graffoe	Early Medieval
MLI86198	Romano-British grey ware found near Somerton Castle, Boothby Graffoe	Roman
MLI86199	Romano-British Pottery, Somerton Castle, Boothby Graffoe	Roman
MLI86208	Medieval Pond, Somerton Castle, Boothby Graffoe	Medieval
MLI86209	Modern earthwork aircraft obstruction, east of Somerton Castle, Boothby Graffoe	Modern
MLI86210	Ridge and furrow remains south west of Boothby Graffoe	Medieval
MLI86211	Ridge and furrow remains west of Boothby Graffoe	Medieval
MLI86212	Former windmill, Grantham Road, south of Boothby Graffoe	Post-Medieval
MLI86213	Old quarry, adjacent to Grantham Road, south of Boothby Graffoe	Post-Medieval

HER Number	Asset Name	Period
MLI86228	Roman Road, continuation of Mareham Lane, north of Sleaford, along the present A15	Roman
MLI86266	Medieval silver coin from west of Bassingham, Norton Disney parish	Medieval
MLI86267	Iron Age coin from west of Bassingham, Norton Disney parish	Iron Age
MLI86270	Romano-British Finds, Bassingham	Roman
MLI86282	Undated Linear Bank, Swinderby and Thorpe on the Hill	Undated
MLI86283	Barbed and tanged arrowhead, Morton, Thorpe on the Hill	Bronze Age
MLI86284	Undated Linear Bank and Ditch, Thorpe on the Hill	Undated
MLI86285	Possible settlement remains of Bracken hamlet in Swinderby parish	Medieval
MLI86357	Possible Romano-British cemetery remains to the south of Chapel Lane, Navenby	Roman
MLI86358	Romano-British burials within a possible mortuary enclosure, west of Ermine Street, Navenby	Roman
MLI86359	Romano-British graves, west of Ermine Street, south of Chapel Lane, Navenby	Roman
MLI86362	Flint scatter, in the angle of High Dike and Chapel Lane, Navenby	Prehistoric
MLI86363	Bronze Age looped palstave, from the site of Skinnand medieval settlement, Navenby	Bronze Age
MLI86387	School, Church Lane, Navenby	Post-Medieval
MLI86390	Burial in the garden of Dial House, Navenby	Roman
MLI86391	Two worked flints from east of Navenby	Prehistoric
MLI86392	One flint button scraper from east of Navenby	Prehistoric
MLI86393	Medieval bronze ring found in a garden in East Lane, Navenby	Medieval
MLI86400	Fourth century coin from Navenby Heath	Roman
MLI86401	Sherd of medieval Toynton ware, Ermine Street, Navenby	Medieval
MLI86404	Post medieval finds, Ermine Street, Navenby	Post-Medieval

HER Number	Asset Name	Period
MLI86405	Bronze medieval pendant, east of Navenby	Medieval
MLI86406	Medieval finds from west of Ermine Street, Navenby	Medieval
MLI86407	Post medieval artefact scatter, east of Ermine Street, Navenby	Post-Medieval
MLI86410	One worked flint, north of Church Lane, Navenby	Prehistoric
MLI86415	Windmill, south of Green Man Road, Navenby	Post-Medieval
MLI86416	Medieval ridge and furrow, Navenby Low Fields	Medieval
MLI86422	Former Fire Engine Station, off East Road, Navenby	Post-Medieval
MLI86423	Gas works off Gas Lane, Navenby	Post-Medieval
MLI86438	Potential medieval cropmarks and earthworks north of Skinnand, Navenby	Medieval
MLI86449	Site of the Church of St Mathias at Skinnand deserted settlement	Medieval
MLI86464	Settlement of Wellingore	Early Medieval
MLI86475	Silver Penny of Edward the Confessor, Wellingore Heath	Medieval
MLI86500	Roman coins found adjacent to Ermine Street, Wellingore	Roman
MLI86521	Anglo-Saxon pins from east of Navenby	Early Medieval
MLI86557	Coin of Trajan from Wellingore Heath	Roman
MLI86558	Former ridge and furrow earthworks, said to have been a 'camp', west of Wellingore	Medieval
MLI86559	Possible road or footpath, Wellingore Low Fields	Undated
MLI86563	Silver coins found near the High Dike, Wellingore	Early Medieval
MLI86570	Former school, Vicarage Lane, Wellingore	Post-Medieval
MLI86571	Brick field, south of Wellingore	Post-Medieval
MLI86572	Site of smithy, possibly located adjacent to The Island, Wellingore	Post-Medieval
MLI86689	Small bronze spearhead, Thompson's Bottom Farm, Temple Bruer with Temple High Grange	

HER Number	Asset Name	Period
MLI86690	Middle Bronze Age socketed spearhead, near Ermine Street, Temple Bruer with Temple High Grange	Bronze Age
MLI86691	Stone axes, north of Thompson's Bottom Farm, Temple Bruer with Temple High Grange	
MLI86692	Stone adze, field west of Sleaford Road, Temple Bruer with Temple High Grange	Neolithic
MLI86694	Old Quarry, near the junction of Sleaford Road and Gorse Hill Lane, Temple Bruer	Post-Medieval
MLI86695	Old Quarry, near the junction of Sleaford Road and Gorse Hill Lane, Temple Bruer	Post-Medieval
MLI86697	Gravel pit, near St John the Baptist church, Temple Bruer with Temple High Grange	Post-Medieval
MLI86699	Old gravel pit, near St John the Baptist church, Temple Bruer with Temple High Grange	Post-Medieval
MLI86958	Undated ditch on land off Winton Road, Navenby	Undated
MLI86959	Medieval stone quarrying on land off Winton Road, Navenby	Medieval
MLI86960	Post medieval stone quarrying on land off Winton Road, Navenby	Post-Medieval
MLI86961	Two Romano-British pottery sherds on land off Winton Road, Navenby	Roman
MLI87100	Post medieval activity at Chapel Heath, Navenby	Post-Medieval
MLI87483	Ridge and furrow	Medieval
MLI88297	Sherd of Iron Age or Romano-British pottery, Tonge's Farm, Norton Disney	Iron Age
MLI88298	Sherds of medieval pottery, Tonge's Farm, Norton Disney	Medieval
MLI88323	Milepost, Ashby Lodge Farm, Ashby de la Launde	Post-Medieval
MLI88357	Possible prehistoric cropmark pit alignment, Ashby de la Launde	Prehistoric
MLI88359	Possible Undate Boundary, Navenby	Undated
MLI88553	Post medieval ditches on land at Norton Low Wood, Norton Disney	Post-Medieval
MLI88578	Romano-British ditch on land at Tonge's Farm, Norton Disney Quarry	Roman

HER Number	Asset Name	Period
MLI88579	Late Mesolithic to early Neolithic flint blade, Tonge's Farm, Norton Disney Quarry	Mesolithic
MLI88601	Witch Bottle from Navenby	Post-Medieval
MLI89150	Pillbox, RAF Digby	Modern
MLI89151	Pillbox, RAF Digby	Modern
MLI89157	Site of former extractive pit, Ashby de la Launde and Bloxholm	Post-Medieval
MLI89203	Site of former extractive pit, Asby de la Launde and Bloxholm	Post-Medieval
MLI89337	Undated ditches and possible kilns on land at Swinderby Airfield, Swinderby	Undated
MLI89350	Undated Ditches, Riverside Cottage, Bassingham	Undated
MLI89351	Early Medieval Pottery Sherd, Riverside Cottage, Bassingham	Early Medieval
MLI90554	The Rectory Camp, Bassingham	Modern
MLI90570	Heath Camp, Pottergate Plantation, Wellingore	Modern
MLI90679	Post-Enclosure field boundaries at Norton Disney Quarry	Post-Medieval
MLI91063	Pottergate	Neolithic
MLI91074	Cropmark undated enclosure, Harmston	Undated
MLI91076	Cropmark possible prehistoric double-ditched enclosure, Aubourn	Prehistoric
MLI91077	Cropmark undated rectangular enclosure, Harmston	Undated
MLI91078	Cropmark probable prehistoric double-ditched enclosure, Boothby Graffoe	Prehistoric
MLI91079	Cropmark possible prehistoric enclosure, Boothby Graffoe	Prehistoric
MLI91080	Cropmark undated maculae and possible enclosures, Coleby	Undated
MLI91082	Cropmark possible triple-ditched system, Coleby	Undated
MLI91085	Cropmark undated double-ditched linear feature, Coleby	Undated
MLI91260	Probable modern cropmarks, Swinderby Airfield	Modern

HER Number	Asset Name	Period
MLI91532	Site of the Sir Isaac Newton public house	Post-Medieval
MLI91628	Bronze Age pits on land off Winton Road, Navenby	Bronze Age
MLI91629	Undated features on land off Winton Road, Navenby	Undated
MLI91630	Mesolithic flint core found at Chapel Heath, Navenby	Mesolithic
MLI91749	Traces of ridge and furrow at the Navenby Medical Centre site	Medieval
MLI91797	Undated features on land to the rear of 11 Water Lane, Bassingham	Undated
MLI91901	Water pump at School Lane/Hill Top, Harmston	Modern
MLI91908	Water hydrant on Chapel Lane, Harmston	Modern
MLI91912	Undated features excavated at Norton Bottoms Quarry	Undated
MLI92342	Heath House Park, Metheringham	Post-Medieval
MLI92367	Boothby Graffoe Hall park, Boothy Graffoe	Post-Medieval
MLI92389	North Field House park, Bassingham	Post-Medieval
MLI92390	Morton Hall park, Swinderby	Post-Medieval
MLI94191	Sundial, three metres east of The Close, Wellingore	Post-Medieval
MLI94217	Gates and wall, Wellingore Hall, Wellingore	Post-Medieval
MLI97264	Prehistoric flint scatter, High Street, Bassingham	Prehistoric
MLI97265	Undated linear features and post holes, High Street, Bassingham	Undated
MLI97266	Roman activity, High Street, Bassingham	Roman
MLI97267	Anglo Saxon/early medieval occupation, High Street, Bassingham	Early Medieval
MLI97286	Site of former Temperance Hall used as a Wesleyan Reform Chapel, High Street, Navenby	Post-Medieval
MLI97346	Early to middle Saxon remains in Thurlby	Early Medieval
MLI97761	Possible fired pit feature or kiln, Navenby	Undated
MLI97763	Possible pit structure or kiln, Navenby	Undated



HER Number	Asset Name	Period
MLI97897	Anglo Saxon pits, Norton Bottoms Quarry, Stapleford	Early Medieval
MLI97898	Roman pottery and tile, Norton Bottoms Quarry, Stapleford	Roman
MLI98363	Parkland associated with Hill House, Wellingore	Post-Medieval
MLI98365	Parkland associated with Thurlby Hall, Thurlby	Post-Medieval
MLI98371	Parkland associated with Harmston Hall, Harmston	Post-Medieval
MLI98380	Parkland associated with Wellingore Hall, Wellingore	Post-Medieval
MLI98516	Upper Palaeolithic or Mesolithic flint bladelet, Carlton le Moorland	Palaeolithic
MLI98544	Undated Pits, Grantham Road, Navenby	Undated
MLI98923	Early Prehistoric Finds, Thurlby	Prehistoric
MLI98924	Second World War Aircraft Crash Site, Thurlby	Modern
MLI99373	Undated Features, Whisby Quarry, Eagle.	Undated
MLI99513	Aubourn and Haddington War Memorial in St Peter's Churchyard	Modern
MLI82024	Former Methodist chapel, Blacksmith Lane, Harmston	Post Medieval
MLI82025	Former smithy, Blacksmith Lane	Post Medieval
MLI82026	National School, now Harmston Primary, School Lane	Post Medieval
MLI82134	The Temple to Pitt at Coleby Hall	Post Medieval
MLI82449	Wesleyan Chapel, junction of Blind Lane and Dovecote Lane	Post Medieval
MLI83015	John Hunt Memorial Wesleyan church, Fosse Lane	Post Medieval
MLI83161	Halfway House Inn, Fosse Way	Post Medieval
MLI85727	Holmedene, Bassingham	Post Medieval
MLI85728	The National School, Bassingham	Post Medieval
MLI85743	Smithy, Bassingham	Post Medieval
MLI86204	Smithy, Blacksmith's Lane, Boothby Graffoe	Post Medieval

HER Number	Asset Name	Period
MLI86207	School, Main Street, Boothby Graffoe	Post Medieval
MLI86421	Smithy, off East Road, Navenby	Post Medieval
MLI86569	Former school, off High Street, Wellingore	Post Medieval
MLI86681	St John the Baptist church, Temple Bruer with Temple High Grange	Post Medieval
MLI86696	School, attached to church of St John the Baptist, Temple Bruer with Temple High Grange	Post Medieval
MLI91884	Rose Cottage, Vicarage Lane, Harmston	Post Medieval
MLI91885	Former Bleak House farm buildings, Harmston	Post Medieval
MLI91886	Outbuilding to Milton House Farm, Harmston	Post Medieval
MLI91887	Hill Top Farm, Harmston	Post Medieval
MLI91888	Sunny Mount, Hill Top, Harmston	Post Medieval
MLI91889	Former farm building, now garage and store to Rotherslade, Harmston	Post Medieval
MLI91890	3,4 and 5 Club Yard, Harmston	Post Medieval
MLI91897	The Thorold Arms, Harmston	Post Medieval
MLI91899	The Old Cottage, High Street, Harmston	Post Medieval
MLI91900	Farm buildings to Manor Farm, Harmston	Post Medieval
MLI91902	Outbuilding to Orchard Lodge, Harmston	Post Medieval
MLI91903	Farm buildings to the north of The Grange, Harmston	Post Medieval
MLI91905	Rosemary Cottage, Chapel Lane, Harmston	Post Medieval
MLI91907	Cottage to the west of the former chapel, Chapel Lane, Harmston	Post Medieval
MLI91909	The Old Garth, Chapel Lane, Harmston	Post Medieval
MLI91910	The Old Barn, Chapel Lane, Harmston	Post Medieval
MLI91911	Farm buildings at Church Farm, Harmston	Post Medieval
MLI91913	Shepherds Cottage, Church Lane, Harmston	Post Medieval

HER Number	Asset Name	Period
MLI91914	Lindum House, Church Lane, Harmston	Post Medieval
MLI91915	The Cottage and cottage immediately to the south, Church Lane, Harmston	Post Medieval
MLI91916	Stone Cottage and Stable View, Church Lane, Harmston	Post Medieval
MLI91983	Post medieval farmstead, Bakers Lane, Bassingham	Post Medieval
MLI94171	Morton House, Green Lane, Swinderby	Post Medieval
MLI86567	Wesleyan Chapel and Sunday School, High Street, Wellingore	Post Medieval
MLI97099	Ebenezer House, Fosse Lane, Thorpe-on-the-Hill	Post Medieval
MLI97243	Former Mission Hall, and possible former Primitive Methodist Chapel, 1, High Street, Bassingham	Post Medieval
MLI82023	Methodist Chapel (Wesleyan), Chapel Lane	Post Medieval
MLI97813	Hall Farm, Coleby	Post Medieval
MLI97391	Control Tower, RAF Coleby Grange	Post Medieval
MLI125243	Harmston Village Hall War Memorial	Post Medieval
MLI97092	Navenby Methodist Church, High Street, Navenby	Post Medieval
MLI85670	Church of St Michael and All Angels, Bassingham	Post Medieval
MLI126293	Tempest Arms, Coleby	Post Medieval
MLI120949	Griffin's Farm, Temple Bruer with Temple High Grange	Post Medieval
MLI120992	South Barn Cottage (Wellingore Southern Barn), Wellingore	Post Medieval
MLI120940	Ashby Lodge, Ashby De La Launde and Bloxholm	Post Medieval
MLI120986	New England Farm, Wellingore	Post Medieval
MLI120997	Wood Farm, Wellingore	Post Medieval
MLI120994	Oak Farm, Wellingore	Post Medieval
MLI120985	Manor Farm, Navenby	Post Medieval
MLI120987	Highfield House Farm (Highfield House), Wellingore	Post Medieval

HER Number	Asset Name	Period
MLI120991	Glebe Barn, Wellingore	Post Medieval
MLI120990	Eggshell Barn, Wellingore	Post Medieval
MLI120989	Grayson's Barn, Wellingore	Post Medieval
MLI120995	Peacocks Farm, Wellingore	Post Medieval
MLI120973	Heath Farm (Glebe Farm), Navenby	Post Medieval
MLI120996	White House, Wellingore	Post Medieval
MLI120975	Highfields (Navenby Heath Farm), Navenby	Post Medieval
MLI120948	Temple High Grange Farm, Temple Bruer with Temple High Grange	Post Medieval
MLI120980	Unnamed farmstead, Navenby	Post Medieval
MLI120978	Unnamed farmstead, Navenby	Post Medieval
MLI120979	Top Farm, Navenby	Post Medieval
MLI121049	Carlton Barn, Carlton-le-Moorland	Post Medieval
MLI120971	Ermine House Farm, Boothby Graffoe	Post Medieval
MLI119731	Meadow Farm, Bassingham	Post Medieval
MLI120970	Unnamed farmstead, Boothby Graffoe	Post Medieval
MLI120969	Somerton House, Boothby Graffoe	Post Medieval
MLI120968	Hall Farm, Boothby Graffoe	Post Medieval
MLI119723	Unnamed farmstead, Bassingham	Post Medieval
MLI119722	Savages Farm, Bassingham	Post Medieval
MLI119730	Wirelock, Bassingham	Post Medieval
MLI120965	Windpump Farm, Boothby Graffoe	Post Medieval
MLI119728	Standacre (Standacre Farm), Bassingham	Post Medieval
MLI119725	Unnamed farmstead, Bassingham	Post Medieval

HER Number	Asset Name	Period
MLI119721	Unnamed farmstead, Bassingham	Post Medieval
MLI120661	Unnamed farmstead, Metheringham	Post Medieval
MLI119774	Tonge's Farm (Tongue's Farm), Norton Disney	Post Medieval
MLI119718	Bassingham Grange, Bassingham	Post Medieval
MLI119720	Willow Tree Farm, Bassingham	Post Medieval
MLI119717	Larker's Farm, Bassingham	Post Medieval
MLI124813	Masons Lodge, Coleby	Post Medieval
MLI119716	Lowfield Farm, Bassingham	Post Medieval
MLI116568	Low Fields Farm (Hall Farm), Coleby	Post Medieval
MLI119719	Witham Farm (Witham House), Bassingham	Post Medieval
MLI116570	Coleby Grange, Coleby	Post Medieval
MLI119641	Grocock's Farm, Aubourn with Haddington	Post Medieval
MLI119715	North Field House, Bassingham	Post Medieval
MLI116569	Heath House, Coleby	Post Medieval
MLI119640	Malborough Farm, Aubourn with Haddington	Post Medieval
MLI119766	South Farm, Thurlby	Post Medieval
MLI119635	Broughton Lane Farm, Harmston	Post Medieval
MLI119765	Middle Farm, Thurlby	Post Medieval
MLI116572	Lodge Farm (Coleby Lodge), Coleby	Post Medieval
MLI119764	North Farm, Thurlby	Post Medieval
MLI116950	Landsdale House, Harmston	Post Medieval
MLI119638	Unnamed farmstead, Aubourn with Haddington	Post Medieval
MLI116961	Haddington Grange, Aubourn with Haddington	Post Medieval

HER Number	Asset Name	Period
MLI119755	Sheep Walks Farm, Witham St. Hughs	Post Medieval
MLI116960	High Walks Farm, Aubourn with Haddington	Post Medieval
MLI119742	Anson's Farm, Swinderby	Post Medieval
MLI116962	Hillside Farm (Glebe Farm), Aubourn with Haddington	Post Medieval
MLI119741	Park Farm (Cross Roads Farm), Swinderby	Post Medieval
MLI116958	Sky-Barn Farm (Black Cat Barn), Aubourn with Haddington	Post Medieval
MLI119740	Bracken Farm, Swinderby	Post Medieval
MLI119739	Rose Cottage, Swinderby	Post Medieval
MLI119738	Cottage Farm, Swinderby	Post Medieval
MLI119676	Tunman Cottage, Eagle and Swinethorpe	Post Medieval
MLI119675	Yew Tree Farm, Eagle and Swinethorpe	Post Medieval
MLI119650	Jubilee Farm, Thorpe on the Hill	Post Medieval
MLI119677	Sycamore House, Eagle and Swinethorpe	Post Medieval
MLI119674	Birchwood Farm, Eagle and Swinethorpe	Post Medieval
MLI119645	The Farm, Thorpe on the Hill	Post Medieval
MLI119679	Oaks Farm, Eagle and Swinethorpe	Post Medieval
MLI119646	Unnamed farmstead, Thorpe on the Hill	Post Medieval
MLI119647	Holme Farmhouse, Thorpe on the Hill	Post Medieval
MLI119644	Home Farm, Thorpe on the Hill	Post Medieval
MLI119643	Scotland Farm, Thorpe on the Hill	Post Medieval
MLI119642	Unnamed farmstead, Thorpe on the Hill	Post Medieval

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