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BEACON FEN ENERGY PARK LTD

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SCOPING REPORT

APRIL 2023

PINS CASE REFERENCE EN010151

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DATE ISSUED:	**APRIL 2023**
JOB NUMBER:	**ST19595**
REPORT NUMBER:	**REP-001**
VERSION:	**V1.0**
STATUS:	**Final**

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1 INTRODUCTION

1.1 Background

1.1.1 This Scoping Report has been prepared by Wardell Armstrong LLP (WA) on behalf of Beacon Fen Energy Park Ltd[1] (the 'Applicant') in support of a request for a Scoping Opinion under the Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017[2] (the 'EIA Regulations'), Regulation 10(1), relating to the EIA of Beacon Fen Energy Park, a proposed ground-mounted solar photovoltaic (PV) electricity generation and battery energy storage system ('BESS'), together with associated grid connection infrastructure (the 'Proposed Development'), at land surrounding Heckington, near Sleaford, Lincolnshire (the 'Site').

1.1.2 The Proposed Development would have a generation capacity of approximately 600MW, with the BESS of a similar capacity, and would be capable of powering approximately 190,000 homes. The Proposed Development constitutes a Nationally Significant Infrastructure Project (NSIP) under Sections 14(1)(a) and 15(2) of the Planning Act 2008 as an onshore generating station in England exceeding 50MW, which requires a Development Consent Order (DCO) application to the Secretary of State (SoS).

1.2 Requirement for an Environmental Impact Assessment

1.2.1 The Proposed Development falls under Schedule 2, Section 3(a) "Industrial installations for the production of electricity…" of the EIA Regulations.

1.2.2 Pursuant to the EIA Regulations, developments listed in Schedule 2 are only subject to an EIA if they are considered 'Likely to have significant effects on the environment by virtue of factors such as its nature, size or location'[3]. Owing to the scale of the Proposed Development, it is considered that the proposals may result in potential significant effects upon the environment and, therefore, an EIA is required. The criteria on which this judgment must be made are set out in Schedule 3 of the EIA Regulations.

1.2.3 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, the Applicant, therefore, wishes to confirm that, under Regulation 8(1)(b) of the EIA Regulations, an ES will be prepared and submitted with the DCO application.

[1] Beacon Fen Energy Park Ltd is the Applicant and Developer of the project which, in turn, is owned by Low Carbon Limited

[2] The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (legislation.gov.uk).

[3] Regulation 3 of the EIA Regulations.

1.2.4 This Scoping Report is submitted in support of a request pursuant to Regulation 10 of the EIA Regulations for a Scoping Opinion from the Planning Inspectorate (PINS) on behalf of the Secretary of State ("SoS") on the scope and level of information to be provided in the ES.

1.3 Scoping

1.3.1 This Scoping Report sets out the proposed scope of the EIA to be undertaken in respect of the Proposed Development.

1.3.2 As required by Regulation 10(3) of the EIA Regulations, this Scoping Report includes the following information:

- A plan sufficient to identify the land (Figure 1.1 Redline Boundary);
- A description of the Proposed Development, including its location and technical capacity (Sections 2 – 3);
- An explanation of the likely significant effects of the Proposed Development on the environment (Sections 4 – 14) and
- Such other information or representations as the person making the request may wish to provide or make (see accompanying Figures and Appendices).

1.3.3 In addition, this Scoping Report includes information on the proposed methodologies to assess potentially significant environmental effects, and, where relevant, potential mitigation measures that may be implemented.

1.3.4 In addition to guidance included within the Planning Act 2008: Guidance on the pre-application process (March 2015)[4], the advice highlighted in Planning Inspectorate Advice Note 7 Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements has also been taken into account in the preparation of this Scoping Report.

1.3.5 Table 1.1 lists the advisory points identified in Advice Note 7[5] and details where they are located within the Scoping Report.

[4] Planning Act 2008: Guidance on the pre-application process (2015) (publishing.service.gov.uk).
[5] Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements | National Infrastructure Planning (planninginspectorate.gov.uk).

Table 1.1 Contents of the Scoping Report based on Advice Note 7	
Suggested Scoping Report Contents	**Location within the Scoping Report**
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).	Section 2 – The Proposed Development
Referenced plans presented at an appropriate scale to convey clearly the information and all known features associated with the Proposed Development.	Drawings (included at the rear of this Scoping Report)
EIA Approach and Aspects	
An outline of the reasonable alternatives considered and the reasons for selecting the preferred option.	Section 2 – The Proposed Development
A summary table depicting each of the aspects and matters that are requested to be scoped out allowing for quick identification of issues.	Section 17 – Summary
A detailed description of the aspects and matters proposed to be scoped out of further assessment with justification provided.	Sections 4 – 16 (Technical Aspects)
Results of desktop and baseline studies where available and where relevant to the decision to scope in or out aspects or matters.	Sections 4 – 16 (Technical Aspects)
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).	Sections 4 – 16 (Technical Aspects)
Any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects.	Sections 4 – 16 (Technical Aspects)
References to any guidance and best practice to be relied upon.	Sections 4 – 16 (Technical Aspects)
Evidence of agreements reached with consultation bodies (e.g., the statutory nature conservation bodies or local authorities).	Sections 4 – 16 (Technical Aspects)
An outline of the structure of the proposed ES.	Section 17 – Summary

1.4 Legislative and Planning Policy Overview

1.4.1 Under the Planning Act 2008 regime, the policy framework for examining and determining applications for development consent is provided by National Policy Statement (NPSs). Section 5 of the Planning Act 2008 allows the relevant SoS to designate NPSs setting out national policy in relation to the types of NSIPs listed at Section 14 of the Act. The NPSs are the primary policy used by the relevant SoS to examine and determine applications for NSIPs.

1.4.2 Section 104 of the PA 2008 provides that where a NPS has effect, the SoS must determine the application in accordance with the relevant NPSs and appropriate marine policy documents (if any) having regard to any local impact report produced by the relevant local planning authority; any matters prescribed in relation to development of the description to which the application relates; and any other matters which the SoS thinks are both "important and relevant" to their decision, unless this would lead to the UK being in breach of its international obligations, be in

breach of any statutory duty that applies to the SoS, be unlawful, result in the adverse impacts of the development outweighing the benefits, or be contrary to any condition prescribing how decisions regarding an NSIP application are to be taken.

1.4.3 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. This includes a revised EN-3[6], which has specific policies relating to solar 3 PV. Whilst 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 the ES. If NPS EN-3 is designated broadly in line with the March 2023 consultation draft and retains policies relating to solar PV, this element will be determined under Section 104 of the Planning Act 2008.

1.4.4 In lieu of an adopted technology specific NPS for solar PV, this Scoping Report has been prepared taking account of the NPSs that currently have effect, namely the adopted Overarching NPS for Energy (EN-1)[7]and the adopted NPS EN-5. A summary of the relevant considerations for each technical assessment is provided for each environmental aspect (i.e., Sections 4 – 13).

1.4.5 The SoS will also consider other important and relevant matters, which may include national and local planning policy. For example, the revised National Planning Policy Framework (NPPF) published in July 2021[8] is considered relevant national planning policy. Similarly the adopted local plans are likely to be an important and relevant matter.

1.4.6 The adopted local planning policy for the land in which the Proposed Development is located includes the following. More detail of these, and emerging local and neighbourhood planning policy, is contained in Appendix 1.1.

- Central Lincolnshire Local Plan 2012-2036, adopted 24 April 2017[9];
- Southeast Lincolnshire Local Plan 2011 – 2036, adopted 8 March 2019[10]; and
- Lincolnshire Minerals and Waste Local Plan including the Core Strategy & Development Management Policies Plan adopted in June 2016[11] and the Site Locations Plan adopted in December 2017[12].

[6] Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) (publishing.service.gov.uk).
[7] 1938-overarching-nps-for-energy-en1.pdf (publishing.service.gov.uk).
[8] National Planning Policy Framework - GOV.UK (www.gov.uk).
[9] Planning policy | North Kesteven District Council (n-kesteven.gov.uk).
[10] South East Lincolnshire – Local Plan | South East Lincolnshire Local Plan (southeastlincslocalplan.org).
[11] Minerals and waste local plan - Core strategy and development management policies – Lincolnshire County Council.
[12] Minerals and waste local plan - Site locations – Lincolnshire County Council.

1.4.7 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 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 seek the assessment of a particular impact or the use of a particular methodology.

1.4.8 Planning Policy Context for the Proposed Development is described further in Appendix 1.1 and a summary of national and local planning policy relevant to each technical assessment is provided for each environmental aspect is provided in Sections 4 to 13.

1.5 Statement of Expertise

1.5.1 Under Regulation 14(4), the 2017 EIA Regulations require that an ES be prepared by competent experts and must be accompanied by a statement outlining the relevant expertise or qualifications of such experts.

1.5.2 Wardell Armstrong LLP is a multi-disciplinary environmental and engineering consultancy and has wide experience of assessing the environmental impacts of developments. Wardell Armstrong LLP is accredited under The Institute of Environmental Management and Assessment's (IEMA) benchmark scheme for consultancies capable of managing EIAs.

1.5.3 Table 1.2 provides a summary of the lead authors and their respective qualifications. All are qualified professionals, a member of their respective professional institutions and deemed to be a 'competent expert'.

Table 1.2 Technical Leads

Role	Technical Lead	Grade
Non-technical aspects	Susan Raine BSc (Hons) MSc PIEMA	Technical Director
	Glen Shah BSc (Hons) MSc Affiliate IEMA	Associate Director
Air Quality	Mariam Weatherly BSC (Hons) MSc	Associate Director
Archaeology & Cultural Heritage	Lorna Goring BSc (Hons) PGDip ACIfA	Technical Director
Climate Change	Simon Allen BSc (Hons) BSc (Hons) AEI	Associate Director
Ecology	Tim Bradford BSc (Hons) MSc. MCIEEM CEnv	Technical Director
Flood Risk Assessment	Emma Keagan BSc (Hons)	Associate Director
Glint	Simon Allen BSc (Hons) BSc (Hons) AEI	Associate Director
Ground Conditions	Matthew Woodcock BSc (Hons) MSc	Associate Director
Human Health	Lauren Davison BSc (Hons) MSc MRTPI	Technical Director
Landscape & Visuals	Lucy Green BSc (Hons) DipLA CMLI	Technical Director
Noise & Vibration	Simon Urquhart IoA Dip MIOA	Technical Director
Socio-economics	Allie Ommer BSc (Hons) MSc ACSM MIMMM	Associate Director
Soils & Agricultural Land	Bill Crooks PhD MSc BSc (Hons) FACTS MISoilSci	Associate Director
Transport and Access	Ian Cronshaw BA (Hons) MCIHT	Associate Director
Waste	Alison Kemp BSc (Hons) MSc MCIWM PIEMA	Regional Director
Water Resources	Rachel Graham BSc (Hons) MSc MCIWEM MIEnvSc	Associate Director

2 THE PROPOSED DEVELOPMENT

2.1 Site Description

2.1.1 The site is located near Sleaford, Lincolnshire, and centred at National Grid Reference (NGR) TF 16348 42178.

2.1.2 The site comprises two distinct areas of land situated to the north and to the southwest of Heckington, adjacent to Ewerby Thorpe and Thorpe Latimer, respectively. These two areas, which will house the above ground solar PV and BESS infrastructure (see below), will be connected by a cable route that will link to the Bicker Fen substation.

2.1.3 Together the two solar array areas and cable route comprise 'the Site' and are illustrated by Figure 1.2 Indicative Development Areas. Both the northern solar array area and southern solar array area and the Cable Route Area are illustrated upon Figure 1.2 Indicative Development Areas.

2.1.4 The Northern Panel Array area predominantly comprises fields in arable use, divided by ditches. Tree cover is sparse, generally limited to small woodland blocks and scattered hedgerow trees. Relatively few hedgerows or other substantial field boundaries remain. The Southern Panel Array similarly is largely arable fields, but is more undulating with fewer drainage ditches and some hedgerows. Further information on the current baseline of the Site and environmental designations and sensitivities is provide within the technical sections (4 – 14) of this Scoping Report.

2.1.5 The majority of the Site is located within the administrative area of North Kesteven District Council ('NKDC'). The south-easternmost sections of the cable route search area, comprising the land to the north and south of the existing Bicker Fen substation, are located within Boston Borough Council ('BBC') and South Holland District Council ('SHDC'). Lincolnshire County Council ('LCC') is the upper tier authority.

2.2 Proposed Development

2.2.1 As touched upon, above, the Proposed Development would comprise the two distinct areas of above ground solar PV and BESS infrastructure connected by the cable route The cable route would connect to the existing Bicker Fen National Grid 400kV substation west of Bicker and there would be no need to develop a new National Grid substation to deliver the Proposed Development. This is expanded upon, below.

2.3 Solar Array Sites

2.3.1 The Northern Panel Array area is approximately 517 ha in size and the Southern Panel Array area is approximately 519 ha in size. These two solar array areas are hereafter

referred to as 'Beacon Fen North' and 'Beacon Fen South'. Together, these two areas equate to an approximate total of 1,036 ha of land. Not all of these areas would be developed with above ground infrastructure. The redline boundary for both Beacon Fen North and Beacon Fen South is illustrated upon Figure 1.1 Redline Boundary at the rear of this Scoping Report.

2.4 Solar PV and Battery Storage Infrastructure

2.4.1 At the time of writing, the infrastructure layout within the two solar array sites has yet to be confirmed as this is to be informed by the findings of design development, onsite surveys, desktop studies and assessment process. Similarly, the location and access arrangement for the compounds required during the construction phase will also be informed by the findings. The design proposals will include enhancement and betterment in relation to biodiversity, boundary treatments, and landscaping.

2.4.2 The infrastructure comprised in the Proposed Development will include the following:

- Solar photovoltaic (PV) modules;
- PV solar mounting structures;
- Inverters;
- Transformers;
- High-voltage (HV) switchgear and control equipment;
- Battery Energy Storage Systems (BESS);
- Electrical Compounds;
- Temporary Construction Compounds;
- Onsite and offsite cabling and kiosks;
- Offsite buildings;
- Storage facilities;
- Fencing, lighting, and security;
- Earthworks and bunds;
- Drainage and utility connections; and
- Access tracks, hardstanding and new or modified accesses.

Solar Array Modules

2.4.3 Solar PV modules convert sunlight into electrical current (as direct current, DC). The height of the arrays considered within the ES will be up to 4.5m. It is possible that the arrays will be lower than this, however 4.5m is to be used as a maximum parameter across the site to ensure all potentially significant effects are considered. This ensures a level of conservatism in the assessment of the likely significant effects.

2.4.4 The individual panels are anticipated to be approximately up to 2.5m long and up to 1.5m wide and consist of a series of PV cells beneath a layer of toughened glass. Other PV technologies are developing rapidly, however, and may be available at the time of construction.

2.4.5 Each module would have a DC generating capacity of between 600 and 800 watts (W) or more depending upon advances in technology at the time of construction (the latest technology under development is approximately 800 W).

2.4.6 The modules are to be fixed to a mounting structure in groups, known as 'strings'. Each string of modules will be mounted on a metal framing system, known as 'tables'. The module frame is anticipated to be built from anodised aluminium or steel for durability. The tables are usually supported by galvanised steel poles, driven between 1m and 2m into the ground. Various factors are currently being considered that will help to inform the number and arrangement of modules in each string, with design flexibility adopted to accommodate future technology developments.

2.4.7 The proposal is for a fixed (i.e., static) panel orientation. The modules will face due south (i.e., 180° azimuth), which is commonly seen on existing UK solar farms. With this configuration, the modules would be angled towards the south at a slope of 10° to 45° from horizontal.

Inverters

2.4.8 It is anticipated that either a string inverter or central inverters would be used, onsite. A single string inverter unit could be utilised for every 10 to 12 (array) strings, with the string inverters small enough to be mounted underneath the modules. The central inverters are larger and require their own electrical cabinet enclosures, but there would be fewer required.

2.4.9 Central inverters would be located at regular intervals amongst the PV arrays, occupying an area (anticipated to be approximately 12m x 3m and up to 3.5m in height) that would be reliant upon the intervals. Being the larger option, central inverters will be assumed in the EIA to ensure a reasonable worst case.

2.4.10 Two options for the central inverters, if to be used, are currently being considered.

2.4.11 The first option is for outdoor equipment. This would entail placing the equipment (i.e., inverter, transformer and switchgear) outdoors and independent from each other, with an approximate footprint of up to 80m^2 and a height of up to 3.5m. The second option is for is for indoor (i.e. enclosed) equipment. This would entail placing the equipment within a purpose built enclosure similar to a 40-foot ISO High Cube Container, with an approximate footprint of up to 80 m^2 and a maximum height of up to 3.5m.

Transformers

2.4.12 Transformers are required to 'step-up' the voltage of the electricity generated prior to it reaching the substation. Transformers will, therefore, be located on Beacon Fen North and Beacon Fen South, with separate transformers required to support the strong inverters (See paragraph 2.3.8, above).

2.4.13 Similar to the inverters, two options are currently being considered for the transformers; one outdoor and one indoor. The outdoor transformers would have a footprint of up to 4m x 3.5m and a height of up to 3.5m. The indoor (i.e., installed within a cabin with indoor switchgear) transformers would have a footprint of up to 7m x 4m and with a height of up to 3.5m. The cabins would likely be located at regular intervals across the Site.

Battery Energy Storage Systems

2.4.14 The Proposed Development will include an associated 600MW battery energy storage system (BESS). A number of different designs for the BESS will be explored as part of the iterative design process, with the maximum parameters for the compound layouts assessed as the worst case within the EIA and defined within the DCO application.

2.4.15 Batteries will be placed within individual enclosures arranged regularly within a compound with vehicular access available to each unit. The precise number will depend upon the level of power capacity and duration of energy storage that the Proposed Development will require. An element of flexibility in approach is, therefore, adopted at this stage as technology, business models and relevant policy all evolve.

2.4.16 The location of the BESS, transformers and dedicated switchgear is determined in part by the BESS being AC-coupled; thereby requiring that they be housed within compounds (rather than distributed around the site next to central inverters).

2.4.17 The dimensions of the BESS containers (and switch rooms) are anticipated to be approximately up to 12.5m x 3m, with a height of up to 4.5m. The total size and

distribution of the BESS across the Site will be reliant upon the existing grid conditions at the time of construction design, as well as the environmental considerations that are currently being investigated. At this stage, the use of a single compound at either Beacon Fen North or Beacon Fen South is being considered alongside the option of splitting the compound and placing one at both sites.

2.4.18 Both the constructions and operational transport implications will be considered within the ES.

Substation

2.4.19 The onsite provisions required to export electricity from the Proposed Development to the National Grid include such electrical infrastructure as the transformers, switchgear and metering equipment. In addition, the substation(s) is expected to include a control building that would house office space and welfare facilities, we well as operational monitoring and maintenance equipment. The area of the control building is likely to have a footprint of up to 20m x 20m and a height of up to 6m.

2.4.20 At this stage, different design options are being explored; informed by ongoing investigations. Should a single onsite substation compound be chosen, it would have a footprint of up to 250m x 160m and a height of up to 11m. Should multiple (likely two or three), smaller substation compounds be chosen, they would each have a footprint of up to 160m x 125m and a height of up to 11m.

Onsite Cabling

2.4.21 Low voltage onsite electrical cabling is required to connect the PV modules and BESS to the inverters (typically via 1.5/1.8kV cables), and the inverters to the onsite transformers (typically via 0.4/1kV cables). The dimension of the trenches for this cabling will vary depending upon the number of circuits they contain, but would be typically be up to 1.2m in width and between 0.8m to 1.2m in depth.

2.4.22 Higher voltage cables (typically 33kV) are required between the transformers and the switchgear and from switchgear to the substations. The dimension of the trenches for this cabling will vary depending on the number of circuits they contain, but are anticipated to be approximately up to 1.2m in width and up to 1.2m in depth.

2.4.23 Where possible, the higher voltage cables will share trenches with the lower voltage cables on the same route.

2.4.24 Onsite cabling between the PV modules and the inverters are anticipated to be above ground level, placed along a row of racks that are fixed to the mounting structure,

before then being placed underground, between racks and in the inverter's input. All other onsite cabling will be underground wherever possible.

2.4.25 Data cables will also be installed to allow monitoring during, operation.

Fencing

2.4.26 The perimeter fence would likely comprise standard 2.5m to 3m tall post and wire, deer fencing, with up to 2.4 m security fencing installed around the substations compounds and, possibly, other infrastructure / compounds.

2.4.27 Mounted internal-facing closed circuit television (CCTV) systems will likely be deployed around the perimeter of the operational areas of the Site; anticipated to be 5m high. The CCTV cameras would have fixed view sheds and will be aligned to face along the fence.

2.5 Cable Route

Cable Route Area / Corridor

2.5.1 Both Beacon Fen North and Beacon Fen South are to be connected to the National Grid via the existing substation located at Bicker Fen, with an anticipated import / export of 600MW.

2.5.2 At this stage, a cable route 'area' has been identified (see Figure 1.2 Indicative Development Areas) and the findings of the current onsite surveys, desk-based studies and assessments are being used to narrow this down to a reduced cable route 'corridor'. The cable route corridor will be assessed within the EIA and detailed within the ES that will accompany the DCO application.

Offsite Cabling

2.5.3 The use of underground cabling is the adopted standard for the solar industry and is the preferred option for the Proposed Development. To this end, the findings of the onsite surveys, desk-based studies and assessments will be used to eliminate down to the bare minimum, if not entirely, the requirement for any above ground cabling or overhead lines.

2.5.4 Should there be instances where environmental constraints prevent the use of underground cabling and sections of above ground / overhead lines (potentially up to 400kV) are required, the scope of the assessments will reflect these sections accordingly.

2.6 Construction Traffic

2.6.1 All construction and decommissioning access will be confirmed as the design of the Proposed Development progresses, and in consultation with the relevant authorities. During the construction phase, one or more temporary construction compounds will be required, with temporary roadways to facilitate access to all land within the Site. The access tracks to be constructed onsite are anticipated to be 3.5m to 5m wide and comprised of compacted stone tracks with 1:2 gradient slopes on either side.

2.6.2 At this stage, it is anticipated that, as a worst case during the peak construction period, there could be up to 120 Heavy Goods Vehicle (HGV) deliveries per day and up to 80 Light Goods Vehicle (LGV) deliveries vehicle movements associated with construction worker arrivals and departures. This is based upon a 24 to 36-month construction programme. Construction traffic predictions and routing will be confirmed during the EIA and detailed within the ES.

2.7 Proposed Phasing

2.7.1 Following the anticipated submission of the DCO application in 2024 and subject to DCO consent then being granted in 2025, the following phases of the Proposed Development would comprise construction, operation (plus maintenance) and eventual decommissioning. Indicative details regarding these three phases are outlined, below.

Construction

2.7.2 It is anticipated that construction would commence in 2026/27 and last for a duration of approximately 24 to 36 months.

Operation

2.7.3 Once operational, the Proposed Development will have an operational life of approximately 60 years. During this timeframe, the condition of equipment will be reviewed at the end of design life to determine whether it remains in a viable condition to continue operation after that time.

Decommissioning

2.7.4 Decommissioning would be anticipated to take between approximately 12 and 24 months to complete, after which the Site would be returned to its former use.

2.7.5 As part of the decommissioning phase, all PV modules, mounting structure, cabling, inverters and transformers would be removed from Site and recycled or disposed of in accordance with good practice and market conditions at that time.

2.7.6 A Decommissioning Statement will be submitted as part of the DCO application. In addition, prior to decommissioning commencing, a Decommissioning Environmental Management Plan (DEMP) will be prepared and agreed with the relevant Local Planning Authority. The future of the substations and associated control buildings would be agreed with the relevant Local Planning Authority prior to commencement of decommissioning and detailed within the DEMP.

2.8 Alternatives Considered

2.8.1 The EIA Regulations require the ES to include a description of the reasonable alternatives studied by the applicant.

2.8.2 With the exception of initial refinements to the redline boundary based upon the Site conditions that are known at this stage, the consideration of alternative designs has yet to be undertaken. This will be considered as part of the EIA and detailed within the ES, as appropriate.

2.8.3 The alternatives to be considered will relate to:

- The "Do Nothing" option (providing a description of the likely evolution of the Site in the absence of the Proposed Development and setting out the need and for and benefits of the Proposed Development);
- Design and layout, including alternative technologies (to be informed by the EIA process, feedback from consultation and developments in solar technology); and
- Cable route corridor (to be informed by the EIA process and feedback from consultation).

2.9 Design Parameters

2.9.1 The layout of Beacon Fen North, Beacon Fen South and the cable route corridor will be informed and confirmed during the EIA process.

2.9.2 As the design evolves, the EIA will consider the worst-case impact of the Proposed Development and be based upon maximum parameters. The parameters upon which the EIA will be based will include the following:

- Maximum footprint of development,
- Maximum size and heights of development components; and
- Capacities for output and storage.

2.9.3 The design will reflect the existing baseline conditions with the intention of designing-out / reduce potential adverse impacts. Embedded mitigation will be implemented via

the adoption of best practice working, including the preparation of and adherence to an appropriate Construction Environmental Management Plan (CEMP). The ES will set out the embedded mitigation being considered within the assessment.

3 EIA APPROACH AND TOPIC AREAS

3.1 Introduction

3.1.1 The EIA will be undertaken in accordance with the EIA Regulations with regard to Schedule 4, which sets out the information for inclusion within an ES.

3.1.2 As a registrant of IEMA's EIA Quality Mark Scheme, WA is experienced and committed to the delivery of effective practice in EIA.

3.1.3 Information relating to the scope of the technical assessments (for inclusion within the EIA / ES) for each environmental aspect, together with a preliminary summary of baseline information and the potential significant effects related to each of these aspects, is provided within Sections 4 - 13 of this Scoping Report.

3.2 EIA Methodology

General Approach

3.2.1 The discussion for each subject area 'generally' follows a format that identifies and addresses the following:

- Site activities – describes the onsite activities and / or sources of potential impact for that particular aspect.
- Embedded mitigation – describes measures intended to design out (e.g. through the adoption of best practice or design principles) potential adverse effects prior to impact assessment.
- Potential impacts – describes the method used within each subject area to assess potential impacts (including a separate assessment of cumulative impacts, where appropriate), and explains any assumptions or modification to the general impact assessment methodology described here.
- Mitigation measures – describes any additional mitigation measures that would be used to reduce potential impacts to acceptable levels.
- Residual impacts – re-assesses significance of impacts after mitigation is applied.
- Cumulative effects – including inter-cumulative and / or intra-cumulative, as appropriate (see paragraphs 3.2.17 to 3.2.22).
- Monitoring and follow-up - identifies what level of monitoring could be necessary, over a defined period, to ensure that mitigation measures remain appropriate and maintain actual impacts within acceptable limits.

- Limitations to the assessment – describes any absence of information or other limitations (e.g. restrictions on access) that have constrained the assessment in any way.

Defining terms and significance criteria for the EIA

3.2.2 The existing baseline conditions will be determined through review and consideration of information obtained by desk-based studies and onsite surveys / monitoring.

3.2.3 The terms impact and effect are often used interchangeably but, within the context of the environmental studies considered in the EIA / ES, these terms have specific meanings.

3.2.4 The term 'impact' is used with reference to changes in a particular aspect of the environment that can be considered attributable to the development. Where possible, the degree of change is quantified. The assessment of the level of these changes (i.e., magnitude of change) to the baseline is based on the magnitude of the impact and the sensitivity of the receptor to that change.

3.2.5 The term 'effect' relates to the implication of changes in the baseline conditions that have been established for a particular receptor. This effect can be concluded to be Significant or Not Significant depending upon the level of effect.

3.2.6 Thus, impacts are a measurement of the change upon aspects of the environment, from the baseline condition, as a consequence of the development; the effect is the significance of the change.

3.2.7 The nature of the assessments and the methodology adopted to define significance will be specified for each environmental aspect, but fits within this general framework.

Site activities and identification of potential impacts

3.2.8 Where quantitative techniques can be used, this approach will be adopted to determine the magnitude of the potential impact as a consequence of the development proposals. Where quantitative techniques are not possible, qualitative techniques (with expert judgement) will be used to define the magnitude of the potential impact. Where predictions are subject to a degree of uncertainty, this is explained within each topic, together with any assumptions on which they are based.

3.2.9 The four attributes that are applied to determine the impact are:

<u>Direction</u>

- Positive Impact – An impact that is considered to provide a net benefit to the receptor.

- Adverse Impact – An impact that is considered to negatively affect the receptor and may require measures to mitigate its effects.

Duration

- Short-term Impact – An impact that would occur during construction activities.
- Long-term Impact – A permanent impact from operation of the development after mitigation measures have been applied.

Receptor sensitivity

3.2.10 This has been based on the scale defined in Table 3.1 below.

Table 3.1 Receptor Sensitivity Scale

Sensitivity of Receptor	Description of Receptor
Low	Low importance; abundant; local importance or scale; resilient to change; potential for substitution within the local area.
Medium	Low to medium importance; relatively abundant; regional importance or scale; reasonably resilient to change; potential for substitution.
High	Medium to high importance; relatively rare; national importance or scale; fragile and susceptible to change; limited potential for substitution.
Very High	Very high importance; extremely rare; international importance or scale; very fragile; highly susceptible to change; very limited potential for substitution.
Note: the scale combines the characteristics of the receptor together with its geographic extent.	

Magnitude of change

3.2.11 The general descriptions used in Table 3.2 have been developed for each environmental aspect, taking into account the relevant performance standards that are applicable.

Table 3.2 Magnitude of Change Scale

Magnitude of Change	Description of Change
Negligible	Minimal detectable changes in baseline resource. Changes are either of short duration or infrequent, such that direct control is not required to manage potential impact.
Low	Detectable change to the baseline conditions or resource. During construction and operations there would be ongoing change in the underlying characteristics or quality of the baseline conditions.
Medium	Degree of change is such that loss of, or adverse alteration to, the baseline conditions of a specific environmental resource would occur. Post-development characteristics or quality would be partially changed during construction and operational phases.
High	Degree of change is such that total loss of, or adverse alteration to, the baseline conditions of a specific resource would occur. Post-development characteristics or quality would be fundamentally and irreversibly changed.

Defining significance

3.2.12 Using the qualitative descriptions from the Receptor Sensitivity (Table 3.1) and Magnitude of Change (Table 3.2), scales have been mapped to produce a matrix (Table 3.3) that can be used to define the level of effect.

Table 3.3 Level of Effect Matrix

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

3.2.13 The scale of the impact can then be used to determine whether the effect is significant; only impacts rated as greater than moderate are considered to have a significant effect. More detailed definitions of the levels of significance are shown in Table 3.4, below. It should be noted that some guidance (for instance, in respect of landscape character and visual amenity), advises against the rigid use of such matrices and that professional judgement should be applied in arriving at a conclusion about significance.

Table 3.4 Significance of Effects

Scale of Impact	Description of Impact (Sensitivity and Magnitude)	Significance of Effect
Negligible	Receptor not concerned or altered by a particular activity; nearly indistinguishable from natural background variations.	Not significant
Minor	Well within accepted limits or standards; noticeable impact on receptor, but sufficiently small so as not to be of concern	Not significant
Greater than Moderate	Within accepted limits or standards, but close to reaching the threshold; high magnitude changes on relatively insensitive receptors; low magnitude changes to highly to very highly sensitive receptors	Significant
Major	Accepted limits or standards are exceeded; high to moderate magnitude changes affecting highly to very highly sensitive receptors	Significant

Mitigation measures and residual impacts

3.2.14 In general, adverse effects rated as significant will be mitigated in order to reduce the level of significance of the residual (post-mitigation) impact. Monitoring measures may also need to be defined to assess the efficacy of the mitigation.

3.2.15 The potential impacts, with mitigation imposed, are assessed to determine the level of residual effects as a result of the site activities. The residual effect is determined as a result of the reduction in level of the impact together with a risk analysis based on any monitoring programme targeted to audit the impact.

3.2.16 The ES will include a mitigation and monitoring schedule clearly setting out the measures proposed to achieve the residual effects identified within the ES, and how these are secured through the DCO process.

Cumulative Impact Assessment

3.2.17 In accordance with Schedule 4 of the EIA Regulations, an assessment of potential cumulative effects will be undertaken as part of the EIA and detailed within the ES. Cumulative impacts can take two forms; intra-cumulative and inter-cumulative, and the consideration of both will be considered within the ES:

- Intra-cumulative (effect interactions) being those impacts that occur as a result of the combination of multiple environmental impacts (from the development in isolation) on a single receptor.
- Inter-cumulative being those impacts that occur as a result of the development in combination with other development(s).

Intra-Cumulative Effects

3.2.18 The assessment of intra-cumulative effects will consider the interactions between residual impacts likely to be experienced for each type of receptor and assess the significance of these cumulative effects. Effects will be tabulated against receptor groups in order to identify potential significant intra-cumulative effects. The methodology for this will adopt the following principles:

- Residual effects, post-mitigation, will be taken as the basis for the assessment, on the assumption that mitigation measures set out in the ES are secured in any DCO and put in place as part of the Proposed Development. Negligible residual effects will be excluded from the assessment on the basis that they have an imperceptible impact on the environment and are unlikely to result in significant adverse effects.
- The sensitivity of receptors and magnitude of impacts will be identified and combined in order to determine the potential for significant adverse cumulative effects.
- Additional mitigation, if required, will then be developed to address any significant cumulative effects.

Inter-Cumulative Effects

3.2.19 The assessment of inter-cumulative effects will be undertaken with regard to PINS Advice Note Seventeen: 'Cumulative effects assessment relevant to nationally significant infrastructure projects', and paragraphs 107 and 108 of 'Planning Act 2008:

Guidance on the pre-application process' (DCLG, 2015), both of which recommend a staged approach.

Stage 1: Establishing the long list

3.2.20 The Zone of Influence (ZOI) for each environmental aspect considered within the ES will be identified and a long list of other developments within the ZOIs will be identified.

3.2.21 It is proposed that the ZOI will comprise a 5km distance out from the red line presented at Appendix 1.1 (and at PEIR and DCO application stage, 5km from the draft Order Limits). This aligns with or exceeds the study area for the majority of environmental assessments.

3.2.22 The long list will be reviewed and developed in consultation with the relevant local planning authorities at the following stages:

- Prior to PEIR
- Prior to the DCO application (with a cut off for inclusion of schemes around one month before submission)

3.2.23 Development will be included in the initial long-list based on the following criteria:

- Development currently under construction;
- Approved applications within the past five years which have not yet been implemented;
- Submitted applications not yet determined;
- Refused applications, subject to appeal procedures not yet determined;
- Projects on the National Infrastructure Planning Programme;
- Development identified in the relevant Development Plans (and emerging Development Plans); and
- Development identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

3.2.24 Criteria will be developed to 'sieve' 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.

3.2.25 Where projects are completed, or expected to be completed before construction of the Proposed Development, these will be considered as part of the baseline.

Stage 2: Establishing the short list

3.2.26 Following Stage 1, threshold criteria will be applied to the long list in order to ensure the cumulative assessment is proportionate. This criteria is likely to include:

- Scale and nature of other developments, informed by definitions of major development and EIA screening thresholds
- Overlap in temporal scope
- Geographical overlap in the ZOI of other developments with the Proposed Development
- Sensitivity and extent of common receptors

3.2.27 The above criteria will be refined following discussion with local planning authorities.

Stage 3: Information gathering

3.2.28 Information on each of the developments on the short list will be collected to inform Stage 4, and will be presented within the ES. Information 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

3.2.29 An assessment of the potential cumulative effects of the Proposed Development with the short list of other developments will be undertaken. The assessment will be proportionate, with regard to the certainty of information available on other developments. Where significant cumulative effects are only likely to arise in relation to one environmental aspect area, the assessment will focus on that issue only. 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;
- The frequency of the effect;
- The 'value' and resilience of the receptor affected; and

- The likely success of mitigation.

3.3 Summary of Scope

3.3.1 It is proposed that the following aspects will be scoped-in for consideration within the EIA and detailed in ES chapters, including appendices and drawings (as necessary):

- Landscape & Visuals;
- Ecology;
- Cultural Heritage;
- Access & Traffic;
- Noise & Vibration;
- Water Resources;
- Climate Change;
- Glint;
- Soils & Agricultural Land; and
- Socio-economics.

3.3.2 The 2017 EIA Regulations requires a description of the expected significant adverse effects on the environment deriving from the vulnerability of the Proposed Development to risks of major accidents and disasters. It has been decided to not include this as a single ES chapter, but instead address the potential for major accidents and disasters in the 'Project Description' of the ES and outline how this subject is managed.

3.3.3 The following will be produced as standalone reports to inform the ES and support the application:

- Arboricultural Assessment;
- Flood Risk Assessment (FRA) & Drainage;
- Archaeological Desk-based Assessment (DBA);
- Heritage Statement;
- Habitat Regulations Assessment;
- Waste and Recycling Strategy;
- Construction Environmental Management Plan (CEMP);
- Travel Plan;

- Transport Assessment;
- Construction Traffic Management Plan (CTMP);
- Statutory Nuisance Report; and
- Decommissioning Statement.

3.3.4 The findings of any ecological surveys, including an arboricultural survey, which are to be undertaken to inform the ES will be detailed within survey-specific standalone reports and submitted to support the application.

3.3.5 The results of the geophysical survey and evaluation trenching, which are to be undertaken to inform the ES, will also be detailed within standalone reports and submitted to support the application.

3.4 Aspects to be Scoped Out

3.4.1 It is proposed that the following technical disciplines will be scoped out of the EIA and, as such, assessment chapters will not be included within the ES:

- Air Quality
- Ground Conditions
- Human Health
- Waste
- Accidents and Disasters
- Electric, Magnetic and Electromagnetic Fields
- Telecommunications, Television Reception and Utilities
- Wind Microclimate
- Daylight, Sunlight and Overshadowing

3.4.2 The rationale for scoping out the above is expanded upon in Section 14.

3.4.3 In addition to the above, due to the nature, scale and location of the Proposed Development it is not considered that it has the potential for significant transboundary effects on the environment of any European Economic Area (EEA) State. Therefore, potential transboundary effects with EEA states are not considered further within this Scoping Report or the EIA.

4 LANDSCAPE & VISUAL

4.1 Introduction

4.1.1 An assessment will be undertaken of the likely significant effects of the Proposed Development on the environment with respect to landscape and visual effects. This section sets out the approach and scope of the landscape and visual amenity assessment that will be undertaken as part of the EIA for the Proposed Development. It identifies the potential for significant effects in relation to the landscape and visual amenity during the construction and operation of the Proposed Development. The sections, below, set out the assessment's proposed technical, temporal and spatial scope, alongside the baseline information available.

4.1.2 This scoping information is to be read in conjunction with the following drawings:

- Figure 4.1 Bareground Zone of Theoretical Visibility).
- Figure 4.2 Topography.
- Figure 4.3 Screened Zone of Theoretical Visibility.
- Figure 4.4 Landscape Character.
- Figure 4.5 Sensitive Receptors and Designated Sites.

4.2 Study Area

4.2.1 The Guidelines for Landscape and Visual Impact Assessment (GLVIA3) [13] suggests that the study area should cover the geographical area from which a development would be potentially visible. The area should also be proportionate to the development itself and may include refinement by professional judgement. In the case of the Proposed Development, the proposed study area for the assessment has been defined by a combination of the ZTV and professional judgement verified by field surveys. The combination of these factors has resulted in a proposed study area that encompasses up to 5km from the Site (see Figure 4.1). It is anticipated that beyond this distance, the Proposed Development would unlikely give rise to significant landscape or visual effects.

4.3 Legislation Context and Guidance

4.3.1 Legislation and guidance relating to LVIA and pertinent to the Proposed Development is listed, below. For the relevant planning policy, please refer to Appendix 1.1 at the rear of this Scoping Report.

[13] The Guidelines for Landscape and Visual Impact Assessment (3rd Edition) (GLVIA3). Landscape Institute and Institute of Environmental Management and Assessment (2013).

- Guidelines for Landscape and Visual Impact Assessment, Third Edition, by the Landscape Institute and Institute of Environmental Management and Assessment (2013);
- An Approach to Landscape Character Assessment, Christine Tudor, Natural England (2014);
- Visual Representation of Development Proposals, Technical Guidance Note 06/19, The Landscape Institute (September 2019);
- An approach to landscape sensitivity assessment – to inform spatial planning and land management, Christine Tudor Natural England (2019);
- Assessing landscape value outside national designations, Technical Guidance Note 02/21, The Landscape Institute (February 2022).

4.4 Current Baseline

Site Description

4.4.1 The Proposed Development comprises Beacon Fen North and Beacon Fen South, and the Cable Route Area. Beacon Fen North and Beacon Fen South share some similar landscape characteristics and comprise predominantly medium-scale fields in arable use. The landscape of Beacon Fen South alongside the western part of the Cable Route Area displays a transitional, gently undulating lowland character between the limestone heath of Slea Valley, west of Sleaford and fens that lie to the east, including the eastern part of the Cable Route Area and Beacon Fen North.

Landform and Drainage

4.4.2 The landform of Beacon Fen North and Beacon Fen South, alongside the western part of the of the Cable Route Area, consists of a gently undulating lowland clay vale, underlain with boulder clay and gravel deposits. The landform slopes gently down from approximately 20m AOD in the west to 5m AOD in the east (Figure 4.3) towards the B1394. Further to the east the landform is distinctly flat with very little variation in topography between 5-0m AOD, which is characteristic for fenland landscape. The Northern Solar Array site alongside the eastern part of the Cable Route Area is located within fenland landscape.

4.4.3 Drains and dykes are typical features of the landscape, although less frequent within the western part of the Cable Corridor Area and Beacon Fen South.

4.4.4 As described in the North Kesteven Landscape Character Assessment[14], surface water emerging from springs at the limestone plateau edge to the west drains into small streams running from west to east. The presence of drainage ditches along fields indicates a change in the porosity of the dry landscapes of the plateau to more porous soils of fens. Some of the key drains that are present within the Site are Car Dyke, The Beck, South Forty Foot Drain and the North Beck.

Land use and Land cover

4.4.5 The landscape of the Site and the wider study area has an agricultural character. The western part of the Site and the study area; contrasts with a much more open fen landscape to the east. The fields are typically medium scale, although some are large or small-scale of varied shape and size. The fields within Cable Route Area and Beacon Fen North are generally arable with some grazing land. The hedgerows are frequent along the road corridors and, often separate, the fields. Small copses of broadleaved woodland are present. The land cover and land use in the eastern part of the Cable Route Area is predominantly arable with sparse woodland cover though some occasional tree planting is often present around farmsteads. Shelterbelts are present occasionally and they often consist of poplars.

4.4.6 The land cover varies from more exposed landscapes to the west and the openness of the Fens to the east. Overall, the agricultural landscape across the Site is well-managed and settled.

4.4.7 There are a few scattered agricultural buildings mostly associated with farmsteads and occasional poultry units. The only industrial and commercial uses are located on the edges of the larger settlements, such as Sleaford, with several commercial Sites at the northern edges. High voltage powerlines and pylons cross the Cable Route Area and are prominent detracting features within the rural landscape. Intensive agricultural activity has led to the removal of hedgerows between fields, which is more visible in the eastern part of the Cable Route Area and Beacon Fen North. In these locations, the field boundaries are frequently regularly shaped along drains that are often linear features. The need for drains resulted in a greater division of fields into small parcels.

Settlements and individual properties

4.4.8 The dominating settlement pattern are small villages, such as Heckington, Helpringham and Great Hale, or hamlets, such as Little Hale. The villages are frequently aligned along the local roads that have a linear character, such as the villages of Heckington and Great Hale and the hamlets of Little Hale and Helpringham

[14] North Kesteven Landscape Character Assessment. North Kesteven District Council (September 2007).

along the B1394. These villages lie on a ridge of high ground beyond which the land falls away to the east. The ridge with villages demarcates the border of the fenland landscape. Heckington is the largest village within the Site, which originated at the intersection of minor roads, but has grown northwards towards the A17 bypass. Red brick buildings with tiled roofs dominate, and although the core of the villages is of historical interest, newer housing has been built on the outskirts of the villages. The Heckington Village and Heckington Station Conservation Area Appraisal[15] refers to "*Heckington Windmill as a prominent landmark….which presents strong historical reference points within the landscape which should be protected from visual interruption.*"

Transport corridors

4.4.9 The main transport corridor that crosses the Site is the Peterborough to Lincoln railway line that is between Helpringham and Thorpe Latimer, with associated features such as bridges, level crossings and signal boxes. The key road within the Site is the B1394, crossing north to south, with the A Roads (e.g. the A17 and A52) running east to west across the study area. The geometric road pattern follows the drainage pattern with small roads raised above the level of the fields, running from west to east is characteristic for the eastern part of the Cable Route Area and the Northern Solar Array site. There are numerous footpaths and Public Rights of Way (PRoW) present within the study area.

Watercourses

4.4.10 There are numerous drains and streams within the Site and the study area. The Cable Route Area includes North Beck, a stream joining the River Tees. North Beck Drain is located to the east of Heckington. The Cable Route Area and Beacon Fen North include large fens and drainage ditches that divide the landscape into small fields. The boundary of Beacon Fen North is delineated by Twelve Drain, Midfodder Dike and Car Dyke. The South Forty Foot Drain is one of the largest drains in the southern part of the study area. The fen landscape was initially created in 17th century and is still an ongoing process to this day, which transformed wild wetlands and meandering streams into long straight channels at regular angles that enabled the use of the peat-rich soils for growing a variety of crops.

[15] Heckington Village and Heckington Station Conservation Area Appraisals. North Kesteven District Council (April 2016).

Designations

4.4.11 As illustrated on Figure 4.5 Designations and Sensitive Receptors, the Site and the study area do not lie within any national landscape designations. There are several Listed Buildings grouped predominantly around villages within the study area, with a few Scheduled Monuments located predominantly along the Peterborough to Lincoln railway line. Aswarby Park, a Grade II Registered Park & Garden is located at the western edges of the study area (approximately 5km from the Site). Owing to the long distance from the Site and the presence of the existing intervening vegetation that will screen the views of the Proposed Development, the effects of this designation are proposed to be scoped out from further assessment.

National Character Areas

4.4.12 At the national level, the Site is crossed by two Natural England National Character Areas (NCA). these are NCA 44 Central Lincolnshire Vale and NCA 46 The Fens (see Figure 4.4).

4.4.13 NCA 46 (The Fens) is characterised as "*Expansive, flat, open, low-lying wetland landscape influenced by the Wash estuary, and offering extensive vistas to level horizons, and huge skies throughout provides a sense of rural remoteness and tranquillity*." Statements of Environmental Opportunity for NCA 46 recommends promoting the creation and restoration of wetland landscapes through coordinated and sensitive management of water resources.

4.4.14 NCA 44 (Central Lincolnshire Vale) comprises "*In general, a regular pattern of medium to large-sized arable fields with hawthorn-dominant hedgerows enclosing most fields and with few hedgerow trees*" covered by a variety of superficial deposits, largely of glacial till (boulder clay), and with the Wolds scarp providing an often prominent boundary to the east. Statements of Environmental Opportunity for NCA 44 recommends expanding the network of semi-natural wetland habitats, woodland, hedgerows, and grassland adjacent to watercourses, field drains and waterbodies to capture sediment and nutrients.

Regional and Local Landscape Character

4.4.15 As there are no published Landscape Character Assessments at the County level, the assessment will refer to baseline descriptions included within Local Landscape Character Assessments, as they will provide a more detailed characterisation of the landscape within the study area. The Site falls within several local authority areas, and the relevant Landscape Character Assessments are listed in Table 4.1, below, and illustrated on Figure 4.4 Landscape Character.

4.4.16 The majority of the Site falls within North Kesteven Landscape Character Assessment[16]. This Landscape Character Assessment identifies Landscape Character Types and Landscape character Sub-Areas that provide more detailed landscape characteristics. Beacon Fen North falls entirely within Fenland LCA. Majority of the Cable Corridor Area falls within Fenland LCA, however the eastern part is located within the Central Clays and Gravels LCA. In contrast, Beacon Fen South site is located almost entirely within Central Clays and Gravels LCA.

4.4.17 The very southern part of the study area falls within the administrative boundaries of South Kesteven District Council, and the landscape of this area is characterised by the South Kesteven Landscape Character Assessment[17]. This Assessment identified seven District LCAs with distinct characteristics. The Fen Margin and the Fens LCA fall within the most southern part of the study area.

4.4.18 In the absence of a Landscape Character Assessment published by the South Holland District Council, the boundaries of the Historic Character of the County of Lincolnshire covering the Lincolnshire area have been used to identify LCAs within the administrative area of South Holland District Council. Based on the review of the available information informed by field surveys, two LCAs were identified, comprising the Wash LCA and the South Holland Fens LCA.

4.4.19 The south-eastern part of the study area falls within the administrative boundaries of Boston Borough Council and the character of the landscape is described within the Landscape Character Assessment of Boston Borough Council[18]. This Landscape Character Assessment identifies Landscape Character Types, which represent distinct types of landscape that are relatively homogenous in character. These Landscape Character Types have been subdivided into nine LCA, which are “single unique areas and are the discrete geographical areas of a particular landscape type”. The Holland Reclaimed Fen LCA falls within the north eastern part of the study area.

4.4.20 Table 4.1, below, outlines the key characteristics of the LCAs within the study area.

Table 4.1 Key Characteristics of Landscape Character Areas

Landscape Character Areas	Characteristics
North Kesteven Landscape Character Assessment	
Central Clays and Gravels Landscape Sub-Area	It is predominantly an empty, open landscape with wide views to the skyline in all directions. The landform is a gently undulating plateau which dips gently towards the east. Generally, the whole area is dry, with no obvious surface drainage due to the

[17] South Kesteven Landscape Character Assessment. South Kesteven Landscape Character Assessment (January 2007).
[18] Landscape Character Assessment of Boston Borough. Boston Borough Council (July 2009).

Table 4.1 Key Characteristics of Landscape Character Areas	
Landscape Character Areas	**Characteristics**
	underlying limestone geology. Scattered woodland copses pepper the whole of the sub-area, which, although relatively small, are prominent features because of the openness of the landscape. Roadside hedgerows are often found with mature trees within. Limestone dry stone walls are apparent along the roadside and some field boundaries but are generally in poor condition. Fields are very large and rectilinear. Field boundaries are often absent, broken or delineated by a strip of rough grass or remnant hedgerow or wall. Intensive arable agriculture dominates land use, with wheat and root crop common. Larger settlements are situated on the edge of the sub-area characterised by having historic cores with limestone buildings but often surrounded by significant levels of 20th century development. Utility Infrastructure, which, although sparse, impacts the landscape, including prominent pylons and the main A15 running north to south. Pressures for change on the Plateau predominately relate to minerals operations, a decline of field boundaries, particularly walls, and intensive agricultural practices. Opportunities for landscape strengthening and enhancement mainly lie in field boundary reinstatement, particularly of dry-stone walls and for more appropriately designed development on the outskirts of settlements.
Fenland Landscape Sub-Area	Low lying with very flat relief. Occasional small islands of slightly higher land. Very large, rich arable fields divided up by drainage channels. A hierarchy of rivers, drains and ditches creating linear patterns across the landscape. The geometric road pattern follows the drainage pattern with small roads raised above the level of the fields, running from west to east. Generally, extensive vistas to level horizons and huge skies, apart from in the north easterly direction where the Lincolnshire Wolds provide a marked 'Upland' horizon. Sparse woodland cover though some occasional trees surrounding farmsteads and some shelter, belts, particularly of poplars. Intensively farmed and managed, it is almost entirely a man-made landscape. Except for scattered farmsteads and farm buildings, the sub-area is unsettled. Prominent power lines and large-scale agricultural buildings.
South Kesteven Landscape Character Assessment	
The Fen Margin LCA	Low flat terrain, level horizons and large skies. Large-scale open rectangular fields divided by drainage ditches and embanked rivers. Sparse trees and woodland cover. Little settlements apart from individual farmsteads, often with large-scale agricultural buildings.
The Fens LCA	Low flat terrain, level horizons and large skies. Large-scale open rectangular fields, divided by drainage ditches and embanked rivers. Sparse trees and woodland cover. Little settlements apart from individual farmsteads, often with large-scale agricultural buildings.
Boston Borough Council	
The Holland	Flat and low-lying reclaimed fenland.

Table 4.1 Key Characteristics of Landscape Character Areas	
Landscape Character Areas	**Characteristics**
Reclaimed Fen LCA	Open and expansive views with big skies and dark night skies, with some views semi-enclosed at ground level by large embankments. More distant views to Boston Stump and to the Lincolnshire Wolds in East Lindsey District to the north. A man-made intensive arable landscape laid out in a regular, geometric pattern with narrow roads and trackways alongside drains, dykes and ditches. The large North Forty Foot Drain and South Forty Foot Drain are key dominating features of the area. Field boundaries are typically open with wet ditches, dykes and drains and the occasional hedgerow. Occasional large-scale horticultural glasshouses and packing or processing plants occur near the southern boundary of the area. Sparsely populated with occasional small hamlets, scattered farmsteads, and occasional rows of former workers' cottages. Occasional derelict farm cottages and field buildings. Sparse tree cover confined to shelterbelts, with occasional hedgerows and small blocks of mixed woodland with shrubby edges. Bicker windfarm and large-scale pylons on the south-western tip are modern landmark features. A semi-remote, tranquil and intact working agricultural landscape.
South Holland District Council	
Wash LCA	Flat topography is dissected by winding creeks, drainage channels and drainage ditches. Extensive areas of salt marsh. Expansive views over the sea and inland. Wide uninterrupted horizon.
South Holland Fens LCA	Predominantly flat topography, dissected by main roads, rivers, drainage channels and drainage ditches, often on raised banks. Primarily nucleated settlements with associated mature trees. Church towers and spires often rise above mature vegetation. Hedgerows are a strong element of the landscape locally. Views are restricted or foreshortened by shelterbelts and woodland or mature hedgerows. Between settlements, the landscape is more open, with locally large-scale extensive views and an uninterrupted skyline. The main detractors are high-voltage overhead power lines and pylons and electricity substations.

4.5 Visual Amenity

Zone of Theoretical Visibility (ZTV)

4.5.1 The potential visibility of the Site is illustrated on Figure 4.1 Baregound Zone of Theoretical Visibility and Figure 4.3 Screened Zone of Theoretical Visibility. These drawings indicate the potential visibility of Beacon Fen North and Beacon Fen South, and combined visibility of both Sites. The ZTV, combined with the field studies, informed the selection of visual receptors.

4.5.2 The ZTV Drawings are based on the Ordnance Surveys Terrain 5 Data set, which is based on a 5m resolution Digital Terrain Model (DTM). To illustrate the worst-case scenario, it has been assumed that the entire Site area will be required for the Proposed Development and that the maximum height of panels will be 4.5m. It is expected that the Proposed Development will be primarily visible from the immediate surroundings of the Site due to the presence of screening elements across the flat landform.

4.5.3 The Screened ZTV is also based on the National Tree Map (NTM) data that includes vegetation and buildings derived from the OS Master map building layer to illustrate the screening effect of vegetation and buildings. The potential visibility illustrated on the ZTV drawings varies significantly, however, from actual visibility as identified during initial field surveys, which is much more restricted to visual receptors in close vicinity.

Extent of Visibility

4.5.4 In general, the Site is located across a relatively flat landform (see Figure 4.2). The flat landform impacts visibility as vegetation along the field boundaries effectively screens the views. The visibility is also restricted by distinct woodland belts and blocks. There is also a range of isolated residential properties within the Cable Route Area. Whilst residents at these properties are visual receptors, themselves, they also break-up the visibility from visual receptors in the vicinity as they are often surrounded by ancillary farm buildings. Their curtilage frequently includes perimeter planting consisting of hedgerows and mature trees. The visibility is more open in the eastern part of the Site as fens comprise small to medium-scale fields separated by drains that demarcate field boundaries with very little vegetation. It is expected that the Proposed Development will be primarily visible from the immediate surroundings of the Site due to the presence of screening elements, such as vegetation.

4.5.5 The key visual receptors likely to experience a change in the views due to the introduction of Beacon Fen North are residents of the small hamlet Ewerby Thorpe. The visibility from residential properties in Ewerby village will be more restricted due to the greater distance from the Proposed Development and screening provided by tree belts along the residential edge, field boundaries and poultry houses. Other potential visual receptors include the Howell hamlet, but, here, tree belts around the hamlet, in combination with a small woodland block to the east and densely scattered mature trees, will heavily restrict visibility. The views from South Kyme will be largely screened by a mature tree belt along the south-western boundary of the settlement. There is also a limited range of isolated residential receptors, mainly local farms such

as Fenmore Farm and Westmoreland that are likely to experience a change in the views.

4.5.6 The key visual receptors likely to experience the change in the views due to construction and operation of Beacon Fen South include residents of Helpringham village, but, here, most of the views will be screened by tree belts along the Peterborough to Lincoln railway line. The views from Swaton village are restricted by tree belts along the field boundaries of adjacent fields and agricultural buildings associated with North End, Manor Farm and small woodland blocks to the north of the village. The views from Horbling will be screened completely by layers of intervening vegetation and small changes in landform undulation. The views from Scredington village are largely screened by tree belts along field boundaries of adjacent fields. A limited range of isolated residential receptors are likely to experience a change in the views, such as Highgate.

4.5.7 The Cable Route Area covers the extensive area between Beacon Fen North and Beacon Fen South. The key visual receptors include villages, such as Heckington and Helpringham, and hamlets, such as Little Hale. The visibility from these receptors is restricted by tree belts and woodland blocks surrounding these settlements. There is also a range of isolated farmsteads within the Cable Route Area where residents may experience potential change to the views.

4.5.8 The Site also includes a range of PRoW that are more densely concentrated around settlements, such as Heckington, Great Hale, Little Hale, Helpringham and Scredington, Little Hale Fen and Helpringham Fen.

4.5.9 The key transport receptors include users of the A52 and A17, and users of B Roads, such as the B1394 and other local roads.

Proposed Viewpoints

4.5.10 Viewpoints are selected to study the potential visual effects of a Proposed Development. The principal criterion is that they are selected to represent the range of views and viewer types likely to experience the Proposed Development (see paragraphs 6.19 and 6.20 of the GLVIA 3). Some viewpoints may also be chosen because they are important existing viewpoints within the landscape.

4.5.11 The selection of viewpoints has been informed by the ZTV analysis, fieldwork and by desk research on access and recreation, including footpaths, bridleways and distribution of population. A range of representative viewpoints have been selected to give coverage from all directions, distances and aspects. The detailed location of

each viewpoint has been considered as typical or representative as possible of the view likely to be experienced.

4.5.12 Although the Cable Route Corridor is not defined at this stage, a range of potential visual receptors are included within the Cable Route Area to capture visibility from visual receptors looking towards Beacon Fen North and Beacon Fen South, as well as to capture visibility towards the Cable Route Area.

4.5.13 Table 4.2, below, lists the proposed viewpoint locations. The viewpoint locations were selected through desktop studies and field surveys, but their position may be altered subject to further field surveys and stakeholder comments. Viewpoint locations may also be altered once the Cable Route Corridor is selected.

4.5.14 It is currently expected that the locations for the photomontages to accompany the ES will be as follows:

- Viewpoint No.5: View from Halfpenny Toll Lane near Ewerby Thorpe.
- Viewpoint No.6: View from Cove Drove near South Kyme.
- Viewpoint No.9: View from the public footpath No. BurP/3/1.
- Viewpoint No.10: View from public footpath No. Scrd/7/3.

4.5.15 The photomontages will show the scale and massing of the Proposed Development in its landscape context from key locations in the surrounding locality. They will also provide a useful tool to aid the judgements made in the LVIA process.

Table 4.2 Proposed Viewpoint locations

Viewpoint Number	Viewpoint Name
1	View from North Drove, near Helpringham
2	View from Public Footpath No. Swat/6/1near Swaton
3	View from Little Hale Road near Great Hale
4	View from Fen Road near Little Hale
5	View from Halfpenny Toll Lane near Ewerby Thorpe
6	View from Cove Drove near South Kyme
7	View from farm track between Asgarby and Boughton
8	View from PRoW No. BurP/1/1 near Burton Pedwardine
9	View from the public footpath No. BurP/3/1.
10	View from public footpath No. Scrd/7/3
11	View from Spanby Lane near Trekingham
12	View from the A17 near East Heckington
13	View from South Forty Foot Drain
14	View from South Drove
15	View from local at Great Hale Fen
16	View from Ferry Lane

4.6 Design Assumptions

4.6.1 The LVIA will inform the iterative design process of the Proposed Development and the mitigation measures, specifically regarding the siting, layout and colour tones of

the solar panels and associated structures to reduce their visibility and perceived scale and mass within the landscape. The LVIA will also inform the iterative design process by identifying opportunities for new Green Infrastructure.

4.6.2 The following outlines the design assumptions. Where possible, any known embedded mitigation measure and limitations are also identified.

4.6.3 For the purposes of scoping, the following design assumptions have been made during the construction and operational phases.

4.6.4 The potential embedded mitigation measures during construction are likely to include the following:

- Siting of compounds and construction access routes and working storage areas away from sensitive receptors;
- Utilise screening provided by landscape elements within the Site and along its perimeter to screen the views;
- Avoid and, if not feasible, minimise the loss of vegetation;
- Retention of existing features such as established trees and hedgerows during construction;
- Any losses of trees, hedgerows and other vegetation will be compensated and enhanced where possible;
- Consideration will be given to using grassed earth storage mounds (height 2-4m) and appropriate perimeter security fencing to minimise visual intrusion during construction;
- Reinstatement of construction areas outside the operational areas of the Proposed Development for agricultural use and/or for nature conservation interests;
- Maintain suitable buffers from landscape and ecological features to reduce the potentially adverse effects e.g. woodlands;
- The existing ProWs that cross the Site will be retained and incorporated within multifunctional green corridors; and
- There may be a requirement to temporarily divert a PRoW during the construction phase, the details of which will be sought to be agreed upon with the relevant key stakeholders, with an appropriate temporary alternative provided.

4.6.5 It is assumed that the cabling connecting the two solar array sites to the substation at Bicker Fen will be underground, although there may be instances where environmental conditions would prevent the use of underground cabling.

4.6.6 The identified embedded mitigation measures during operation include:

- Mitigation measures relating to the establishment and management of new and existing planting within and around the Site will be detailed within an accompanying Landscape Environmental Management Plan (LEMP);
- Measures to minimise night-time lighting; and
- Minimising impacts on tranquillity for recreational receptors from noise and visual intrusion and screening or minimise the visual intrusion in views from visual receptors.

4.7 Likely Significant Effects

4.7.1 The Proposed Development has the potential to result in temporary significant adverse landscape effects during the construction phase due to the change in land use, loss of vegetation, the presence of construction machinery and associated reductions in tranquillity. These aspects of the construction phase also have the potential to result in significant adverse visual effects, due to changes to the composition of views, compared to views of fields and general farming activity.

4.7.2 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. In the longer term, the Proposed Development has the potential to result in significant beneficial landscape effects through the introduction of such permanent landscape elements as hedgerow and woodland shelter belts across the Site. The proposed structures also have the potential to result in significant adverse visual effects due to the changes in the composition of views that overlook farming activity.

4.7.3 The decommissioning phase has the potential to result in significant adverse landscape and visual effects, similar to the construction phase, albeit of likely smaller magnitude due to the removal of panels and associated structures. Following decommissioning, the impact is anticipated to be neutral to beneficial.

4.7.4 Table 4.3, below, provides a summary of the key issues to be considered in relation to landscape and visual effects.

Table 4.3 Summary of Likely Significant Effects		
Receptor	**Potential Effects**	**Scoped in**
Construction Phase		
Landscape Character of the Site	Potentially significant effects on landscape receptors, landscape elements, perceptual qualities, and the landscape character of the Site.	✓
Landscape Character areas affected directly by the Proposed Development	Potentially significant effects on landscape receptors, landscape elements, perceptual qualities, and the landscape character of directly affected Landscape Character Areas within the study area.	✓
The overall landscape character of the study area where from the Proposed Development is likely to be visible	The potential effects on landscape character areas not affected directly are unlikely to result in significant effects.	✓
Visual receptors: – Local residents and visitors; – Users of PRoWs; – Employees – Transport receptors	The effects on visual receptors will be assessed from identified representative viewpoint locations. Significant effects are expected for visual receptors located in close vicinity to the Proposed Development.	✓
Operational Phase		
Landscape Character of the Site	Potentially significant effects on landscape receptors, landscape elements, perceptual qualities, and the landscape character of the Site.	✓
Landscape Character areas affected directly by the Proposed Development	Potentially significant effects on landscape receptors, landscape elements, perceptual qualities, and the landscape character of directly affected Landscape Character Areas within the study area.	✓
The overall landscape character of the study area where from the Proposed Development is likely to be visible	The potential effects on landscape character areas not affected directly are unlikely to result in significant effects.	✓
Visual receptors: – Local residents and visitors; – Users of PRoWs; – Employees – Transport receptors	The effects on visual receptors will be assessed from identified representative viewpoint locations. Some visual receptors may still be significantly affected in operation; however, it is expected that the effects will reduce to not significant due to the embedded mitigation measures will become effective in operation.	✓
Decommissioning Phase		
Effects on Landscape character and visual receptors	The potential effects during decommissioning stage will be associated with the dismantling of existing features and restoration of land to the existing use or similar land use.	✓

Table 4.3 Summary of Likely Significant Effects		
Receptor	**Potential Effects**	**Scoped in**
Construction Phase		
	These effects will be similar to effects during construction stage.	

4.7.5 Further to the above, Table 4.4 below provides details on the matters to be scoped out of further assessment within the ES.

Table 4.4 Matters to be scoped out of the assessment	
Matter	**Rationale**
Effects on Grade II Registered Park and Garden - Aswarby Park	The landscape and visual effects are proposed to be scoped out on Aswarby Park Grade II Registered Park and Garden due to the lack of intervisibility between the Proposed Development due to the distance (approximately 5km) and screening provided by intervening vegetation.

4.8 Proposed Methodology

4.8.1 The approach to the assessment of landscape and visual effects will consider both impacts to landscape character and visual receptors and will draw upon the established and best practice standards. These include:

- The Guidelines for Landscape and Visual Impact Assessment (3rd Edition) (GLVIA3), Landscape Institute and Institute of Environmental Management and Assessment, 2013;
- An Approach to Landscape Character Assessment, Natural England, 2014[19]; and
- Visual Representation of Development Proposals, Technical Guidance Note 06/19, Landscape Institute, 2019[20].

Landscape Character Assessment

4.8.2 The Landscape Character assessment will assess the effects of the Proposed Development on the landscape character of the Site and the surrounding landscape within the study area. The effects on the landscape character will be assessed with reference to the effects on the landscape character of the Site and the landscape of the potentially directly affected LCAs and the effects on the landscape character of the study area, where the views of the Proposed Development may be available.

4.8.3 The assessment will assess the value and the susceptibility of landscape character to determine the sensitivity of landscape receptors to the Proposed Development. The nature of the effect that is likely to occur, defined as magnitude, is determined by

[19] An Approach to Landscape Character Assessment, Natural England (2014).
[20] Visual Representation of Development Proposals, Technical Guidance Note 06/19, Landscape Institute, 2019.

consideration of size / scale, geographical extent, duration and reversibility of change to the landscape character.

4.8.4 The nature of the effect that is likely to occur, referred to as magnitude, is determined by considering size / scale, geographical extent, duration and reversibility. A consideration of the sensitivity of the landscape receptors to the development and the magnitude of change resulting from the Proposed Development will define the level of the predicted effects and whether these would be Significant (or Not Significant) in EIA terms. Where necessary, appropriate mitigation will be identified, with the aim of minimising the effects of the Proposed Development.

Visual Assessment

4.8.5 As with the landscape character assessment, the visual assessment would identify the value of the visual receptors within the study area and their susceptibility to the proposed change, which would determine the sensitivity of visual receptors. The magnitude of change will be assessed with reference to the geographical extent, scale, duration, and reversibility. The final conclusions on the significance of effects will be drawn by a combination of sensitivity and magnitude of change to establish the significance of effects. Where necessary, appropriate mitigation will be identified with the aim of minimising the visibility of the Proposed Development.

Cumulative Effects

4.8.6 Potential cumulative impacts (intra and / or inter-cumulative, as appropriate) will be identified and considered as part of the assessment.

4.9 Potential Mitigation Measures

4.9.1 At this stage, no potential additional mitigation measures have been identified; it is anticipated that any potentially adverse effect will be addressed through the embedded mitigation measures described above.

5 ECOLOGY

5.1 Introduction

5.1.1 An assessment will be undertaken of the likely significant effects of the Proposed Development on the environment with respect to Ecology.

5.2 Legislative Context and Guidance

5.2.1 The legislation relevant to the assessment of effects on ecological features includes the below, with more details provided within Appendix 5.1 at the rear of this Scoping Report:

- The Environment Act 2021;
- Conservation of Habitats and Species Regulations 2017 (the 'Habitats Regulations');
- Natural Environment and Rural Communities Act 2006 (the 'NERC Act');
- Countryside and Rights of Way Act 2000 (the 'CRoW Act');
- The Hedgerows Regulations 1997 (the 'Hedgerow Regulations');
- Protection of Badgers Act 1992 (the 'Protection of Badgers Act');
- Wildlife and Countryside Act 1981 (as amended) (WCA); and
- The Water Environment (Water Framework Directive (England and Wales) Regulations 2017.

5.2.2 For the relevant planning policy, please refer to Appendix 1.1 at the rear of this Scoping Report

5.3 Study Area

5.3.1 The study area encompasses the area over which all desk-based and field data have been or will be undertaken to inform the assessment. Owing to the presence of multiple ecological features and many potential effects, the level and type of data collection varies across the study area.

5.3.2 The 'study area' comprises:

- The Site (the initially anticipated developable area produced early in the design process);
- The desk study area for European sites;
- The desk study area for legally protected and notable ecological features; and
- The field survey area(s).

5.3.3 The extent of the desk study area(s) and field survey area (see Table 5.1) were determined based on best practice guidance and a high-level overview of the types of ecological features present, and the potential effects that could occur (see Figure 5.1 to 5.4). The study area was defined on a precautionary basis to ensure that, as a minimum, the Zone of Influence (ZoI) relevant to all ecological features (see Table 5.1) are covered during baseline data collection activities.

Table 5.1 Information Relevant to the Desk Study

Ecological Feature	Example / Description	Desk Study Areas
Statutory sites designated under international conventions or European Directives.	Wetlands of International Importance (also known as Ramsar sites), Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).	The Site and within 20 km of it.
Sites of Special Scientific Interest (SSSIs).	SSSIs designated under the Wildlife and Countryside Act 1981 (as amended) for their biodiversity value.	The Site and within 10 km of it.
Other statutory sites designated under national legislation.	National Nature Reserves (NNRs) and Local Nature Reserves (LNRs).	The Site and within 2 km of it.
Locally designated sites.	In Lincolnshire these are termed as Local Wildlife Sites (LWS)	The Site and within 2 km of it.
Habitats of Principal Importance (HPI) and Species of Principal importance (SPI), Red-listed species21 and legally protected species.	HPIs and SPIs, species recorded on The IUCN Red List of Threatened Species and/or local Red Lists for the UK or relevant sub-units (e.g. regions or counties) and legally protected habitats and species include those listed on Schedules 1, 5 and 8 of the Wildlife and Countryside Act 1981 (as amended), those included on Schedules 2 and 5 of the Habitats Regulations. Badger and Hedgerows are provided protection under the Protection of Badgers Act 1992 and the Hedgerows Regulations 1997 respectively.	The Site and within 1 km of it.
Legally controlled species.	Legally controlled species include those listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).	The Site and within 2 km of it.
Bat roosting locations.	Bat roost locations are considered separately from other species records in accordance with guidance.	The Site and within 5 km of it.

[21] Red listed species for the purposes of this assessment refer to those noted using IUCN criteria as being 'Near Threatened', 'Vulnerable', 'Endangered' and 'Critically Endangered', and those on present on local Red-Lists in the categories 'Nationally Scarce' and 'Nationally Rare'.

Table 5.1 Information Relevant to the Desk Study		
Ecological Feature	**Example / Description**	**Desk Study Areas**
Water body locations.	Water bodies may support species within the groups listed above (for example legally protected great crested newts).	The Site and within 0.5 km of it.

5.4 Current Baseline

5.4.1 The Site is dominated by arable land divided by wet ditches. Less frequently there are hedgerows, with woodland blocks and copses occasionally found.

Statutory Designated Sites

5.4.2 The following internationally designated sites are present within 20 km of the Site (see Figure 5.1):

- The Wash Ramsar is located approximately 15 km east of the Site and is designated for its marine habitats and internationally important populations of migratory and overwintering wetland birds;
- The Wash SPA located approximately 15 km east of the Site and is designated for its internationally important populations of wetland birds during the breeding season and over winter; and
- The Wash and North Norfolk Coast SAC located approximately 15 km east of the Site and is designated for its marine habitats along with populations of harbour seals and otters.

5.4.3 The following SSSIs are present within 10 km of the Site (see Figure 5.2):

- Horbling Fen, located 1.3 km south of the Site (designated for geological reasons);
- Wilsford and Rauceby Warrens, 6. km west of the Site (designated for calcareous grasslands habitats and the species supported within these); and
- Sunfleet Lows, 9.2 km west of the Site (designated for wet meadow habitats with the plant and birdlife that this supports).

5.4.4 There are no NNRs or LNRs present within 2 km of the Site.

Non-statutory Designated Sites

5.4.5 There are 12 LWS present within 2 km of the Site. These are detailed in Table 5.2, below, and illustrated on Figure 5.3.

Table 5.2 Local Wildlife Sites within 2km of the Site	
Site name	**Summary of features**
Beacon Hill Railway Cutting	Supports a good calcareous grassland flora. Additional features include Tussocky vegetation, Abundant nectar sources, bare ground, steep slopes.
Broadhurst Drain East	This 0.73km long channel and its banks extends upstream from Old Forty Foot Drain westwards to a hedge around Broadhurst Farm. The downstream end holds shallow, clear water 1.5m across. On the southern drain bank there is botanically rich, open, managed grassland, whereas the unmanaged northern bank is characterised by a denser and longer sward.
Dove Drain Horbling Fen	This 3.67km long channel and its banks extend upstream from a pumping station. Banks are largely dominated by coarse vegetation, such as cock's-foot. Some good neutral grassland occurs mainly on south-facing banks towards the western end of the site. Scrub and trees are very scarce, although much more numerous in the west. Species present include sycamore, ash, crack willow.
Evedon Wood	A woodland apparently of ancient origin now dominated by ash Fraxinus excelsior with sycamore Acer pseudoplatanus and pedunculate oak Quercus robur, of which there are a few veteran individuals. Ditches and limited areas of damp rides around the site also support a good flora.
Great Hale Eau	The eastern half or section 1 of the drain has a channel width of approximately 1-2m, with earth banks. The banks of the drain support rank grassland with tall ruderal vegetation. There is occasional scrub. There is an area approximately a third of the way along this section with willow trees. There is an active badger Meles meles sett [redacted] The western half or section 2 of the drain has a channel width of approximately 1-2m. There is a fringe of emergent vegetation along the edges of the channel. The banks of the drain support rank grassland with tall ruderal vegetation
Hammond Beck	This is a 2-5m wide and 6km long stretch of Hammond Beck flowing south. The site has a diverse and interesting aquatic and waterside flora, but with rather a lot of algae in places.
Mill Drain	Comprises two connected watercourses. It is characterised by very shallow, clear water over gravel and supports an exceptional aquatic and waterside flora. The banks are also of significant botanical interest.
North Drain, Horbling Fen	1km long and 2-3m wide channel. Common reed occurs rather sparsely, and there is very little woody vegetation, thus allowing a wide range of other wetland plants to flourish. The banks are dominated by coarse and weedy vegetation.
Old Forty Foot Drain	1.94km long channel. Botanical interest declines slowly from south to north. The key aquatic species is the globally threatened fine-leaved water-dropwort, which is common south of Little Hale Drove. Woody species are sycamore, willow, hawthorn, elder, dogrose and bramble.
Old Forty Foot to South Forty Foot Drain	0.95km long channel. At the upstream end, the channel is 0.5m wide, dominated by grassy vegetation and almost dry, whereas central and western parts are 2m wide and hold water to a depth of perhaps 50cm. There is clear water throughout, but with plentiful algae midway along the drain.

Table 5.2 Local Wildlife Sites within 2km of the Site	
Site name	**Summary of features**
South Forty Foot Drain	0.95km long channel. At the upstream end, the channel is 0.5m wide, dominated by grassy vegetation and almost dry, whereas central and western parts are 2m wide and hold water to a depth of perhaps 50cm. There is clear water throughout, but with plentiful algae midway along the drain.
Willow Farm Drain	0.5km long channel. Holds water 1-2m wide that looks highly eutrophic. Both banks are botanically-poor.

Habitats of Principal Importance and Ancient Woodland

5.4.6 Five types of HPI are present within 1 km of the Site. These are listed, below, and illustrated on Figure 5.4:

- Coastal and floodplain grazing marsh;
- Good quality semi improved grassland;
- Deciduous woodland;
- Traditional orchard; and
- Lowland calcareous grassland.

5.4.7 One area of ancient and semi-natural woodland is present within 1 km of the Site. This is Old Wood, which is located approximately 0.9 km north-east of the Site (see Figure 5.4).

Legally Protected Species, Species of Principal Importance and Red-Listed Species

5.4.8 The data search returned the following records within 2 km of the Site:

- One protected invertebrate species (white-letter hairstreak *Satyrium w-album*) and seven other invertebrate SPI;
- Records of great crested newt *Triturus cristatus*;
- Records of 61 bird species, including 13 SPI;
- Records of at least four species of bat; and
- Other terrestrial mammals; water vole *Arvicola terrestris*, otter *Lutra lutra*, badger, brown hare *Lepus europaeus* and hedgehog *Erinaceus europaeus*.

Legally controlled species

5.4.9 Five plant species controlled under the Wildlife and Countryside Act 1981 (as amended) are recorded within 2 km of the Site.

5.5 Design Assumptions

5.5.1 The following outlines the design assumptions. Where possible, any known embedded mitigation measure and limitations are also identified.

5.5.2 For the purposes of Scoping, the following design assumptions have been made:

- Baseline ecological surveys commenced in 2022 and will continue throughout 2023 to determine the current status of biodiversity at the Site.
- It is assumed that the following habitats will be retained by the scheme:
  - Woodlands,
  - Ponds and ditches;
  - Buildings; and
  - The majority of the hedgerows.
- That some pruning of mature trees at the edge of woodland blocks and within hedgerows may be necessary (e.g. to prevent overshading). The woodland edge and trees in hedgerows will be assessed.
- Where mitigation or enhancement is required, including to deliver biodiversity net gain (BNG), the land for this will be within the Site.

5.5.3 During the scoping process, the following limitations apply:

- Baseline surveys are ongoing and those surveys undertaken after Scoping may find the presence of new significant ecological features that could be affected by the Proposed Development.

5.6 Likely Significant Effects

5.6.1 There is the potential for the following impacts during the different phases of Proposed Development which may result in significant effects.

Construction

5.6.2 During the construction phase of the Proposed Development, the following impacts are expected to occur, which may result in significant effects on ecological receptors:

- Land take / land use change. This will include the temporary loss of land (e.g., for the installation of cables and creation of equipment laydown areas). There will also be permanent land take (e.g., for the installation of panels). This will be in primarily arable land and is likely to include an element of habitat creation / enhancement to support BNG.

- Fragmentation of habitats and / or populations. Where a previously continuous ecological network (e.g., hedgerows) is broken up physically (e.g., hedgerow removal) or by light or noise pollution on the hedgerow (or similar) creating a barrier to animals crossing. This can prevent sensitive species (e.g., bats) crossing from their dwellings to their feeding area.
- Disturbance. Where the conditions onsite change (e.g., presence of humans, additional noise, light or vibration), individuals or populations may change their behaviour or range.
- Habitat degradation. The impacts from reduction of the value of the existing habitat from physical means (e.g., soil compaction from construction vehicles) or chemical changes (e.g., pollution of watercourses).
- Mortality or injury of species. These impacts will be as a result of construction activity (e.g., vehicle impact or during habitat clearance).

Operation

5.6.3 During the operation of the Proposed Development, the following impacts may occur on ecological features, which may result in significant effects on ecological receptors:

- Enhancement of habitats. Habitats created in construction (e.g., grassland or new hedgerows) will take a number of years to establish / reach their peak condition. Management during the operational phase will enhance them to provide additional opportunities for wildlife.
- Disturbance / attraction of species. Fauna, especially invertebrates, may be attracted by heat, light or noise produced by the Proposed Development. Where there are concentrations of these species, their predators (e.g., birds or bats) may be attracted, too. Conversely, if invertebrates are attracted by the Proposed Development, but their prey are deterred and stay in historic foraging areas, they may have less food available and, consequently, suffer an adverse impact.
- Potentially creation of dwellings and new infrastructure; and
- Reduction of artificial inputs onto the arable land (i.e. pesticides and fertilisers) and the consequent enhancement of the land and watercourses.

5.6.4 The risk of collision for birds and bats with the solar array panels will also be considered, although it is considered that this is likely to not be a significant risk.

Decommissioning

5.6.5 The impacts on ecological features of decommissioning the scheme are likely to be the same as those during construction.

5.7 Proposed Methodology

5.7.1 Table 5.3, below, provides a summary of the key issues to be considered in relation to ecology.

Table 5.3 Summary of Likely Significant Effects

Receptor	Potential Effects	Scoped In
Construction Phase		
Land take/ Land use change	Loss of habitats. Destruction/modification of animal dwellings. Creation or enhancement of habitats.	✓
Habitat fragmentation	Creation of barriers preventing animals reaching feeding areas. Loss of population mixing and genetic diversity.	✓
Disturbance (light/noise)	The range of a population may be reduced, or their behaviour in an area may be altered.	✓
Habitat degradation (physical/chemical)	Loss of habitats' ability to support protected or notable species.	✓
Operational Phase		
Habitat enhancement	Creation of new/better quality habitats for protected and notable species, including creation of new dwellings.	✓
Disturbance/ attraction	Artificial movement of species, especially invertebrates due to abiotic changes (increased light/heat etc), subsequent loss of these species from their predators' (e.g. bats and birds) foraging areas.	✓
Decommissioning Phase		
Land take/ Land use change	Loss of habitats. Destruction/modification of animal dwellings. Creation or enhancement of habitats.	✓
Habitat fragmentation	Creation of barriers preventing animals reaching feeding areas. Loss of population mixing and genetic diversity.	✓
Disturbance	The range of a population may be reduced, or their behaviour in an area may be altered.	✓
(light/noise)	Loss of habitats' ability to support protected or notable species.	✓

5.7.2 Further to the above, Table 5.4, below, provides details on the matters to be scoped out of further assessment within the EIA.

Table 5.4 Matters to be scoped out of the assessment	
Matter	**Rationale**
N/A	At this stage, it is not possible to identify impacts to scope out of the assessment. The results of the ongoing Preliminary Ecological Assessment (PEA) surveys and the subsequent refinement of the Cable Route Corridor will be used to scope-out impacts during the EIA. These will be detailed within the ES.

Proposed further surveys

5.7.3 The scope of further surveys will be confirmed following the completion of the ongoing Preliminary Ecological Appraisal (PEA), which incorporates a phase 1 habitat survey and scoping for protected species. At present, the further surveys are anticipated to include the following:

- Botanical assessment;
- Terrestrial and aquatic invertebrate survey;
- Reptile presence / absence survey;
- Great crested newt eDNA (presence / absence) and population assessment;
- Breeding bird surveys;
- Wintering bird surveys;
- Preliminary roost assessment of trees for bats, tree climbing and bat emergence and return survey;
- Bat activity survey;
- Badger surveys, including territory bait marking surveys; and
- Riparian mammal surveys (i.e., otter and water vole).

5.7.4 The survey areas for the further surveys will be the Site and up to 50 m from the Site. The exceptions to this are:

- Great crested newt surveys, which will be carried out up to 0.5 km from the order limits; and
- Riparian mammal surveys, which will be carried out up to 200 m from the order limits on waterbodies that lie partially within the order limits.

Valuing Ecological Features

5.7.5 Where protected species are present and there is the potential for a breach of the legislation, those species should always be considered as 'important' features. With the exception of such species receiving specific legal protection or those subject to

legal control (e.g., invasive species), all ecological features that were determined to be important at negligible level would be scoped out of the assessment at the ES stage. Further, ecological features of local importance, where there was a specific technical justification, will be scoped out in the ES. This is because a significant effect in EIA terms could not occur and would not influence the decision-making about whether or not consent should be granted for the Proposed Development. This approach is consistent with that described in the CIEEM (2018) Guidance.

5.7.6 All legally protected species and ecological features that are of sufficient importance were then taken through to the next stage of the scoping assessment.

5.7.7 The generic project-wide approach to the assessment methodology is set out in Section 3.2. However, whilst this will inform the approach that will be used in the assessment, it will be aligned with the standard industry guidance provided by the CIEEM (2018) Guidance.

5.7.8 The assessment will be based upon the results of the desk study and field surveys, as well as any relevant published information (e.g., on the status, distribution, sensitivity to environmental changes and ecology of the features scoped into the assessment, where this information is available) and professional knowledge of ecological processes and functions.

5.7.9 Where part of a designated site is located within the ecological ZoI relating to a particular biophysical change as a result of the Proposed Development, an assessment will be made of the effects on the designated site as a whole. A similar approach will be taken for areas of notable habitat.

5.7.10 For the fauna species that are present within the ZoI, the assessment will consider the total area that is used by the affected individuals and / or the local population of the species (e.g. for foraging or as breeding territories).

5.7.11 The importance of each feature within the Proposed Development will be determined through the ongoing baseline survey work. Following the Chartered Institute of Ecology & Environmental Management's (CIEEM) 2018 Guidance[22], the importance of ecological features is first determined with reference to UK legislation and planning policies and then with regard to the extent of habitat or size of population that may be affected by the Proposed Development.

5.7.12 As the importance of ecological features is determined with regard to the extent of habitat or size of population that may be affected by the Proposed Development, each

[22] CIEEM 2018 Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.

status can differ from that which would be conferred by legislative protection or identification as a conservation notable species. For example, house sparrow is important at a national level because it is a SPI and features on the Birds of Conservation Concern (BoCC) Red-List. However, a small population that could be affected by a development would be assessed as being of less than national importance due to the large, albeit declining, national population (in excess of 5 million pairs). Similarly, a small length of hedgerow, an HPI, even if deemed to be 'important' with regard to the Hedgerow Regulations may be considered to be less than of national importance due to the extent of this habitat type across a given county.

5.7.13 Wherever possible, information regarding the extent and population size, population trends and distribution of the ecological features has been used, to inform the categorisation described in Table 5.5 to determine importance at the project level. Where detailed criteria or contextual data are not available, professional judgement was used to determine importance.

Table 5.5 Importance of the Proposed Development for Ecological Features affected by the proposed development

Geographic context of importance	Example / Description
International or European	1. European sites including SPAs, SACs, candidate SACs and Sites of Community Importance (SCI). Potential SPAs (pSPA), possible SACs (pSACs), Ramsar sites (designated under international convention) and proposed Ramsar sites should also be considered in the same manner in accordance with national planning policy. 2. Areas of habitat or populations of species[23] which meet the published selection criteria based on discussions with Natural England and field data collected to inform the EcIA for designation as a European site or Ramsar site, but which are not themselves currently designated at this level.
National	1. A nationally designated site including SSSIs and National Nature Reserves (NNRs). 2. Areas (and the populations of species which inhabit them) which meet the published selection criteria guidelines for selection of biological SSSIs but which are not themselves designated based on field data collected to inform the EcIA, and in agreement with Natural England. 3. HPI and SPI, Red listed and legally protected species that are not addressed directly in Part 2 of the Guidelines for Selection of Biological SSSIs, but can be determined to be of national importance using the principles described in Part 1 of the guidance.

[23] This includes habitats and species listed under Annex I and Annex II of the Habitats Directive, birds listed under Annex I of the Birds Directive and all regularly occurring migratory birds.

Table 5.5 Importance of the Proposed Development for Ecological Features affected by the proposed development	
Geographic context of importance	**Example / Description**
	4. Areas of Ancient Woodland e.g. woodland listed within the Ancient Woodland Inventory and ancient and veteran trees.
Regional	1. Regularly occurring HPI and populations of SPI, Red-listed and legally protected species may be of regional importance in the context of published information on population size and distribution.
County	1. LNRs and Non-Statutory Designated sites - LWSs designated in the county/metropolitan context. 2. Areas which based on field data collected to inform the Ecological Impact Assessment (EcIA) meet the published selection criteria for those sites listed above (for habitats or species, including those listed in relevant Local Biodiversity Action Plans (BAP)) but which are not themselves designated.
Local	1. HPI and SPI, Red listed and legally protected species that based on their extent, population size, quality etc are determined to be at a lesser level of importance than the geographic contexts above. 2. Common and widespread semi-natural habitats occurring within the study area in proportions greater than may be expected in the local context. 3. Common and widespread native species occurring within the study area in numbers greater than may be expected in the local context.
Negligible	1. Common and widespread semi-natural habitats and species that do not occur in levels elevated above those of the surrounding area. 2. Areas of heavily modified or managed land uses (e.g. hard standing used for car parking, as roads etc.)

Overview

5.7.14 The CIEEM (2018) Guidance defines a significant effect as one "*that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general*".

5.7.15 When considering potentially significant effects on ecological features, whether adverse or beneficial, the following characteristics of environmental change are taken into account:

- Extent – the spatial or geographical area over which the environmental change may occur;
- Magnitude – the size, amount, intensity or volume of the environmental change;
- Duration – the length of time over which the environmental change may occur;
- Frequency – the number of times the environmental change may occur;

- Timing – the periods of the day/year etc. during which an environmental change may occur; and
- Reversibility – whether the environmental change can be reversed through restoration actions.

Magnitude of change

5.7.16 The characteristics described above are all important in assessing effects by using information about the way in which habitats and species are likely to be affected. The scale for the magnitude of the environmental change (i.e. impact) as a result of the Proposed Development is described within Table 5.6 and will be used to provide an understanding of the relative change from the baseline position.

Table 5.6. Magnitude of Change

Scale of Change	Criteria and resultant effect
High	The change permanently (or over the long-term) affects the conservation status of a habitat/species, reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area. Relative to the wider habitat resource / species population, a large area of habitat or large proportion of the wider species population is affected. For designated sites, integrity is compromised. There may be a change in the level of importance of the receptor in the context of the project.
Medium	The change permanently (or over the long term) affects the conservation status of a habitat/species reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area. Relative to the wider habitat resource/species population, a small-medium area of habitat or small-medium proportion of the wider species population is affected. There may be a change in the level of importance of this receptor in the context of the project.
Low	The quality or extent of designated sites or habitats or the sizes of species' populations, experience some small-scale reduction or increase. These changes are likely to be within the range of natural variability and they are not expected to result in any permanent change in the conservation status of the species / habitat or integrity of the designated site. The change is unlikely to modify the evaluation of the receptor in terms of its importance.
Very Low	Although there may be some effects on individuals or parts of a habitat area or designated site, the quality or extent of sites and habitats, or the size of species populations, means that they would experience little or no change. Any changes are also likely to be within the range of natural variability and there would be no short-term or long-term change to conservation status of habitats/species receptors or the integrity of designated sites.
Negligible	A change, the level of which is so low, that it is not discernible on designated sites or habitats or the size of species' populations, or changes that balance each other out over the lifespan of a project and result in a neutral position.

Determining Significance

5.7.17 Adverse effects are assessed as Significant if the favourable conservation status of an ecological feature would be lost as a result of the Proposed Development. Beneficial effects are assessed as those where a resulting change from baseline improves the quality of the environment (e.g. increases species diversity, increases the extent of a

particular habitat or halts / slows down an existing decline). For a beneficial effect to be Significant, the conservation status would need to positively increase in-line with a magnitude of change of 'High', as described in Table 5.6, above.

5.7.18 Conservation status is defined as follows (as per the CIEEM 2018 Guidance):

- "For habitats, conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and typical species within a given geographical area;
- For species, conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area."

5.7.19 The decision as to whether the conservation status of an ecological feature would alter will be made using professional judgement, drawing upon the information produced through the desk study, field survey and assessment of how each feature is likely to be affected by the Proposed Development.

5.7.20 A similar procedure will be used where designated sites may be affected by the Proposed Development, except that the focus will be on the effects on the integrity of each site, defined as "The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and / or the levels of populations of the species for which it was classified". The assessment of effects on the integrity of each site will draw upon the assessment of effects on the conservation status of the features for which the site has been designated.

Cumulative Effects

5.7.21 Potential cumulative impacts (intra and / or inter-cumulative, as appropriate) will be identified and considered as part of the assessment.

5.8 Potential Mitigation Measures

5.8.1 The mitigation measures will be dependent upon the ecological features found during the baseline survey. This will include assessing the condition of habitats to provide a baseline for BNG. Once the value of the ecological features and the likely effects on them are fully understood, the following mitigation hierarchy will be adopted:

- Avoid impacts (e.g. move aspects of the Proposed Developments to avoid features entirely);
- Minimise impacts (e.g. reducing the area of land take); and
- Restore after impacts (e.g. restoring a habitat damaged during construction).

5.8.2 If none of the above can be carried out, compensation (e.g. creating habitat where it was not previously found) would be undertaken.

5.8.3 As much as possible, the Proposed Development design will be guided to avoid ecological impacts. The mitigation to be described in the PEIR and Ecology ES chapter will focus on minimising, restoring and compensating for impacts that cannot be avoided. Where the design incorporates avoidance of ecological features, this will be identified. The proposed mitigation will be designed to be proportionate to the value of the feature and consequent impacts of the Proposed Development. Where there is uncertainty in the level of effect, a precautionary approach will be taken.

5.8.4 To support BNG appropriate to the landscape, strategically significant habitats (e.g. valuable habitats which are limited or have been lost from the local area) will be restored or created where practical. Such habitats will be identified by referring to available guidance such as Natural England's National Character Area profiles or Local Nature Recovery Strategy.

6 CULTURAL HERITAGE

6.1 Introduction

6.1.1 An assessment will be undertaken of the likely significant effects of the Proposed Development on the environment with respect to cultural heritage (comprising built heritage, archaeology and the historic landscape). The purposes of this assessment will be 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 any likely effects.

6.2 Study Area

6.2.1 The study area for designated heritage assets would be set at 5km from the Site boundary. However, this approach will be flexible and considerate of an asset's importance. Assets beyond the 5km study area may also be considered; this would be driven by the technical team and / or the County Archaeologist and the LPA Conservation Officer. This will also be guided by the Proposed Development's Zone of Theoretical Visibility (ZTV), which will be prepared as part of the Landscape and Visual Impact Assessment (LVIA) chapter. However, it is appreciated that effects to the setting of a heritage assets are not solely visual. The study area for non-designated heritage assets will be set at 2km from the Site boundary. This will allow for all cultural heritage assets to be set within their wider context.

6.2.2 The study area has been identified through consideration of Lincolnshire County Council's (LCC) guidance for National Significant Infrastructure Projects (NSIP) and will include both built heritage and archaeological assets; thereby allowing for the Site to be put within a wider archaeological and historical context.

6.3 Legislation Context and Guidance

6.3.1 Legislation and guidance relating to cultural heritage and pertinent to the Proposed Development is listed, below. For the relevant planning policy, please refer to Appendix 1.1 at the rear of this Scoping Report.

Legislation

- Infrastructure Planning (Decisions) Regulations 2010;
- Planning (Listed Buildings and Conservation Areas) Act 1990; and
- Ancient Monuments and Archaeological Areas Act 1979 and 2002).

National Guidance

- Planning Practice Guidance, Section 16: Conserving and enhancing the historic environment;
- Historic Environment Good Practice Advice in Planning Note 2. Managing Significance in Decision Taking in the Historic Environment: Historic England;
- Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets: Historic England (2017);
- Historic Environment Statement of Heritage Significance: Analysing Significance in Heritage Assets: Historic England Advice Note 12: Historic England (2019);
- Commercial Renewable Energy Development and the Historic Environment: Historic England Advice Note 15 (2021); Chartered Institute for Archaeologists (CIfA) Standard and Guidance for Historic Environment Desk-Based Assessment;
- CIfA Code of Conduct; and
- Institute of Environmental Management and Assessment (IEMA), the Institute of Historic Building Conservation (IHBC) and the Chartered Institute for Archaeologists (CifA).

6.4 Current Baseline

Designated Heritage Assets

6.4.1 There are no designated heritage assets record within Beacon Fen North and Beacon Fen South. It should be noted, however, that the Scheduled Monument of Thorpe Latimer medieval moated site, settlement and cultivation remains, post medieval park and garden borders Beacon Fen South.

6.4.2 There are seven designated heritage assets recorded within the Cable Route Area. These comprise the following:

- Roman Saltern in Helpringham Fen (NHLE 1004962: Scheduled Monument);
- The Manor House (NHLE 1061818: Grade II Listed Building);
- Normanton House and Outbuilding (NHLE 1271843: Grade II Listed Building);
- Farm buildings to the south-east of Normanton House (NHLE 1271844: Grade II Listed Building);
- Methodist Chapel (NHLE 1169014: Grade II Listed Building);

- Iron Footbridge at Boughton House (NHLE 1306997: Grade II Listed Building); and
- Boughton House (NHLE 1061835: Grade II Listed Building).

6.4.3 The designated heritage assets present within 1km of the Site comprise:

- Seven Scheduled Monuments;
- Three Conservation Areas;
- Six Grade I Listed Building;
- Three Grade II* Listed Buildings; and
- 58 Grade II Listed Buildings.

6.4.4 The designated heritage assets present between 1km and 3km from the Site comprise:

- 11 Scheduled Monuments;
- Three Conservation Areas;
- Five Grade I Listed Buildings;
- Six Grade II* Listed Buildings; and
- 64 Grade II Listed Buildings.

6.4.5 The designated heritage assets present between 3km and 5km from the Sites comprise:

- 11 Scheduled Monuments;
- Four Conservation Areas;
- Nine Grade I Listed Buildings;
- Eight Grade II* Listed Buildings;
- 209 Grade II Listed Buildings; and
- One Grade II Registered Park and Garden.

6.4.6 These are shown on Figure 6.1 to Figure 6.3.

Non-Designated Heritage Assets

6.4.7 The identification of non-designated heritage assets within the Site has been split into the following three areas:

- Beacon Fen North;
- Beacon Fen South; and

- Cable Route Area.

Beacon Fen North

6.4.8 Within Beacon Fen North, the Lincolnshire Historic Environment Record (HER) identifies five non-designated assets. Within a wider 2km vicinity of the Site, the HER records features spanning all archaeological periods. A high-level summary of key assets is presented below. A comprehensive summary of baseline information will be provided as part of an Archaeological Desk-Based Assessment (DBA) and Aerial Assessment.

6.4.9 Those assets recorded within Beacon Fen North relate to the prehistoric and medieval periods and are listed, below:

- Medieval pottery figure found on Ewerby Common (MLI89396): located in parcel A;
- Flint axe found on Ewerby Waithe Common (MLI89392): located in parcel A;
- Medieval cropmark and earthwork field system (MLI88982): located in the north-western extents of parcels B and C. This large field system extends west of the plot and is 3.9km in length;
- Cropmark undated boundary ditch (MLI90710): located within parcel D; and
- Worked flints (NLI60542) and medieval pottery (MLI60543): located within parcel D.

Beacon Fen South

6.4.10 Within Beacon Fen South, the LHER records 12 non-designated assets. Within a 2km vicinity of the Site, the HER records features spanning all archaeological periods. A high-level summary of key assets is presented, below. A comprehensive summary of baseline information will be provided as part of an Archaeological DBA and Aerial Assessment.

6.4.11 The features recorded within Beacon Fen South relate to the prehistoric, medieval and post medieval periods and are listed, below:

- Settlement of Burton Pedwardine, thought to originate in the early medieval period (HER MLI89977): located within parcels E and F;
- Bronze Age Flint arrowhead found near Gorse Farm (HER MLI90539): located within parcel F;
- Post Medieval Poplar Farm (Gorse Farm) (HER MLI121449): located within parcel G;

- Post medieval Field Farm South (HER MLI122031): located within parcel G;
- Post medieval The Field farmstead (HER MLI122032): located within parcel G;
- Post medieval unnamed farmstead (HER MLI122030): located within parcel G;
- Medieval ridge and furrow surrounding Thorpe Latimer, a deserted settlement (HER MLI90028): located within parcel H;
- Post medieval park and garden at Thorpe Latimer (HER MLI60012): located within parcel H;
- Neolithic flint axe at Pear Tree farm (HER MLI115923): located within parcel I;
- Dressed stone found near Pear Tree farm (HER MLI90032): located within parcel I;
- Undated bank and ditch to the west of the Car Dyke (HER MLI90033): located within parcel I; and
- Roman artefact scatter (HER MLI85863): located within parcel I.

Cable Route Area

6.4.12 There are a total of 144 non-designated heritage assets recorded by the HER within the Cable Route Area. The assets recorded date from the prehistoric period onwards. Owing to the number of the assets recorded, these have not been listed, but all recorded assets within the corridor are presented on Figure 1.2 Redline Boundary (with hatching).

Archaeological Background

6.4.13 The archaeological background included, here, is a summary of the HER information. A full, detailed background will be provided as part of the Archaeological DBA.

Prehistoric (Bronze Age and earlier)

6.4.14 Evidence for the prehistoric period is limited to single finds and cropmarks identified through aerial photography. The earliest recorded evidence is dated to the Neolithic period. The finds comprise of flint axes, stone axes, bronze axes, worked flints, flint scatters and pottery. The prehistoric evidence is limited as the Site moves further south, and away from the River Slea; there is still potential for transient activity within the southern extent.

6.4.15 Aerial photography has identified a possible Bronze Age barrow alongside an enclosure and ring ditch of unknown date (HER NLI86039) located 905m north of the Site. The probable barrow is located to the north of the River Slea, which, at its closest

point, is located 485m north of the Site. The river would have been a source of water for prehistoric populations and it would have been within an area of fertile ground. Although unconfirmed, the presence of a barrow would be indicative of settlement activity within the wider area.

Iron Age and Romano-British

6.4.16 The Iron Age and Roman period, unlike the Prehistoric period, contains a higher amount of evidence the further south in the Site. However, there is a lack of evidence for the Iron Age with records spanning both the Iron Age and Roman periods, thus suggesting potential activity within the area from the late Iron Age onwards. Evidence for Iron Age / Roman activity comprises a salt working site (HER MLI90008) and a pottery scatter (HER MLI90010). Salt working continues into the Roman period, with a further site identified solely from this period. The Iron Age is also represented through a single ditch (HER MLI82553) located 885m north-west of the Site; identified during a watching brief.

6.4.17 Roman activity is represented by the Car Dyke, an artificial water channel thought to have been constructed by the Romans in 125AD, which runs along the eastern boundary of Beacon Fen North and Beacon Fen South, it also extends through the Cable Route Area. A scheduled section of the dyke is located to the immediate south-east of the Site, although the artificial waterway continues on a north-south alignment. A possible Roman settlement is recorded straddling the waterway (HER MLI90004-5), 425m north-east of the Site. Other finds associated with the period include coins, pottery and a trackway.

6.4.18 The evidence suggests there was little activity during the Iron Age period with a significant increase in activity during the Roman period.

Early Medieval

6.4.19 Evidence for the early medieval period is represented by the shrunken setting of Howell (HER MLI84590) and the settlement of Ewerby Thorpe (MLI89429), located 5m south-west and 165m west of the Site. Further evidence for the early medieval period is demonstrated by settlements at Burton Pedwardine, Helpringham and Swaton. Helpringham is located 260m east of the Site and Swaton is located 625m south of the Site. These settlements are recorded in the Domesday Book and are thought to originate from the early medieval period. The close proximity of the settlements to the Site and settlement at Burton Pedwardine extending into the Site, suggests the land within the Site was likely utilised during the early medieval period, although this is likely to have been for agricultural purposes.

6.4.20 Evidence is also seen through Saxon finds, pottery and an unidentified bronze object (MLI89848), located 735m south-west of the Site. The finds are further evidence of activity within the wider area. Further evidence can be seen through Beacon Hill, which is a possible early medieval meeting place for the wapentake of Aswardhurn between AD 900 and 1065 (HER MLI60747). Other evidence includes a spindle whorl at Helpringham and, the Church of St Andrew, and associated churchyard, at Burton Pedwardine.

Medieval

6.4.21 The medieval period is represented within the Site and the wider vicinity through settlement and agricultural evidence including ridge and furrow within southern extent of the Site. The most significant asset is the medieval moated site, settlement and cultivation remains, post-medieval park and garden at Thorpe Latimer (NHLE 1010708). The Latimer family established a manor after the Norman conquest. The Scheduled Monument description records earthworks of a moated platform and a medieval hamlet alongside ridge and furrow. The HER also records Thorpe Latimer as being a deserted medieval settlement.

6.4.22 This period saw some growth within the wider area including Howell Hall and St Oswald's church and churchyard, which contains the Scheduled Monument of St Oswald's Churchyard Cross (NHLE 1009228). This cross is located 165m south-west of the Site within Howell. Other evidence from this period includes earthworks, ridge and furrow, former field systems, pottery scatters, an old wood and findspots (pottery and half a mirror case).

6.4.23 Further evidence for this period is seen at Helpringham through several areas of medieval ridge and furrow, manor farmhouse and St Andrew's Church and Churchyard. A moated site is also recorded at Burton Pedwardine.

6.4.24 Considering the above, there is a significant increase in settlement during this period with some remains extending into the Site, in the form of ridge and furrow.

Post-medieval

6.4.25 The post medieval period is the most represented period within the vicinity of the Site and records attest towards significant growth within the wider area. Gashes Barn, which is located within the north-east extent of the Site (although outside of the Site boundary) was constructed at this time. Several farmsteads are recorded within the wider area alongside Howell Hall, houses and Old Rectory.

6.4.26 Remains, beyond buildings, comprise of four demolished farmsteads, Sleaford Navigation canal, ridge and furrow, two square enclosures, two parks and parkland

associated with Howell Hall. The evidence shows a continuation of agriculture within the plot with expansion, development and growth of the rural community within the wider vicinity. The evidence suggests a significant growth in agricultural activity and local industry.

6.4.27 Historic Ordnance Survey (OS) maps from 1880's shows the Site subject to regular enclosure with farmsteads recorded. When reviewing satellite imagery via Google Earth from 1995 onwards, there is evidence that some fields opened.

Modern

6.4.28 The modern period contains limited remains including two war memorials, a resistance hide and a school at Swaton. The resistance hide was built during the Second World War for British Auxiliary Units in the event of a German invasion. Modern OS mapping shows a continuation of agriculture through regular enclosures of the fields with some fields being combined in the late 20th century / early 21st century although the earlier enclosure has largely been retained.

6.5 Design Assumptions

6.5.1 The following outlines the design assumptions. Where possible, any known embedded mitigation measure and limitations are also identified.

6.5.2 The Proposed Development will incorporate a number of designed-in mitigation measures during the construction and/or operation periods, which may include:

- Buffers / stand-offs to sensitive heritage assets / receptors;
- Both Beacon Fen North and Beacon Fen South will have battery energy storage systems (BESS) capabilities and associated equipment;
- Cable route connections will be below ground wherever possible within Beacon Fen North and Beacon Fen South, but there may be some above ground / overhead cabling requirement;
- Reinforcement and enhanced management of existing vegetation structures and patterns;
- New planting to provide visual screening to sensitive heritage assets / receptors;
- Solar arrays to be constructed on galvanised steel piles driven between 1 – 2m into the ground;
- Soil strips restricted to the location of the substations, storage buildings, compounds and roadways (unless no-dig methods are utilised);

- Solar arrays to be up to 4.5m high;
- Sub and electrical stations and compounds construction on concrete slab foundations;
- Non-designated heritage assets could be directly affected by the development footprint;
- Designated heritage assets could be directly affected through ground disturbance associated within the cable route or in-directly affected through a change in their setting; and
- Key elements of the historic landscape (including hedgerows) will be retained where possible.

6.6 Likely Significant Effects

Construction Phase

6.6.1 There are a number of non-designated heritage assets within the Site and a number of designated and non-designated assets within the study area that may be affected by the construction of the Proposed Development.

6.6.2 Ground disturbance has the potential to remove / truncate remains of archaeological and historic interest. The baseline undertaken to inform this Scoping Report has confirmed that there is evidence of archaeological activity across the Site. This includes potential buried archaeological remains, which are of unknown date at present.

6.6.3 There is potential for previously unrecorded archaeological deposits to survive within the Site boundary. These remains could potentially be affected during excavation works required during construction of the elements of the scheme as set out in Chapter 2.

6.6.4 There is also the potential for effects on the setting of non-designated archaeological assets within the study area to be impacted during the construction of the Proposed Development.

6.6.5 Built Heritage assets and the historic landscape may be temporarily impacted through the visual presence of construction equipment and associated noise within the area during the construction phase.

Operational Phase

6.6.6 There will be no operational impacts to the archaeological resource as a result of operation of the Proposed Development.

6.6.7 Operation of the Proposed Development has the potential to impact the significance of Built Heritage assets within the vicinity of the Site as a result of introducing changes within their setting. The baseline has highlighted a number of Built Heritage assets to be assessed within the ES.

6.6.8 The likely significant effects of the Proposed Development on the significance of the built heritage resource will be assessed within a Heritage Statement, which will assess the potential impact to the significance of cultural heritage assets. The Heritage Statement will be prepared as a standalone report and included within the Technical Appendices of the ES. The assessment of the likely significant effects will be set out within the Cultural Heritage ES chapter.

6.6.9 If the cable route is constructed exclusively below ground, indirect impacts to the significance of heritage assets from this element of the Proposed Development could be scoped out of further assessment.

Decommissioning Phase

6.6.10 There will be no impacts to the archaeological resource as a result of the decommissioning of the Proposed Development.

6.6.11 Decommissioning of the Proposed Development has the potential to impact the significance of Built Heritage assets within the vicinity of the Site as a result of introducing changes within their setting. Decommissioning is anticipated to comprise the removal of the proposed solar arrays, BESS and infrastructure equipment and return of the land to current use. Built Heritage assets and the historic landscape may be temporarily impacted through the visual presence of construction equipment and associated noise within the area during the decommissioning phase.

6.6.12 Table 6.1, below, provides a summary of the key issues to be considered (scoped in) to the assessment in relation to archaeology and cultural heritage.

Table 6.1 Summary of Likely Significant Effects

Receptor	Potential Effects	Scoped In
Construction Phase		
Archaeological Assets	Physical impacts to the archaeological resource.	✓
Built Heritage Assets	Temporary impacts to the setting of built heritage assets which may temporarily affect the assets significance.	✓
Historic Landscape	Impacts to historic landscape as a result of the construction phase.	✓
Operational Phase		
Archaeological Assets	There should be no impacts to the archaeological resource during this phase of works.	X

Table 6.1 Summary of Likely Significant Effects		
Receptor	**Potential Effects**	**Scoped In**
Construction Phase		
Built Heritage Assets	Temporary, long-term impacts to the setting of built heritage assets.	✓
Historic Landscape	Temporary, long term impacts due to the change of use of the historic landscape.	✓
Decommissioning Phase		
Archaeological Assets	Assuming the existing access tracks are being utilised, and there is no ground disturbance beyond that undertaken in the construction phase, there would be no impact to the archaeological resource.	✓
Built Heritage Assets	Indirect impacts to the significance of built heritage should be limited to the presence of construction vehicles within the vicinity of the Site. These would be temporary impacts.	✓
Historic Landscape	The landscape should be restored to its original use, as such there would be no impact to the historic landscape.	✓

6.6.13 Further to the above, Table 6.2, below, provides details on the matters to be scoped out for further assessment within the EIA.

Table 6.2 Matters to be scoped out of the assessment	
Matter	**Rationale**
Construction Phase	
Built Heritage Assets	Direct physical effects on assets beyond the Site boundary on the basis that there will be no construction activities beyond the Site that could have a direct physical effect on the significance of the heritage assets.
Operational Phase	
Archaeological assets	Direct physical effects on assets during the operation of the Proposed Development (as physical effects will only occur during the construction which will be mitigated as required).
Built Heritage Assets	Direct physical effects on assets beyond the Site boundary on the basis that there will be no operational activities beyond the Site that could have a direct physical effect on the significance of the heritage assets.
Decommissioning Phase	
Archaeological assets	Direct physical effects on assets during the decommissioning phase of the Proposed Development (as physical effects will only occur during the construction which will be mitigated as required)
Built Heritage Assets	Direct physical effects on assets beyond the Site boundary on the basis that there will be no decommissioning activities beyond the Site that could have a direct physical effect on the significance of the heritage assets.
Historic Landscape	During the decommissioning phase the landscape will be restored to its original use and, as such, there will be no impacts to the Historic Landscape during this phase.

6.7 Proposed Methodology

6.7.1 The ES will be supported by the following documents:

- Heritage Statement;
- Archaeological Desk Based Assessment;
- Aerial Assessment; and
- Archaeological Evaluation Fieldwork Reports.

6.7.2 The Heritage Statement will include reference to the ZTV, to field observations and primary and secondary resources. With regards to the Scheduled Monument of Thorpe Latimer, which is in close proximity to the Site boundary, consultation with Historic England will be undertaken as part of the preparation of the Heritage Statement.

6.7.3 Any mitigation measures deemed necessary will be set out in the Cultural Heritage ES chapter and will take account of the available baseline information and pre-application discussions with stakeholders including the Lincolnshire County Archaeology, Historic England and the LPA Conservation Officer.

6.7.4 The assessment of the likely significant effects of the Proposed Development on built heritage will be undertaken following Historic England's best practice guidance presented in the Setting of Heritage Assets (2017), specifically utilizing the five-step approach to assessment and presented within Statements of Heritage Significance (2019).

6.7.5 A Geophysical survey is proposed to be undertaken from April 2023 to determine the presence of archaeological remains and to inform the necessity, extent and location of further archaeological evaluation fieldwork to be informed by discussions within the Lincolnshire County Council Archaeologist.

6.7.6 An Archaeological DBA and Aerial Assessment will be undertaken. These will be prepared as standalone reports and included within the Technical Appendices to the Cultural Heritage ES chapter. The assessment of the likely significance of effects will be set out within the Cultural Heritage ES chapter.

6.7.7 Further discussions will be held with the Lincolnshire County Council Archaeologist during the preparation of the EIA, to ascertain the need for/detail of any further archaeological investigation and necessary mitigation, including in relation to any requirement to be proposed in the DCO in respect of the same.

6.7.8 The assessment of potential effects as a result of the Proposed Development on cultural heritage will be undertaken using the methodology set out, below.

6.7.9 The value of a heritage asset (and its heritage significance) is guided by its designated status, but is also derived from its heritage interest, which may be archaeological, architectural, artistic or historic. Each identified heritage asset can be assigned a value as set out in Table 6.3, below. Using professional judgement and the results of consultation, heritage assets are also assessed on an individual basis and regional variations and individual qualities are taken into account, where applicable.

Table 6.3 Criteria for assessing the value of heritage assets

Asset Value	Description (to be used alongside professional judgement)
Very High	World Heritage Sites
High	Scheduled Monuments Grade I and II* Listed buildings. Registered Battlefields Grade I and II* Registered Parks and Gardens Conservation Areas of demonstratable high value Non-Designated heritage assets that could be shown to have demonstrable national importance. Well preserved historic landscape character areas, exhibiting considerable, coherence, time-depth or other critical factors
Medium	Grade II Listed Buildings Conservation Areas Grade II Registered Park and Gardens Non-Designated Heritage Assets which have demonstrable regional importance Historic landscape character areas which have been reasonably preserved Historic townscapes with historic integrity
Low	Locally Listed Buildings Non-Designated Heritage Assets which have demonstrable local important Assets whose values are comprised by poor preservation or survival of contextual associations to justify inclusion into a higher grade. Historic landscape character areas whose value is limited by poor preservation and / or poor survival of contextual associations.
Very Low	Assets which have no archaeological, architectural, artistic or historic value Landscape with no or little significant historical merit

6.7.10 Once the value has been identified, the next stage in the assessment will be to identify the level and degree of impact to an asset arising from the Proposed Development. Impacts may arise during construction, operation and / or decommissioning 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.

6.7.11 Impact magnitude will be assigned with reference to a four-point scale, as set out in Table 6.4 below. The assessment of impact magnitude will be made in consideration of any design mitigation (embedded mitigation). If no impact is identified, no impact rating will be given and no effect reported.

Table 6.4 Factors influencing the assessment of magnitude of impacts

Magnitude of Impact	Description of Impact
High	Changes such that the asset and its significance is totally altered or destroyed. Comprehensive change to, or total loss of, elements of setting that would result in harm to the asset and the ability to understand and appreciate its significance.
Medium	Change such that the asset and its significance is significantly altered or modified. Changes such that the setting of the asset is notably different, affecting the significance and resulting in changes in the ability to the understand and appreciate the significance of the asset.
Low	Changes such that the significance of the asset is slightly altered. Changes to the setting that have a slight impact on the 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.

6.7.12 The assessment will consider potential effects on cultural heritage. In relation to this, the following steps for 'cultural heritage' are proposed:

- Review and integrate aerial photographic transcription into baseline;
- Review and integrate geophysical results into baseline;
- Undertake site walkover and setting assessment for key sensitive heritage receptors;
- Engage with relevant disciplines such as landscape, noise and glint and glare to better understand the potential for impacts from mitigation upon the historic environment;
- Produce a draft assessment chapter;
- Consult with relevant stakeholders as necessary throughout the process;
- Produce a draft Archaeological DBA;
- Produce a draft Heritage Statement; and
- Produce a draft Cultural Heritage ES chapter.

6.7.13 The search area for the assessment will be further refined considering the results of the baseline data collection and the site walkover and setting assessment.

6.7.14 Direct impacts will be presented and tabulated using the impact assessment methods and criteria outlined in Table 6.4. Indirect impacts would be presented and tabulated as outlined as detailed, above. This will be supported by professional judgement and the principles detailed within the following:

- Code of Conduct, Chartered Institute for Archaeologists, (CIfA, 2020a);
- Conservation Principles: Policies and Guidance for the Sustainable Management of the Historic Environment, (Historic England, Consultation Draft, November 2017);
- Historic Environment Good Practice Advice in Planning Note 3 (second edition):
- The Setting of Heritage Assets (Historic England, 2017); and
- Standard and Guidance for Historic Environment Desk-Based Assessment, (CIfA, 2020).

6.7.15 The assessment chapter will be used as a basis for the Cultural Heritage ES chapter, which will identify:

- Potential effects including potential cumulative effects, as appropriate;
- Mitigation measures to avoid, minimise or reduce adverse impacts, where possible; and
- Residual effects based on the impact assessment and proposed mitigation.

Cumulative Effects

6.7.16 Any potential cumulative impacts (intra and / or inter-cumulative, as appropriate) will be identified and considered as part of the assessment.

6.8 Potential Mitigation Measures

6.8.1 Indicative mitigation measures may include the following, where appropriate:

- Vegetative screening;
- Stand off from Heritage Assets;
- Programme of archaeological evaluation and mitigation works established through consultation with the Lincolnshire County Council Archaeologist; and
- Retention of Historic Landscape Features such as historic hedgerows and historic boundaries.

7 ACCESS & TRAFFIC

7.1 Introduction

7.1.1 An assessment will be undertaken of the likely significant effects of the Proposed Development on the environment with respect to traffic and access during the construction phase. It is proposed that the operational and decommissioning phase effects of are scoped out of the assessment for reasons that are set out below.

7.2 Study Area

7.2.1 The study area for the assessment of the likely significant effects of the Proposed Development is the potential construction traffic routes from A17, A15 and A52 for the solar arrays and cable route. Owing to the spatial disaggregation of the two solar array sites and the cable route, it is likely there will be several construction traffic routes that will be used to different intensities and at different stages of the construction programme.

7.2.2 At present, the proposed construction compound locations and, hence, the construction traffic routes are to be determined. However, based on professional judgement, the construction traffic routes will not extend beyond the study area shown on Figure 7.1 below.

7.3 Legislation Context and Guidance

7.3.1 Legislation and guidance relating to access and traffic and pertinent to the Proposed Development is listed, below. For the relevant planning policy, please refer to Appendix 1.1 at the rear of this Scoping Report.

- National Planning Policy Framework (NPPF, 2021);
- National Planning Policy Guidance (NPPG, Travel Plans, Transport Assessments and Statements, March 2014);
- Guidelines for the Environmental Assessment of Road Traffic (Institute of Environmental Assessment (now IEMA, 1993); and
- DMRB LA 104 Environmental Assessment and Monitoring Revision 1 (2020).

7.4 Current Baseline

7.4.1 Current baseline data is available from Department for Transport (DfT) Road Traffic Statistics, which provide a summary of traffic counts available within the study area. There are nine DfT count locations within the study area although only five have data from within the last three years. The DfT data is summarised in Table 7.1 and the count locations are shown on Figure 7.2 (Figure 7.1 illustrates the study area).

Table 7.1 DfT Road Traffic Statistics				
Site Number	**Road Name**	**Count Year**	**Average Annual Daily Traffic (AADT)**	**HGV%**
6701	A153	2021	13569	6.64
75205	A17	2021	6641	9.07
75204	A17	2021	20160	6.11
75207	A17	2021	6641	9.07
75206	A153	2021	11034	6.58
991464	Park Lane	2009	422	3.79
810254	Kyme Road	2019	1049	1.33
969162	B1394	2009	1010	8.11
931668	Mareham Lane	2009	1597	9.94

7.4.2 Additional baseline data will be collected as part of the assessment to inform the Traffic & Access ES chapter. This this is set out further in the proposed methodology section, below.

7.5 Design Assumptions

7.5.1 For the purposes of scoping, the following design assumptions have been made:

- Where practicable, construction site accesses will be designed to suitable standards and guidance set out in the Design Manual for Roads and Bridges (DMRB) and the Manual for Streets;
- Where site accesses do not comply with design standards, suitable mitigation will be provided in the form of temporary traffic management measures to ensure safe entry and egress.

7.6 Likely Significant Effects

7.6.1 The likely significant effects on traffic and transport are generally envisaged during the Proposed Development's construction phase. This will include the effects on existing traffic flows and the local road network, which will increase due to the addition of construction traffic movements to the local highway network. Traffic composition is also likely to change due to introduction of additional HGV movements on the rural road network to deliver construction materials, components, and plant to the site.

7.6.2 On the basis of professional judgement and experience of other solar projects, likely significant effects on traffic and access resulting from the Proposed Development are not anticipated during the operational phase. This is due to solar arrays and cable routes generating very low levels of vehicular traffic during the operational phases; typically one vehicle per week travelling to / from the Proposed Development and between fields comprising the Proposed Development for maintenance and security purposes. The only times during the operational phase where traffic impacts may be material is when equipment such as panels and transformers are replaced. The traffic impact at these times is likely to be less than during the construction phase. On this

basis, it is proposed that an assessment of the Proposed Development's operational phase effects on access and traffic are scoped out of the assessment.

7.6.3 On the basis of professional judgement, likely significant effects on traffic and access resulting from the decommissioning phase of the Proposed Development are likely to be less than or equal to construction phase effects. The decommissioning phase is likely to commence approximately 60 years after commencement of operation, and this is considered too far into the future to accurately predict traffic flows within the study area. It is, therefore, not possible to undertake any meaningful assessment of the likely effects of the Proposed Development decommissioning phase against a baseline. On this basis, it is proposed that an assessment of the decommissioning phase of the Proposed Development is scoped out of the assessment. A Decommissioning Statement will, however, be submitted as part of the DCO application and prior to decommissioning commencing, a DEMP will be prepared and agreed with the relevant Local Planning Authority.

7.6.4 Table 7.2, below, provides a summary of the key issues to be considered (scoped in) within the assessment in relation to transport and access.

Table 7.2 Summary of Likely Significant Effects

Receptor	Potential Effects	Scoped in
Construction Phase		
Local residents and users of area through which construction traffic passes	Severance effects resulting from increased traffic flows.	✓
Road users – vehicle occupants	Effects of increased traffic flows on driver delay, and accidents and safety.	✓
Road users – pedestrians and cycles	Effects of increased traffic flows on severance, delay and amenity, fear and intimidation, and accidents and safety.	✓

7.6.5 Further to the above, Table 7.3, below, provides details on the matters to be scoped out for further assessment within the EIA.

Table 7.3 Matters to be scoped out of the assessment

Matter	Rationale
Public Right of Way users	To be assessed in The socio-economic assessment.
Operational phase effects	Not likely to be significant due to very low traffic flows.
Decommissioning phase effects	Potential effects and mitigation similar to construction phase, but on the basis that it is not possible to accurately predict what the baseline will be in 60 years, it is not possible to undertake a meaningful assessment. It is, therefore, proposed that an assessment of the decommissioning phase of the Proposed Development is scoped out of the assessment.

7.7 Proposed Methodology

7.7.1 Scoping discussions will be undertaken with the Local Highway Authority, Lincolnshire County Council, to seek agreement to the extent of study area and the assessment methodology.

7.7.2 The Transport & Access Chapter will be informed by a full Transport Assessment (TA), which will be included within the Technical Appendix of the ES. The TA will be undertaken in accordance with guidance National Planning Policy Guidance (NPPG Travel Plans, Transport Assessments and Statements, March 2014)

7.7.3 The Transport & Access ES chapter will be prepared with due cognisance of 'Guidelines for the Environmental Assessment of Road Traffic' (Institute of Environmental Assessment (now IEMA), 1993) and DMRB LA 104 Environmental Assessment and Monitoring Revision 1 (2020).

7.7.4 In the context of traffic and access impacts resulting from the Proposed Development, the main receptors are broadly categorised as:

- Local residents and users of the areas through which construction traffic passes; and
- Users of the roads within the study area, including vehicle occupants, pedestrians and cycles.

7.7.5 The Institute of Environmental Management and Assessment (IEMA) sets out the receptor sensitivity descriptions detailed within Table 7.4, below.

Table 7.4 IEMA Receptor Sensitivity

Sensitivity	Rationale
Substantial	Receptors of greatest sensitivity to traffic flows: schools, colleges, playgrounds, accident, black spots, retirement homes, roads without footways that are used by pedestrians
Moderate	Traffic flow sensitivity receptors: congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, recreation facilities
Minor	Receptors with some sensitivity to traffic flow: places of worship, public open space, listed buildings, tourist attractions and residential areas with adequate footway provision
Negligible	Receptors with low sensitivity to traffic flows

7.7.6 Once the construction traffic routes have been established, potential substantial and moderate receptors on these routes will be identified and considered within the assessment.

7.7.7 The likely significant effects of the construction phase of the Proposed Development on traffic and access will be assessed. This will include quantitative assessment of the effects of existing traffic flows on the local highway network, through comparison of

baseline traffic flows and vehicle composition, with the flows predicted as a result of construction of the Proposed Development.

7.7.8 The likely significant cumulative effects on traffic flows of the Proposed Development's construction traffic, and traffic generated by other developments, will also be assessed as necessary.

7.7.9 It is proposed that 7-day, 24-hour Automatic Traffic Count (ATC) surveys will be undertaken on links comprising the construction traffic routes within the study area in order to collect baseline traffic flow and composition data, where suitable data for recent years is not available from the DfT. The construction traffic routes are to be determined as part of the TA. Detailed scoping of ATC locations will be determined in consultation with the Highway Authority once more information about construction traffic routes is known.

7.7.10 Accident data for the latest available 5-year period for the study area will also be obtained and analysed as part of the TA. This will inform assessment of the effects of the Proposed Development on accidents and safety.

7.7.11 Estimates of traffic generated during the construction phase, taking account of variation in construction traffic profile during the construction period, will be compared against the baseline traffic flow and composition data.

7.7.12 The following rules, as set out in the IEMA guidance, will be used to determine which links within the traffic and access study area should be considered for further assessment:

- Rule 1 – Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%); and
- Rule 2 – Include any other specifically sensitive areas (such as schools, hospitals, congested junctions, etc.) where traffic flows are predicted to increase by 10% or more.

7.7.13 It is proposed that Rules 1 and 2 are used as a screening tool to determine whether full assessment of effects on routes within the study area is required as a result of an increase in road traffic. Where anticipated construction traffic flows from the Proposed Development do not constitute an increase over and above baseline traffic flows of greater than 30% (or 10% at sensitive locations), a detailed assessment of effects is not necessary.

7.7.14 In accordance with IEMA guidance, the detailed assessment will consider Proposed Development impacts due to increased traffic flow on:

- Severance;
- Driver stress and delay;
- Pedestrian amenity and delay;
- Fear and intimidation; and
- Accidents and safety.

7.7.15 Impacts will be assessed quantitatively, where practicable, via comparison of baseline traffic flows and estimated Proposed Development construction phase traffic generation. The ES will include a construction works programme, a description of the type of vehicles used during the construction phase and an estimate of traffic anticipated to be generated disaggregated by light and heavy vehicles.

7.7.16 In order to assess the largest cumulative combination of baseline predicted development generated traffic flows, the assessment will be based on traffic flows of the construction months with the greatest predicted traffic volumes.

7.7.17 Where the worst case predicted construction traffic volumes are greater than Rule 1 and Rule 2 thresholds, the significance of the effects on receptors will be assessed against the IEMA guidance environmental impact criteria.

7.7.18 The nature of each residual transport and access impact will be established and the significance of each effect is assessed as:

- Beneficial - Meaning that they produce environmental benefits in transportation terms, i.e. where overall traffic flows or percentage HGV decrease, where the performance of the local highway network is predicted to improve or there are improved facilities for pedestrians, cyclists or public transport users.
- Negligible - Meaning that changes are too small to meaningfully measure.
- Adverse - Meaning that they produce environmental dis-benefits in transportation terms, i.e. where overall traffic flows or percentage HGV increase, where the performance of the local highway network is predicted to decline or there are reductions in facilities for pedestrians, cyclists or public transport users.

7.7.19 Beneficial and adverse effects will be further characterised as major, moderate, minor, and negligible, as detailed in LA 104. Typical descriptions of the magnitude of impact, from LA 104 are set out in Table 7.5, below.

Table 7.5 Magnitude of Impact

Magnitude of impact (change)		Typical description
Major	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Moderate	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Minor	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

7.7.20 LA 104 provides limited criteria on which to assess the magnitude of impact. Therefore, it is proposed to apply the magnitudes of impact from the IEMA Guidelines, with its 'substantial' magnitude treated as being comparable to the LA 104 'major' magnitude and reworded as such. A summary of the criteria used to determine magnitude of impacts in the assessment is provided in Table 7.6, below.

Table 7.6 Impact Criteria

Impact	Magnitudes of Impact			
	Negligible	Minor	Moderate	Substantial
Severance	Change in total traffic or HGV flows of less than 30%	Change in total traffic or HGV flows of 30-60%	Change in total traffic or HGV flows of 60-90%	Change in total traffic or HGV flows over 90%
Driver Delay	Change in journey time of less than 30 secs	Change in journey time of 30secs-1min	Change in journey time of 1min-2mins	Change in journey time of more than 2mins
Pedestrian Delay	Change in total traffic or HGV flows of less than 30%	Change in total traffic or HGV flows of 30-60%	Change in total traffic or HGV flows of 60-90%	Change in total traffic or HGV flows over 90%
Pedestrian & Amenity	Change in total traffic or HGV flows of less than 30%	Change in total traffic or HGV flows of 30-60%	Change in total traffic or HGV flows of 60-90%	Change in total traffic or HGV flows over 90%

Table 7.6 Impact Criteria				
Impact	**Magnitudes of Impact**			
	Negligible	**Minor**	**Moderate**	**Substantial**
Fear & Intimidation	Change in total traffic or HGV flows of less than 30%	Change in total traffic or HGV flows of 30-60%	Change in total traffic or HGV flows of 60-90%	Change in total traffic or HGV flows over 90%
Accidents & Safety	Change in total traffic or HGV flows of less than 30%	Change in total traffic or HGV flows of 30-60%	Change in total traffic or HGV flows of 60-90%	Change in total traffic or HGV flows over 90%

Cumulative Effects

7.7.21 Any potential cumulative impacts (intra and / or inter-cumulative, as appropriate) will be identified and considered as part of the assessment.

7.8 Potential Mitigation Measures

7.8.1 ACTMP will be prepared and included within the Technical Appendix of the ES. The CTMP will set out measures to mitigate the impact of increased traffic generated by the Proposed Development. These may include such measures as, but not limited to, the following:

- Signage strategies to raise direct construction traffic on the correct routes, and inform the general public of any traffic management measures such as road closures and diversions;
- Delivery Management Plan setting out permitted hours and days for deliveries, and any traffic management measures required to manage deliveries;
- Management measures to ensure all site staff are aware of measures and their obligations to follow the CTMP; and
- Enforcement measures and process for dealing with contractor failure to meet obligations.

7.8.2 The CTMP provides a mechanism for introducing a suite of measures to mitigate traffic during the construction phase, with the aim of ensuring no substantial adverse impact on traffic and access during the construction phase.

8 NOISE & VIBRATION

8.1 Introduction

8.1.1 An assessment of the likely significant effects of the Proposed Development with respect to noise and vibration will be undertaken. This will include construction phase (short-term) and operational phase (long-term) effects. The decommissioning phase impact will be similar to and no greater than the construction phase.

8.2 Study Area

8.2.1 The location of the Site is discussed within Sections 1 and 2 of this Scoping Report. The existing sensitive receptors (ESR) in relation to the assessment of likely significant noise and vibration impacts as a result of the Proposed Development comprise the following:

- Existing residential receptors;
- Existing leisure receptors; and
- Existing community receptors.

8.2.2 For the purpose of Scoping, the study area comprises the area of the Site and an area extending up to 300m from the Site boundary. A 300m distance is normally sufficient to encompass nearby ESRs and, if required, other specific receptors further afield may be assessed.

8.3 Legislation Context and Guidance

8.3.1 Legislation and guidance relating to noise and vibration and pertinent to the Proposed Development is listed, below. For the relevant planning policy, please refer to Appendix 1.1 at the rear of this Scoping Report.

- British Standard (BS) 5228:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise and Part 2: Vibration'.
- British Standard 4142: 2014+A1:2019 Methods for rating and assessing industrial and commercial sound (BS4142).

8.4 Current Baseline

Beacon Fen North

8.4.1 During the daytime, the baseline sound levels at receptors around Beacon Fen North are likely to be affected by existing road traffic noise, primarily from the distant A17 found at least 1.5km to the south. The A153 may be more influential in the northern

area of the Site. Other sources will likely include local roads, agricultural noise from fixed or mobile plant and birds. At night, agricultural noise and local road traffic are likely to be reduced and background noise levels are likely to be influenced mostly by the distant A17.

Beacon Fen South

8.4.2 Receptors north of Beacon Fen South may be slightly affected by existing road traffic noise from the A17 and may also be affected by noise from an existing Solar Farm and a rail line. The rail line is located along the eastern boundary and is likely to affect most receptors to the east. There is one receptor located to the west along Helpringham Road for which the road may be the main source in this area. Other local roads, agricultural noise and birds will also likely affect noise levels at receptors, primarily throughout the day. At night, background noise levels are likely to lower compared to the day.

Cable Route Area

8.4.3 The Cable Route Area is located between the two solar array sites, within this 'area' the cable route corridor (which will have a much smaller and defined footprint) will be determined as the design evolves. Noise emanating from the cable route corridor would only be during construction and would be temporary work. At this stage, no significant baseline survey has been assumed for potential receptors surrounding the Cable Route Area, and only short measurements may be undertaken to cover this topic. This will be reviewed as the design of the actual cable route is refined.

8.5 Design Assumptions

8.5.1 The following outlines the design assumptions. Where possible, any known embedded mitigation measure and limitations are also identified.

8.5.2 Noise and vibration impacts that may occur during the construction phase can be mitigated by the use of good practice during construction. Embedded measures relevant to the construction phase and which will mitigate the impacts of the Proposed Development will be set-out within a Construction Environmental Management Plan (CEMP).

8.5.3 The operational Site will be planned considering the principals of good acoustic design. Wherever possible, the electrical plant associated with the Proposed Development will be located away from sensitive receptors. In addition to this, all items of plant will be selected and installed in such a way that tonal and impulsive noise emissions will be minimised or eliminated and other characteristics that may be identified against the ambient acoustic environment will be reduced as far as is practicably practicable.

8.6 Likely Significant Effects

8.6.1 Table 8.1, below, provides a summary of the key issues to be considered (scoped in) within the assessment in relation to noise.

Table 8.1 Summary of Likely Significant Effects		
Receptor	**Potential Effects**	**Scoped In**
Construction Phase		
Existing houses and community places	Noise and vibration from construction activities such as digging trenches for cable routing, ground excavation or driving steel frames into the ground.	✓
Operational Phase		
Existing houses and community places	Noise from fixed electrical plant associated with Solar Farms and Battery Energy Storage System.	✓
Decommissioning Phase		
Existing houses and community places	Same as construction phase, with less activities expected.	✓

8.6.2 Further to the above, Table 8.2, below, provides details on the matters to be scoped out of further assessment within the EIA.

Table 8.2 Matters to be scoped out of the assessment	
Matter	**Rationale**
Baseline near Cable Route Area	Noise and vibration from the cable route would only be during construction and it would be temporary work. At this, stage where the actual cable route is not precisely known, no baseline survey has been assumed for potential receptors surrounding the broad potential Cable Route Area. This will be reviewed as the design of the actual cable route is refined.

8.7 Proposed Methodology

Baseline monitoring

8.7.1 It would not be feasible to undertake baseline sound monitoring at all identified receptors around the Site and, as such, each monitoring location will be representative of a number of identified receptors. It is expected that receptors will be grouped depending on their proximity to the existing noise sources in the area, which are the A17, the A153, railway noise, industrial noise from and existing solar farm and any smaller local roads. A minimum of 8 monitoring locations will be surveyed, and the suggested noise monitoring locations, in the context of identified receptors and the study area, are shown on Figures 8.1 and 8.2 Noise Monitoring Locations. These will be discussed during consultation with the relevant consultees, prior to undertaking the survey.

8.7.2 The baseline noise monitoring survey will measure noise levels for at least 24 hours at each location. Given the industrial and construction noise type of assessment to be undertaken, the following baseline noise metrics will be measured, as required by BS41412 and BS5228:

- ambient average sound levels (LA_{eq},T);
- ambient background sound levels (LA_{90},T);
- maximum and minimum noise events; and
- 1/3 octave spectrum of ambient sound.

Assessment

Construction and Decommissioning Phases

8.7.3 The likely significant effects of noise and vibration during the construction phase of the Proposed Development will be assessed qualitatively, in accordance with the British Standard (BS) 5228:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise and Part 2: Vibration'. The focus will be on mitigation measures to be included in a CEMP.

8.7.4 Effects during the decommissioning phase will be similar to and no greater than the construction phase and will be assessed using the same methodology.

Operational Phase

8.7.5 The likely significant effects of onsite operational noise during the operational phase of the Proposed Development will be assessed with reference to the BS 4142:2014+A1:2019 'Methods for rating and assessing commercial and industrial sound'. The focus will be on predicting the noise emissions from the proposed electrical equipment during operation, at the most sensitive receptors.

8.7.6 Not all receptors identified within 300m will be assessed; a selection of the most sensitive receptors will be required based mostly on proximity to the Site for a given area. The predicted levels would be assessed by an initial comparison of operational rating level with background sound level, followed by an assessment of the context in which these levels occur.

8.7.7 The assessment will include the following scenarios:

- Daytime (07:00 – 23:00 hours) assessment of all energy storage and solar components in operation year-round;

- Night-time assessment of all energy storage and solar components in operation during the early morning hours (05:00 – 07:00) from March to September, inclusive; and
- Night-time (23:00 – 07:00 hours) assessment of energy storage components in operation year-round.

8.7.8 For each scenario, the lowest observed adverse effect level ('LOAEL') and most significant observed adverse effect level ('SOAEL') criteria will be established. The LOAEL will be equal to the measured background sound level (LA90,T) and the SOAEL will be equal to the measured background sound level (LA90,T) plus 5dB. This level will be determined to be the rating level noise limit.

8.7.9 The residential receptors within 300m of the Site boundary will initially be considered to have a medium to high sensitivity to noise and, therefore, all impacts of moderate and major magnitude may initially be considered to be significant, with the final magnitude of impact based on context and professional judgement.

8.7.10 An initial BS4142 assessment, pending further contextual assessment, of noise from the proposed development (operational) will be undertaken with the impact magnitude criteria given below:

- Major: rating level 5dB or more above the rating level noise limit;
- Moderate: rating level above the rating level noise limit;
- Minor: rating level below the rating level noise limit; and
- Negligible: rating level 5dB or more below the rating level noise limit.

8.7.11 However, following the initial assessment there is a requirement set out in BS4142 guidance to consider the noise impact in context, with reference to the absolute noise level of the sources and residual sound, character of the noise to be introduced and specific sensitivity of any receptor. The context in which the sound occurs could change the magnitude of any impact at sensitive receptors.

Cumulative Effects

8.7.12 Any potential cumulative impacts (intra and / or inter-cumulative, as appropriate) will be identified and considered as part of the assessment.

8.7.13 In summary noise during the construction and decommissioning phases will be assessed based on the BS5228 standard and a qualitative assessment of baseline levels and locations of existing receptors near proposed construction activities. Noise during the operational phase, from proposed electrical equipment, has the potential to result

in significant effects for nearby existing receptors. The assessment will be undertaken using the following steps:

- Determination of study area and likely existing sensitive receptors;
- Consultation with the Local Authority to agree receptors, appropriate assessment criteria and monitoring methodology;
- Undertake baseline noise monitoring;
- Noise modelling of the proposed layout (operational phase) using data provided for proposed electrical plant, to predicted noise receptors;
- Determination of magnitude of impact and significant effects;
- Review of requirements for potential noise mitigation;
- Re-assess magnitude of impact and subsequent residual significant effects;
- Production of an assessment chapter.

8.8 Potential Mitigation Measures

8.8.1 For the construction phase, it is likely that embedded mitigation discussed above will be sufficient. For operational noise, beyond good practice to locate the electrical plant at appropriate location and selecting appropriate plant, other measures such as enclosure of specific noise plant or erecting acoustic fences may also be considered.

9 WATER RESOURCES

9.1 Introduction

9.1.1 As part of the EIA, an assessment of the likely significant effects of the Proposed Development on the environment in relation to water resources will be undertaken.

9.2 Study Area

9.2.1 For the purposes of the water resources assessment, the study area will be a 2km buffer from the Site boundary.

9.2.2 The Heckington Sewage Treatment Works is situated in the central northern section of the Site.

9.2.3 The Site, as defined in paragraph 2.1.1, is irregularly shaped, comprising agricultural fields delineated by hedgerows and tree belts. It extends to approximately 8,250 ha. A number of farmsteads are sparsely located throughout the site.

9.2.4 Heckington Eau flows in a west to east direction within and along the northern part of the Site before it then joins with Head Dyke and, later, the Skerth Drain to the northeast of the Site. Within the Southeast section of the Site, the Scredington North Beck flows east to west before it fans out into various smaller channels and later joins the South Forty Foot Drain, which flows south to north within the Site boundary. A large pond is present to the east of the Site, located at its closest point, approximately 700m from the site boundary and 1km to south of the A17.

9.3 Legislation Context and Guidance

9.3.1 Legislation and guidance relating to water resources and pertinent to the Proposed Development is listed, below. For the relevant planning policy, please refer to Appendix 1.1 at the rear of this Scoping Report.

- European Directive: The Water Framework Directive (2000/60/EC);
- European Directive: The Groundwater Daughter Directive (2006/118/EC);
- European Directive: The Priority Substances Directive (2008/105/EC);
- The Environment Protection Act 1990;
- The Land Drainage Act 1991;
- The Water Resources Act 1991;
- Water Act 2003;
- Water Act 2014;

- National Policy: The National Planning Policy Framework (2021) (as amended);
- National Policy: Planning Practice Guidance: Flood Risk and Coastal Change (2014);
- Guidance: Construction Information Research and Information Association CIRIA) C532 Control of Water Pollution from Construction Sites;
- Guidance: CIRIA C741 Environmental good practice on site guide;
- Guidance: CIRIA C750 Groundwater control - design and practice;
- Guidance: CIRIA C753 SuDS manual; and
- Guidance: CIRIA C786 Culvert, screen and outfall manual.

9.3.2 The following local documents and policies are of relevance to the assessment:

- Joint Lincolnshire Flood Risk And Water Management Strategy 2019-2050;
- Lincolnshire County Council Preliminary Flood Risk Assessment 2011;
- Central Lincolnshire Local Plan 2012-2036; and
- North Kesteven Strategic Flood Risk Assessment.

9.4 Current Baseline

9.4.1 The following description of the baseline hydrology and hydrogeology conditions of the Site have been derived from a desktop study.

Hydro-ecological Designated Site

9.4.2 The Site is not located within a hydro-ecological designated site, such as a Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protected Area (SPA) or Ramsar.

Surface Water Features

9.4.3 The Site is situated entirely within the South Forty Foot Drain operational catchment. Beacon Fen North is situated entirely within Black Sluice Internal Drainage Board (IDB) draining to the South Forty Foot Drain waterbody surface water catchment, which has an overall Water Framework Directive[24] (WFD) 'moderate' ecological status[25]. Beacon Fen South is located within a number of surface water catchments, including the Black

[24] EU Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for action in the field of water policy. The Water Framework Directive was adopted into UK law through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 Available at: https://www.legislation.gov.uk/uksi/2017/407/contents/made Accessed March 2023

[25] Catchment Date Explorer, Environment Agency (2033). Available [online] at: https://environment.data.gov.uk/catchment-planning/. Accessed March 2023.

Sluice IDB draining to the South Forty Foot Drain waterbody, a very small section of the Cliff Beck waterbody, the South Beck waterbody and the Swaton Drains waterbody. All the water bodies have an overall WFD 'moderate' ecological status. The cable route area is mainly located within the Black Sluice IDB draining to the South Forty Foot Drain waterbody, with a small area located within the South Beck waterbody surface water catchments.

9.4.4 Within the southwest section of Beacon Fen North there is an unnamed drain flowing west to east for 600m before exiting the Site. It joins Hodge Dike, which flows through a gap in the Site and joins the Car Dyke Canal, before then joining Head Dike and, finally, the South Forty Foot Drain. Approximately 1km south of Beacon Fen North, the Heckington Eau flows in a west to east direction. Further downstream of the Site, it later joins Head Dike, then Skerth Drain and eventually the South Forty Foot Drain. The River Slea flows in a general west to east direction to the north and then on the boundary of Beacon Fen North, later joining the Kyme Eau and then the River Witham. There is a large unnamed pond in the south of Beacon Fen North.

9.4.5 Beacon Fen South features a network of unnamed drains in its southeast section and the area surrounding it, the drains flow west to east into Helpringham South Beck, which eventually drains directly into South Forty Foot Drain. In Beacon Fen North and Beacon Fen South, the North Beck flows west to east through the Site, before flowing past the eastern boundary and joining Helpringham Eau. The North Beck's tributary, Cliff Beck, joins at the western border of the Site. There is a reservoir, located roughly 850m north of Beacon Fen South.

9.4.6 The Cable Route Area features a number of watercourses and drains, including the Heckington Eau and the Helpringham Eau, which are all tributaries of the South Forty Foot Drain. There are a number of reservoirs and small ponds present within the cable route area.

9.4.7 The Site is located entirely within a surface water Nitrate Vulnerable Zone (NVZ), but is not located within a surface water drinking water safeguard zone or surface water drinking water protection area[26].

Groundwater

9.4.8 The Site is not located within a groundwater catchment monitored under the WFD.

9.4.9 According to the BGS 1:50,000 mapping, bedrock geology at Beacon Fen South consists of the West Walton Formation (Mudstone and Siltstone) in the east of Beacon

[26] Available at: Magic Map Application (defra.gov.uk) Accessed March 2023.

Fen North and the Oxford Clay Formation (Mudstone) in the west of Beacon Fen North. Both the West Walton Formation and the Oxford Clay Formation are considered unproductive strata, which are defined as strata that "are largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them."

9.4.10 Beacon Fen North's superficial deposits consist of:

- Tidal Flat Deposits 1 (Clay and Silt);
- Till, Mid Pleistocene (Diamicton);
- Alluvium (Clay, Sand, Silt, and Gravel); and
- Glaciofluvial Ice Contact Deposits, Mid Pleistocene (Sand and Gravel).

9.4.11 According to Environment Agency mapping, Tidal Flat Deposits and Glaciofluvial Ice Contact Deposits are considered unproductive aquifers. Till is considered a secondary undifferentiated aquifer, defined as "*aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value*". The Alluvium is considered to be a Secondary A aquifer, which "*comprise permeable layers that can support local water supplies, and may form an important source of base flow to rivers*".

9.4.12 According to the British Geological Society (BGS) 1:50,000 mapping, Beacon Fen South's bedrock geology consists entirely of Oxford Clay Formation – (Mudstone) (unproductive strata).

9.4.13 Beacon Fen South's superficial deposits consist of:

- Glaciofluvial Sheet Deposits, Mid Pleistocene (Sand and Gravel) (Unproductive Strata);
- Till, Mid Pleistocene (Diamicton) (Secondary Undifferentiated);
- Alluvium (Clay, Sand, Silt, and Gravel) (Secondary A); and
- Sleaford Sand and Gravel (Sand and Gravel) (Secondary A).
- There are also areas of Beacon Fen South with no superficial deposits.
- The cable route area comprises the following bedrock and superficial geologies:
- Tidal Flat Deposits 1 (Clay and Silt) (Unproductive Strata);
- Till, Mid Pleistocene (Diamicton) (Secondary Undifferentiated);

- Glaciofluvial Sheet Deposits, Mid Pleistocene (Sand and Gravel) (Unproductive Strata);
- Sleaford Sand and Gravel (Sand and Gravel) (Secondary A);
- Alluvium (Clay, Sand, Silt, and Gravel) (Secondary A);
- Oxford Clay Formation (Mudstone) (unproductive strata); and
- West Walton Formation (Mudstone and Siltstone) (unproductive strata.

9.4.14 The BGS mapping shows that there are three faults present across the Site, which run along an east to west alignment. The BGS mapping also records two areas of Made Ground onsite, one area surrounding the unnamed pond in Beacon Fen North and one area in the east of the Beacon Fen South.

9.4.15 Beacon Fen South is located within groundwater Source Protection Zones (SPZ) 1, 2 and 3. Neither Beacon Fen North nor the cable route area are located within a SPZ.

9.4.16 The Site is not located within a groundwater Drinking Water Safeguard Zone.

Flood Risk

9.4.17 The Environment Agency Flood Map for Planning[27] indicates that Beacon Fen South is almost wholly located within fluvial Flood Zone 1 (low risk), with a less than 1 in 1000 annual probability of flooding. A narrow section of land adjacent to the North Beck Main River is shown to be located within Flood Zone 3 (high risk), with a greater than 1 in 100 annual probability of flooding. It is noted that flood defences are present along sections of the watercourse, but the level of protection these provide is not shown on the mapping. There are also a number of ordinary watercourses within the Site and it is unlikely that the flood risk will have been modelled by the Environment Agency. Any risk of flooding from these would not, therefore, be shown on the flood mapping.

9.4.18 Over half of Beacon Fen North is shown to be within Flood Zone 3. These areas, in the north and east of the Site, are assumed to be coincident with low-lying ground in the vicinity of the Heckington Eau and River Slea Main Rivers. It is noted that flood defences are also present along sections of these watercourses, although the level of protection is also not shown. As with Beacon Fen South, there are several ordinary watercourses present that may not have been modelled by the Environment Agency.

9.4.19 Large areas in the east of the cable route area are also shown to be within Flood Zone 3, which are again assumed to be low-lying parcels of land in the vicinity of Main

[27] Available at: https://flood-map-for-planning.service.gov.uk. Accessed March 2023.

Rivers. Flood defences are also present in these areas. Areas in the west of the cable route area are generally located within Flood Zone 1, with narrow sections adjacent to Main Rivers within Flood Zone 3.

9.4.20 The Environment Agency's Long Term Flood Risk map[28] shows that areas of Beacon Fen North have an increased risk of surface water (pluvial) flooding. The risk is generally 'low' (between a 1 in 1000 and 1 in 100 annual probability of flooding), with smaller areas of 'medium' (between a 1 in 100 and 1 in 30 annual probability) and 'high' risk (greater than 1 in 30 annual probability). These areas are generally coincident with areas within fluvial Flood Zones 2 and 3. Other parcels of land adjacent to ordinary watercourses are also at an increased risk.

9.4.21 Narrow sections adjacent to watercourses in Beacon Fen South are also at an increased risk. The risk is generally lower in areas of the cable route to the east of Heckington, where a larger network of land drainage is present.

9.4.22 Long-term mapping also shows that areas in the northwest of Beacon Fen North, land along the North Beck and land in the east of the cable route area are shown to be within the maximum extent of reservoir flooding. The source of flooding is understood to be from a reservoir upstream of the North Beck, approximately 7km to the west of the Beacon Fen South boundary.

9.4.23 The mapping in the Lincolnshire County Council Preliminary Flood Risk Assessment shows that areas in the vicinity of Sleaford have a high susceptibility to groundwater flooding. The susceptibility is lower in eastern areas of the cable route area.

9.4.24 There is, therefore, a potential risk of flooding from fluvial, pluvial and groundwater flooding at the Site. The project design will, therefore, consider and, where possible, mitigate for this. The project design will aim not to increase the risk of fluvial and pluvial flooding as a result of the Proposed Development.

9.5 Design Assumptions

9.5.1 The following outlines the design assumptions. Where possible, any known embedded mitigation measure and limitations are also identified.

9.5.2 The design of the Proposed Development will take into account best practice guidance. This includes no built development in hydrologically sensitive areas, maintaining a minimum 10m standoff distance between any built development and watercourses, retaining hydraulic connectivity across the Site and adopting pollution prevention measures. As a consequence, mitigation measures will be embedded into

[28] Available at: https://check-long-term-flood-risk.service.gov.uk/map. Accessed March 2023.

the design and will adhere to the implementation of standard best practice, together with bespoke measures that relate to the baseline environment.

9.5.3 The embedded mitigation measures (e.g. pollution prevention and the design and incorporation of Sustainable Drainage Systems (SuDS) will be designed to avoid, reduce or offset potential adverse effects and will inform the design of the Proposed Development, including the layout.

9.6 Likely Significant Effects

9.6.1 The assessment will consider the potential for likely significant effects from the Proposed Development during the construction, operational and decommissioning phases. These may include the following:

- Increased runoff on exposed ground causing erosion and pollution;
- Increase in silt and sediment loads as a result of construction works;
- Disturbance or erosion of bed and banks of watercourses and land drains;
- Increased runoff from hard standing areas causing erosion and pollution;
- Increase in downstream flood risk from watercourse crossings;
- Changes to watercourse morphology and surface water flow and any associated changes in downstream flood risk;
- Point source pollution from accidental spillages; and
- Disruption / cut-off of natural surface and groundwater pathways.

9.6.2 Effects associated with the decommissioning phase of the Proposed Development are not expected to be greater than those associated with the construction phase.

9.6.3 Table 9.1, below, provides a summary of the key issues to be considered (scoped in) within the assessment in relation to water resources.

Table 9.1 Summary of Likely Significant Effects

Receptor	Potential Effects	Scoped in
Construction Phase		
Surface water receptors	Changes to water quality/quantity	✓
Groundwater receptors	Changes to water quality/quantity	✓
Water resource users (e.g. abstractions and private water supplies)	Changes to water quality/quantity	✓
Hydro ecological receptors	Changes to water quality/quantity	✓

9.6.4 Further to the above, Table 9.2, below, provides details on the matters to be scoped out for further assessment within the EIA.

Table 9.2 Matters to be scoped out of the assessment	
Matter	**Rationale**
Water Framework Directive Assessment	The Environment Agency's '*Water Framework Directive Risk Assessments: How to Assess the Risk of your Activity*'[29] (April 2016) identifies four stages to determine the need to undertake a full WFD assessment for a proposed development. For the purposes of this assessment, it is considered that a WFD assessment will not be required in support of the proposed development for the following reasons: • 'Stage 1 – Make sure that the assessment covers the receptors that are protected by WFD': the Site is located within the South Forty Foot Drain Operational Catchment. The Site is not located within a groundwater body. • 'Stage 2 - demonstrate that the activity supports the objectives of the local River Basin Management Plan ('RBMP')': the objectives of the river basin management plan for the Anglian River Basin District[30] are listed under a program of measures implemented in order to meet the objectives of the WFD. Specifically, these focus on preventing a deterioration in the status of surface waters and groundwater and achieving 'good' status for all waterbodies. The Proposed Development is unlikely to affect the implementation or effectiveness of these measures; • 'Stage 3 - investigate the risks on WFD receptors and possible ways of managing those risks': given the nature of the Proposed Development (solar), once operational, there will be very limited potential for adverse effects on the water environment to arise following the implementation of standard, best practice mitigation measures. During the construction and decommissioning phases of the project, adverse effects will be avoided or minimised through measures in a CEMP or equivalent (e.g. pollution prevention plan, sediment management plans and stand off from receptors). Therefore, any adverse effects from the Proposed Development can be mitigated and will not interfere with the waterbodies' objectives or its ability to maintain or achieve good WFD status; and • 'Stage 4 - show that it meets the sustainability criteria set out in Article 4(7) of the WFD': this stage is not required as the stage 3 requirements have been met. As it has been demonstrated above that a WFD assessment is not required, its requirement is proposed to be scoped out of the ES.

9.7 Proposed Methodology

9.7.1 The following background surveys / studies will be completed.

Table 9.3 Background Surveys/studies	
Survey/Study/Analysis/ Overview/Evaluation	**Pending**
Desk Based Survey	To be undertaken as part of the ES chapter
Watercourse Crossing Survey	Pending on the site design, may be required if engineering works. If required, it will be undertaken as part of the ES chapter
Flood Risk Assessment	To be undertaken as part of the ES chapter

[29] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/522426/LIT_10445.pdf Accessed March 2023.

[30] Available at: Anglian_RBD_Part_1_river_basin_management_plan.pdf (publishing.service.gov.uk) Accessed March 2023.

Desk-Based Baseline Study

9.7.2 The desk-based baseline study will examine the catchments and the conditions of the water resources on the Site and downstream of the Site. It is proposed that the following tasks will be undertaken to ensure that the baseline data provides sufficient information for the assessment of the Proposed Development's likely significant effects:

- Review of Ordnance Survey ('OS') maps to identify surface water features;
- Review of the Environment Agency's River Basin Management Plans;
- Identification of the locations and characteristics of catchments, surface water features and springs within and adjacent to the Site;
- Identification of WFD classifications and objectives, obtained from the Environment Agency website for watercourses and waterbodies within and adjacent to the Site;
- Review of Environment Agency flood mapping;
- Collation of data on abstractions and discharge consents within and adjacent to the Site;
- Collation of information on climate (including long term average monthly rainfall figures), surface hydrology and flood risk; and
- Identification of hydrogeological conditions and groundwater resources (including groundwater vulnerability and productivity); together with secondary information relating to:
    - bedrock and superficial geology mapping; and
    - review of soil mapping.

Consultation

9.7.3 As part of the desk-based baseline study, the Environment Agency, NKDC, LCC and the Black Sluice Internal Drainage Board (IDB) will be consulted regarding incidents of flooding, surface water and groundwater quality data within the Site and surrounding area, as appropriate. Both LCC and NKDC will also be consulted regarding the presence of Private Water Supplies within or close to the Site.

Watercourse Crossing Survey

9.7.4 Depending upon whether there is a requirement for engineering works to the onsite rivers and drain network, if required, a watercourse crossing survey will be carried out.

The survey will validate the recorded characteristics of watercourses and waterbodies within the Site and in surrounding area identified in the desk-based baseline study. Characteristics that will be recorded include bank height, channel width and depth of water and bank vegetation and any manmade modifications that have been undertaken. A photographic record of the observed watercourses and waterbodies will also be taken. The data from the survey will be used to determine the location and type of any proposed watercourse crossing(s).

9.8 Assessment Methodology

9.8.1 The assessment of likely significant effects to sensitive receptors will consider the sensitivity of the receptor (on a scale of very high, high, medium, low and negligible) and the magnitude of change (on a scale of high, medium, small and negligible) to determine the level of effect on a scale of major, moderate, minor and negligible. Following this, Significant / Not Significant effects will be determined through professional judgment.

9.8.2 If significant effects are identified through the assessment, these would require the implementation of specific mitigation (such as specific receptor environmental protection plans and / or monitoring) in addition to the good design, pollution prevention measures and mitigation measures contained in the CEMP. Effects that are identified as minor or negligible are considered to be Not Significant and no further mitigation, beyond the adoption of good industry practice and guidance, will be required.

9.8.3 Owing to a large section of the Site being located within Flood Zone 3 and the overall size of the Site (over 1ha in area), a Flood Risk Assessment will be prepared and included as a standalone report within the Technical Appendices of the ES.

Cumulative Effects

9.8.4 Any potential cumulative impacts (intra and / or inter-cumulative, as appropriate) will be identified and considered as part of the assessment.

9.9 Potential Mitigation Measures

9.9.1 Mitigation measures (e.g., pollution prevention, CEMP, and the design and incorporation of SuDS (with applicable climate change allowances in the design of the Proposed Scheme) will be designed to avoid, reduce or offset potential adverse effects and these will inform the Proposed Development's design, including its layout. The mitigation section of the Water Resources ES chapter will, if required, provide preliminary hydrological and hydrogeological monitoring proposals. If required, the

extent and nature of monitoring will depend on the findings of the baseline surveys and the assessment of effects.

10 CLIMATE CHANGE

10.1 Introduction

10.1.1 An assessment will be undertaken of the likely significant effects of the Proposed Development on the environment with respect to climate change, recognising that climate change is a global issue.

10.1.2 The climate change impact assessment will identify and assess the likely significant effects of the Proposed Development on the climate (i.e., greenhouse gas / carbon emissions) and how to minimise these. The assessment will also consider how the Proposed Development will adapt to a changing climate, how other (EIA) aspects and receptors could be affected and how resilience can be designed-in.

10.2 Study Area

10.2.1 Climate change is a global phenomenon. The Proposed Development will impact global greenhouse gas (GHG) concentrations. Therefore, within a climate change context, the key sensitive receptor to the impacts of the development will be global climate. This receptor differs from others listed within an EIA context as it is not at a distinct local scale, but a global one.

10.2.2 In terms of GHG emissions, the assessment will consider the whole lifecycle emissions from the Proposed Development that will contribute to global climate change, based on the information available at the planning stage. A 'cradle to grave' system boundary will be applied to cover the whole lifecycle stages of the development, defined by the Institute of Environmental Management and Assessment[31] (IEMA) as:

- before life stage (pre-construction, product and construction process stage);
- use stage;
- end of life stage; and
- beyond asset life cycle (benefits and loads beyond the system boundary).

10.2.3 In terms of climate resilience, the location of a site has a considerable influence when assessing vulnerability and adaptability to future climate change. Site location features within the application redline boundary that may have the potential to cause, mitigate or be at risk from climate change will be identified during the assessment.

[31] Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022).

10.3 Legislation Context and Guidance

10.3.1 Legislation and guidance relating to climate change and pertinent to the Proposed Development is listed, below. For the relevant planning policy, please refer to Appendix 1.1 at the rear of this Scoping Report.

- European Commission, 'Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment' (2013);
- European Investment Bank ('EIB') 'EIB Project Carbon Footprint Methodologies. Methodologies for the Assessment of Project GHG Emissions and Emission Variations' (2022);
- Royal Institution of Charted Surveyors ('RICS'), 'Whole life carbon assessment for the built environment' (2017);
- BSI - PAS 2080:2016 'Carbon Management in Infrastructure';
- HM Government's 'UK Climate Change Risk Assessment' (2022).Guidance Document for PAS 2080: The world's first specification for managing whole life carbon in infrastructure; and
- IEMA 'Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance' (2022).

10.4 Current Baseline

10.4.1 In terms of GHG emissions, the current baseline represents existing GHG emissions from the assessment of the Site prior to construction and operation of the project under consideration. Prior to development the Site is comprised of agricultural land, which would typically emit emissions in the form of methane (CH_4) and nitrous oxide (N_2O) from the soils. There are no existing buildings within the Site boundary. The Site has no existing demands for regulated or unregulated energy and therefore no emissions associated with these sources. The future sectoral baseline will represent a typical 'business as usual' development of a similar type built elsewhere to minimum regulatory standards.

10.4.2 In terms of climate resilience, the current baseline is a temperate oceanic climate with warmer summers and milder winters. The average temperature in Sleaford, near to where the Site is located, is 10.2°C. The region experiences an average rainfall of 710 mm per year[32]. The future climate baseline will be determined using the UK climate change projections for a regional 25km grid surrounding the Site.

[32] https://en.climate-data.org/europe/united-kingdom/england/sleaford-8782/ [Accessed March 2023].

10.5 Design Assumptions

10.5.1 The following outlines the design assumptions. Where possible, any known embedded mitigation measure and limitations are also identified.

10.5.2 The Proposed Development will incorporate a number of designed-in mitigation measures during the construction and/or operation periods, which may include (inter alia):

- Anti-reflective coatings on panels – these are routinely applied to modern solar panels and give the panels a dark colour with a textured finish.
- Employing climate-resilient native species in any proposed screening/planting to help ensure the longevity of mitigation.
- Construction and decommissioning phases of the project expected to be undertaken in line with guidance provided in a CEMP, and a similar equivalent plan will be in place for the decommissioning phase.
- Some climate adaptation proposals expected to be informed by results of other specialist assessments, such as the Flood Risk Assessment (FRA), which will be undertaken and will consider the risk of potential extreme flood events as a result of the changing climate.

10.6 Likely Significant Effects

10.6.1 The Proposed Development will generate GHG emissions as a result of the Proposed Development's whole life cycle (i.e., construction, operation and decommissioning). These emissions are unavoidable.

10.6.2 The embodied carbon of the solar photovoltaic panels is likely to result in the biggest proportion of whole lifecycle emissions. Once operational, solar parks convert sunlight into electricity (direct current) through the use of photovoltaic (PV) cells, which is then converted to alternating current and exported to the national grid. As the fuel source is sunlight, there are no carbon emissions associated with the operation of the Site, except those from operations and maintenance vehicles and electrical equipment use during the night. The 'In Use' lifecycle stage for the solar PV panels is likely to have an emissions reduction when compared with alternative technologies (e.g., gas engines or diesel engines) delivering an equivalent amount of energy. The Proposed Development is, therefore, expected to have a positive impact on climate change with no further mitigation measures required.

10.6.3 The Proposed Development could potentially be affected by the impact of climate change, including increased risk of such extreme weather events as extreme

prolonged heat and intense flash flooding. Resilience to extreme weather events will be incorporated within the design process and the Proposed Development will be constructed in accordance with relevant regulations and guidance. The Proposed Development is, therefore, expected to be resilient to climate change with no further mitigation measures required.

10.6.4 Table 10.1, below, provides a summary of the key issues to be considered (scoped in) within the assessment in relation to climate change.

Table 10.1 Summary of Likely Significant Effects		
Receptor	**Potential Effects**	
Construction Phase		
Global Climate	Release of Greenhouse Gas Emissions	✓
Proposed Development	Resilience of Development to Climate Change	✓
Operational Phase		
Global Climate	Release of Greenhouse Gas Emissions	✓
Proposed Development	Resilience of Development to Climate Change	✓
Decommissioning Phase		
Global Climate	Release of Greenhouse Gas Emissions	✓
Proposed Development	Resilience of Development to Climate Change	✓

10.6.5 Further to the above, Table 10.2, below, provides details on the matters to be scoped out for further assessment within the EIA.

Table 10.2 Matters to be scoped out of the assessment	
Matter	**Rationale**
N/A	N/A

10.7 Proposed Methodology

10.7.1 Owing to the way climate change is assessed in an EIA, the methodology may vary from typical methodologies used by other aspects within the EIA.

Impacts on Climate Change from Proposed Development

10.7.2 The focus of the first part of the assessment will be on GHG emissions associated with the Proposed Development over the entire lifecycle from cradle to grave, and the impacts on climate change. IEMA's 'Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance' (2022) will act as the primary guidance for this assessment, as this is the most recent available and is applicable to the UK. It is also considered to be the most holistic method of assessing GHG emissions as it applies a whole life cycle methodology, incorporating not just the construction and operational phase of development, but also the decommissioning / end of life and beyond asset life cycle stages, allowing a more robust 'worst case

scenario' to be applied. Activities where expected emissions are less than 1% of the total emissions can be excluded, but only where all exclusions total up to a maximum of 5% of total overall emissions associated with the Proposed Development.

10.7.3 The Proposed Development as a whole is assessed for its relative emissions (Re) or net emissions. This is expressed as the difference between absolute emissions generated by the Proposed Development and the baseline emissions for a 'typical' development of a similar type. This methodological approach is recommended by the EIB[33] (2023) and the general equation is:

Relative Emissions (Re) = Absolute Emissions (Ab) – Baseline Emissions (Be)

10.7.4 All GHG emissions are considered adverse and will be assessed as Minor, Moderate, or Major. In order to qualify as a 'Minor adverse impact', it must be demonstrated that the Proposed Development's whole life GHG emissions are aligned to meet or exceed the Government's net zero trajectory, in line with the Paris Agreement's 1.5ºC pathway. Moderate and Major adverse impacts and beneficial impacts are considered to be Significant. Only projects that actively reverse (rather than only reducing) the risk of severe climate change can be judged as having a beneficial effect.

10.7.5 Where GHG emissions cannot be avoided, the goal of the EIA process is to reduce the project's residual emissions at all stages of the project lifetime. The assessment will identify any likely significant effects, either adverse or beneficial, based on the difference between predicted emissions and the baseline. Where appropriate, the assessment will make recommendations to help deliver carbon reduction measures.

Impacts on Proposed Development from Climate Change

10.7.6 The aim of the second part of the assessment will be to assess the vulnerability of the Proposed Development to global climate change, which will highlight the potential risk of major accidents, and to identify adaptation and resilience measures to mitigate risk. The 2020 IEMA Guidance presents a methodology for the consideration of climate change resilience and adaption in the EIA process, which will be followed in the EIA.

10.7.7 The first stage of the assessment is to is review the future climate projections published by the Met Office (through the UK Climate Projections (UKPC18) website), which includes variables such as annual mean temperatures and annual changes in summer and winter precipitation. It is proposed that the Site is assessed for climate projections under four different future climate scenarios, to cover the life of the

[33] Project Carbon Footprint Methodologies: Methodologies for the assessment of project greenhouse gas emissions and emission variations Version 11.3 (European Investment Bank, January 2023). Available [online] at: https://www.eib.org/attachments/lucalli/eib_project_carbon_footprint_methodologies_2023_en.pdf.

development in varying future conditions. These range from RCP2.6 where atmospheric emission concentrations are strongly reduced through to the worst-case scenario, RCP8.5, where emission concentrations continue to rise, unmitigated. A range of probability levels are available, although this study will use the 50% probability level (i.e. a central estimate with less uncertainty).

10.7.8 Following the 2020 IEMA Guidance, the assessment of resilience will use a combination of probability and consequence to reach a reasoned conclusion on the magnitude of the effect of climate change on the Proposed Development, including risk of vulnerability to increased heatwaves, flooding and extreme weather. It is likely that if the probability and / or consequence of the effect is High then the magnitude of the effect would also be High. The significance of this impact on the Proposed Development will be determined using the Significance Matrix for Climate Resilience. Effects of Moderate Adverse or Major / Substantial Adverse are considered to be Significant in EIA terms.

Cumulative Effects

10.7.9 Cumulative effects are not considered in terms of climate change on the basis that it is not possible to quantify the assessment. Whilst carbon emissions from the proposed development will contribute to global climate change, there will be no meaningful direct measurable impact upon local receptors and, as such, no specific cumulative effects relating to climate change.

10.7.10 In terms of the potential impacts of the changing climate on the Proposed Development, the principal receptor to consider is the Proposed Development, itself. The level of resilience of the Proposed Development to the changing climate is unlikely to affect other receptors in a way that could be quantified for cumulative assessment.

10.8 Potential Mitigation Measures

10.8.1 In addition to the designed-in mitigation for the Proposed Development, the need for any further mitigation will be identified (where necessary) following the detailed assessment work.

10.8.2 IEMA (2022) and PAS 2080 guidance[34] reinforces a key principle of EIA, which is to reduce the impact of a Proposed Development's whole lifecycle emissions through mitigation. It is important to look at what measures can be implemented through the entire design and EIA process to reduce the release of GHG emissions. Designing in

[34] Guidance Document for PAS 2080: The world's first specification for managing whole life carbon in infrastructure. Available [online] at: https://www.constructionleadershipcouncil.co.uk/wp-content/uploads/2019/06/Guidance-Document-for-PAS2080_vFinal.pdf.

mitigation measures can also build the Proposed Development's resilience to future climate change. Potential mitigation measures to reduce any residual effects of the Proposed Development will be considered as part of the assessment, though no commitment to any particular mitigation strategy is provided at this stage. Nevertheless, consideration could include (inter alia):

- Investigation of potential for Agrivoltaics with the landowner during concept design stage. If technically and economically viable, such a system could help to improve food security, as well as increase provision for biodiversity, including climate resilient landscaping;
- Introducing sustainability measures during the construction phase, such as utilising plant optimisation techniques; and
- Improving sustainable drainage to reduce flood risk.

11 GLINT

11.1 Introduction

11.1.1 An assessment will be undertaken of the likely significant effects of the Proposed Development on the environment with respect to 'glint'.

11.1.2 Glint, glare and dazzle are often used interchangeably depending on the definition attached to each term by different organisations. For example, the Sandia National Laboratories defines glint as the specular direct reflection of sunlight off smooth materials, such as solar panels and does not account for the diffuse component. The US Federal Aviation Administration on the other hand defines glint as a 'momentary flash of bright light' and glare as a 'continuous source of bright light'. The UK Building Research Establishment makes use of the terms glint and dazzle when referring to reflected sunlight from a glazed façade.

11.1.3 In all cases, reflected sunlight can be either in the form of specular reflections, which are caused by reflections from smooth surfaces or diffuse reflections which are reflections from rough surfaces. The glint assessment will interpret glint as the reflected sunlight off smooth surfaces, which causes a specular reflection and glare as the reflected sunlight off a rough surface. Owing to the intensity of glint being much higher than glare, the assessment will focus on glint effects that have potential to cause more significant impacts.

11.1.4 The intensity of glint is higher than glare and, as such, whilst the assessment will focus on glint effects, the effects of potential glare will also be covered. The terminology that will be applied in the assessment does not in itself distinguish between or imply the duration of effect (as momentary or prolonged) but rather, the assessment will consider all events, and comment on the expected duration of those events. Therefore, the assessment encompasses all effects, as identified in the industry standard Forge Solar software.

11.2 Study Area

11.2.1 The study area for general ground-based receptors is taken to be the area within 5km of the solar panels. For aviation assets, where aircraft (and occupants of any air traffic control tower) may be at a much higher elevation, the distance is increased. Any airfields within 15km will be considered in the initial appraisal. This study area is consistent with standard practice and hard limits within the modelling software.

11.1 Legislation Context and Guidance

11.1.1 Legislation and guidance relating to glint and pertinent to the Proposed Development is listed, below. For the relevant planning policy, please refer to Appendix 1.1 at the rear of this Scoping Report.

11.1.2 The UK Civil Aviation Authority (CAA) issued interim guidance in relation to solar farms in December 2010. Whilst the formal policy was cancelled in September 2012, in the absence of new formal policy, the former guidance is still considered instructive from an assessment perspective.

11.1.3 Best international practice is described by the Federal Aviation Administration's (FAA) guidance documents. Comprehensive guidance setting out a methodology for assessing solar farm developments near aerodromes was produced in November 2010 in a document entitled *'Technical Guidance for Evaluating Selected Solar Technologies on Airports'*. This was updated in Oct 2013 in the *'Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports'*. In April 2018 the FAA released a new version (Version 1.1) of the *'Technical Guidance for Evaluating Selected Solar Technologies on Airports'*, and in May 2021 it provided a further set of guidance entitled *'14CRF Part 77 - FAA Policy: Review of Solar Energy System Projects on Federally Obligated Airports'*.

11.2 Current Baseline

11.2.1 For the purpose of the assessment, the baseline is considered to be a 'zero baseline'. That is, the assessment will not consider other sources of glint in the surrounding environment as part of the assessment baseline. In practice, glint effects could arise from sunlight being reflected off most surfaces from glass in windows and car windscreens, to exposed metal and even tarmac and grass. It is not realistically feasible to identify and model all of these items, so it is safer to model the effects of the solar farm in isolation and determine the effects that it introduces to the environment.

11.3 Design Assumptions

11.3.1 For the purposes of scoping, the following design assumption has been made: The final layout will be optimised to maximise generation whilst at the same time minimising any adverse environmental effects. Part of this consideration will be whether the type, height, orientation and inclination of the panels can be varied to reduce effects.

11.4 Likely Significant Effects

11.4.1 Modelling of the receptors exposure to glint will be undertaken as described in the methodology section, below. Once the level of glint effects at all the sensitive receptors are understood, a level of significance will be assigned. For the purpose of the assessment, unmitigated glint with the potential for after image (also termed yellow glint) will be considered potentially significant at all receptors other than Air Traffic Control Towers (for which any glint will be considered Significant). The degree of screening and the sensitivity of the receptor will also be taken into account when determining the level of significance. For example, residential receptors will have a slightly lower sensitivity than route receptors because any effect is will be a nuisance rather than posing a tangible risk to health and safety. Where a dwelling only has limited visibility from upstairs windows, this will be considered less sensitive again.

11.4.2 Table 11.1, below, provides a summary of the key issues to be considered (scoped in) within the assessment in relation to glint.

Table 11.1 Summary of Likely Significant Effects

Receptor	Potential Effects	Scoped In
Construction Phase		
Residential receptors (various to be confirmed during assessment)	No quantitative assessment	✓
Road receptors	No quantitative assessment	✓
Rail receptors	No quantitative assessment	✓
Aviation receptors	No quantitative assessment	✓
Operational Phase		
Residential receptors (various TBC during assessment)	Glint visibility – Intensity, duration and timings	✓
A15 (Main RD)	Glint visibility – Intensity, duration and timings 4.5km from Beacon Fen South at its closest point 8.2km from Beacon Fen North at its closest point	✓
A17 (Main Rd)	Glint visibility – Intensity, duration and timings 1.5km from Beacon Fen North at its closest point 1.7km away from Beacon Fen South at its closest point	✓
A153 (Main Rd)	Glint visibility – Intensity, duration and timings 1.8km to Beacon Fen North at its closest point 7.78km to southern point at its closest point	✓
Holland Road / A52 (Main Road)	Glint visibility – Intensity, duration and timings 2km away from Beacon Fen South at its closest point 10km away from Beacon Fen North at its closest point	✓
B1395 (Minor Road)	Glint visibility – Intensity, duration and timings	✓

Table 11.1 Summary of Likely Significant Effects		
Receptor	**Potential Effects**	**Scoped In**
	2.3km away from Beacon Fen North at its closest point 6.75km away from Beacon Fen South at its closest point	
B1395 (Minor Road)	Glint visibility – Intensity, duration and timings Intersects Beacon Fen South 6.2km away from Beacon Fen North at its closest point	✓
Mareham Lane (Minor Road)	Glint visibility – Intensity, duration and timings 2.25km away from Beacon Fen South at its closest point 5.7km away from Beacon Fen North at its closest point	✓
Thorpe Lane (Minor Road)	Glint visibility – Intensity, duration and timings 0.1km away from Beacon Fen North at its closest point 4.6km away from Beacon Fen South at its closest point	✓
Park Lane (Minor Road)	Glint visibility – Intensity, duration and timings 1.7km away from Beacon Fen North at its closest point 4.65km away from Beacon Fen South at its closest point	✓
Sleaford to Bolton line running east to Bolton	Glint visibility – Intensity, duration and timings 2.35km away from Beacon Fen North at its closest point 1.5km away from Beacon Fen South at its closest point	✓
Sleaford to Spalding running southeast to Spalding	Glint visibility – Intensity, duration and timings Intersects Beacon Fen South 4.25km away from Beacon Fen North at its closest points	✓
RAF Cranwell	Glint visibility – Intensity, duration and timings 10.5km northwest to one of site areas, 11km from other	✓
RAF Coningsby	Glint visibility – Intensity, duration and timings 9.5km to the northeast of the northern site area	✓
RAF Barkston Heath	Glint visibility – Intensity, duration and timings airfield under command of RAF Cranwell but separate site 13.6km away from Beacon Fen South	✓
Boston Airfield	Glint visibility – Intensity, duration and timings 14km southeast of the Beacon Fen North at its closest point	✓
Decommissioning Phase		
Residential receptors (various to be confirmed)	No quantitative assessment	✓
Road receptors	No quantitative assessment	✓
Rail receptors	No quantitative assessment	✓
Aviation receptors	No quantitative assessment	✓

11.4.3 Further to the above, Table 11.2, below, provides details on the matters to be scoped out for further assessment within the EIA.

Table 11.2 Matters to be scoped out of the assessment	
Matter	**Rationale**
Construction	Construction Phase installation works are temporary with most of the equipment used removed as soon as the construction activities have been completed. Industry standard glint analysis software does not include the facility to assess construction phase glint and this would be a near impossible task anyway due to minor variations in the position and orientation of reflective components resulting in potentially large changes in the predicted locations and intensity of glint. It is not possible to model effects during the temporary construction period with all the inherent changing circumstances but it is unlikely that this would be significant. Although there is a slight risk of reflections from steel legs prior to mounting the panels on top, this is limited and adopting a progressive approach to installation should considerably reduce this. As the panels are mounted, they form a visual barrier screening reflections from being observed from components behind.
Decommissioning	The decommissioning works, which will include the removal of all panels and mounting structures amongst other site clearance and restoration, will retrace the process of installing the panels but in reverse, so the same level of effect will be expected. Removing internal panels prior to the ones around the perimeter of the Site, will allow the outer panels to act as screening for the internal ones.

11.5 Proposed Methodology

11.5.1 Despite 'glint and glare' being acknowledged within several guidance and policy documents in the UK, there is no specific guidance on how to assess glint effects. The assessment will, therefore, rely on the approach that was originally developed by Sandia National Laboratories in the US on behalf of the Federal Aviation Administration (FAA) to assess aviation glint impacts. The FAA approved the use of the Solar Glare Hazard Analysis Tool (SGHAT) software model, and this has now been utilised effectively in numerous countries around the world including extensively in the UK.

11.5.2 The glint assessment focuses on the operational phase of the Proposed Development. It is expected that the construction and decommissioning phases of the Proposed Development will be undertaken in-line with guidance provided in a CEMP. Recommendations around minimising construction and decommissioning glint will be made, but no formal assessment of the glint effects will be undertaken as these phases are temporary and are not able to be modelled using industry standard software. It is possible that some glint could be produced from components used in the construction process but it is unlikely that this would be significant. Equally, glint could arise from any other sources of reflection in the local natural and built environment.

11.5.3 The operational effects of glint are expected to be consistent over the duration of the Proposed Development (i.e., it is assumed that the receptors considered within the assessment are fixed and present over the project lifetime). Receptors that may be susceptible to glint effects from the Proposed Development will be identified and assessed using ForgeSolar's GlareGauge software tool (a licensed version of the SGHAT tool) to model the effects of glint on receptors for a given panel array and specification.

11.5.4 The model can predict 'low intensity glint', which is termed 'green glint', and 'medium intensity glint with potential for temporary after image', which is termed 'yellow glint'. Temporary after image is a phenomenon whereby, after glancing at a bright light, the image remains burned into the retina for a short time after looking away.

11.5.5 The glint prediction model will indicate glint effects from the Site on receptors that may be exposed to glint, if there are any at all over the course of a full year. This will include key data on the timing and frequencies of any predicted glint events. The frequency of theoretical glint events based on geometric analysis will be processed further to present more realistic results with respect to the local weather conditions occurring at the Site.

11.5.6 Glint effects for both ground-based, which includes both point and route receptors, and aerial receptors will be assessed. A preliminary assessment of potentially susceptible receptors has identified a wide range of fixed-point receptors within 5km the Site. These are traditionally characterised as residential dwellings, commercial properties and industrial sites. Parts of the Site appear to be visible from numerous isolated properties in the surrounding land, as well as nearby settlements, including Sleaford, Heckington, Helpringham, Great Hale, Ewerby and Anwick. These areas have potential visibility to the Site due to a lack of existing screening in the form of vegetation such as trees, hedgerows, crops and plants in fields. Careful consideration will be given to the potential glint effects on all these dwellings and mitigation may need to be recommended. In addition, there are several route receptors that will also be assessed given the large site area.

11.5.7 Motorists are particularly sensitive to glint effects as highlighted in the UK's Road Safety Guidance, which encourages motorists as follows: "*If you are dazzled by bright sunlight, slow down and if necessary, stop*" (Rule 237, The Highway Code, 2021).

11.5.8 Given the proximity of the rail tracks to Beacon Fen South, the effects on train drivers will be considered as part of the assessment and through engagement with Network Rail.

11.5.9 Modern solar PV panels have an anti-reflective coating that gives the panels a dark colour with a textured finish. This feature reduces the potential of glint effects occurring, but cannot prevent glint effects entirely.

11.5.10 The assessment will identify glint effects that are predicted to occur for ground-based receptors. Consideration will be given to the following:

- The visibility of the panels from the receptor, based on a Zone of Theoretical Visibility;
- The geometrical area within which glint reflections can theoretically occur;
- The screening that is present in the form of trees, hedgerows and buildings et cetera; and
- Historic weather conditions in the region and the likelihood of glint-producing sunlight being present.

11.5.11 For licensed aviation receptors, the assessment will be made in-line with FAA requirements, which, in the absence of their own specific guidance, have been accepted by the UK Civil Aviation Authority (CAA). The FAA recently relaxed the requirement that no 'medium intensity glint with potential for temporary after image' be visible to pilots on final approach to the runway, from their normal viewing angles, citing glint to be an occurrence that pilots routinely deal with in the built and natural environment. However, it remains a requirement that no glint (yellow or green) be visible at an Air Traffic Control Tower.

11.5.12 Although it is noted that unlicensed aviation receptors are afforded less safeguarding protection than their licensed equivalents, the same considerations will be given for determining the level of effect that these will experience.

Cumulative Effects

11.5.13 Potential cumulative impacts (intra and / or inter-cumulative, as appropriate) will be identified and considered as part of the assessment.

11.6 Potential Mitigation Measures

11.6.1 Glint has potential to cause different levels of effect, linked to the intensity of the glint, the time when it occurs and the receptor that is affected. Low intensity effects are not considered to require mitigation. Medium intensity glint, with potential for temporary after image, may require mitigation, especially if the affected receptor is highly sensitive.

11.6.2 Depending on the output of the assessment, there are various mitigation measures that could be used if necessary. These include screening the Proposed Development by deploying hedgerow planting or fencing, re-orientating or relocating panels so they do not present glint at certain receptors, changing the panel angle or using tracking panels rather than fixed panels. Further information will be provided as part of the assessment where applicable.

12 SOILS & AGRICULTURAL LAND

12.1 Introduction

12.1.1 Agricultural Land Classification (ALC) is a standardised method for classifying the quality of agricultural land, based on factors such as soil type, climate, topography and drainage. The ALC places land into five Grades (with Grade 3 subdivided into Subgrades 3a and 3b) from Excellent to Very Poor. Grades 1, 2 and Subgrade 3a (Excellent, Very Good and Good quality land are termed Best and Most Versatile (BMV) land; and National Planning policy promotes the development of non-BMV land over BMV land, or of land of the lowest quality where BMV avoidance is not possible.

12.1.2 This section sets out the approach and scope of the assessment on soils and agricultural land that will be undertaken as part of the EIA for the Proposed Development.

12.2 Legislation Context and Guidance

12.2.1 Legislation and guidance relating to soils and agricultural land, and pertinent to the Proposed Development is listed, below. For the relevant planning policy, please refer to Appendix 1.1 at the rear of this Scoping Report.

- Statutory Instrument 2015 No. 595, The Town and Country Planning (Development Management Procedure) (England) Order 2015, Schedule 4, Part (y);
- Natural England (2018), Guide to assessing development proposals on agricultural land;
- Natural England (2012), Technical Information Note 049, 'Agricultural Land Classification: protecting the Best and Most Versatile agricultural land';
- Institute of Quarrying (2021), Good Practice Guide for Handling Soils';
- DEFRA (2009), Construction Code of Practice for the Sustainable Use of Soils on Construction Sites;
- IEMA (2022) A New Perspective on Land and Soil in Environmental Impact Assessment.

12.3 Current Baseline

12.3.1 The following resources have been used to assess the baseline conditions of the soil resources and agricultural land quality present within the Site:

- Agricultural Quality of Land at Bicker Fen North, Lincolnshire (Land Research Associates, 2023).
- Agricultural Quality of Land at Bicker Fen South, Lincolnshire (Land Research Associates, 2023).
- Soil Survey of England and Wales (1984) Soils and their use in Eastern England (Sheet 4).
- Natural England (2022) Provisional Agricultural Land Classification.
- Natural England (2022) Post 1988 Agricultural Land Classification.
- MAFF (1988) Agricultural Land Classification of England and Wales.
- The Meteorological Office (1989) Climatological Data for Agricultural Land Classification.
- Natural England (2022) Likelihood of 'Best and Most Versatile' (BMV) Agricultural Land – East Midlands Region.

Agricultural Land Classification

12.3.2 Natural England's provisional ALC data maps the Site as a mix of Grade 1, 2 and 3 agricultural land. Beacon Fen North is Grade 3 and Beacon Fen South is dominantly Grade 3, with Grade 2 in the south. The Cable Route Area is dominantly Grade 2 (2,411.9 ha, 65.9 % of the cable route area), with portions of Grade 1 (337.5 ha, 9.2 % of the cable route area) in the east and Grade 3 (908.8 ha, 24.8 % of the cable route area) in the north and west.

12.3.3 The post 1988 ALC data, collected by Land Research Associates (see Appendix 12.1 and 12.2), for the Site indicates that Beacon Fen North is mainly Subgrade 3b (362.3 ha, 69.7 % of Beacon Fen North), with a smaller portion of Subgrade 3a (149.9 ha, 28.9 % of Beacon Fen North). Beacon Fen South is also mainly Subgrade 3b (422.3 ha, 83.5 % of Beacon Fen South), with portions of Grade 2 (7.4 ha, 1.5 % of Beacon Fen South) and Subgrade 3a (75.9 ha, 15.0 % of Beacon Fen South) to the south. No post 1988 ALC data is available for the Cable Route Area; the nearest ALC survey was conducted circa 1.2km northeast of the Site and found a mix of Grade 2 and Subgrade 3a agricultural land.

12.3.4 Beacon Fen North falls within High likelihood of BMV land (>60 % area BMV) category and Moderate likelihood of BMV land (20-60 % area BMV) category. Beacon Fen South has mainly Moderate likelihood of BMV land (20-60 % area BMV) category with small portions of High and Low as well. The Cable Route Area is mainly High and Moderate BMV, with small portions of urban areas.

12.3.5 The review of climatic limitations within ALC, suggests the Site will not be limited by climate (high average annual rainfall and field capacity days).

12.3.6 The ALC surveys of the solar array areas confirmed that 791.8 ha of land (77.3 % of the solar array area) is not BMV agricultural land. This comprises 784.5 ha of ALC Subgrade 3b land and 7.33 ha of non-agricultural land. Of the remaining surveyed land, 7.39 ha (0.7 %) is Grade 2 and 225.76 ha (22.0 %) is Subgrade 3a.

12.3.7 In the Cable Route area, based on the provisional ALC and assuming a conservative 50/50 split between subgrade 3a and subgrade 3b, 454.4 of land (12.4 %) is assumed to be not BMV agricultural land. The remaining land comprises, 337.5 ha (9.2 %) of Grade 1, 2,411.9 ha (65.9 %) of Grade 2, and 454.4 ha (12.4 %) of Subgrade 3a.

12.3.8 Assuming a 50/50 split between subgrade 3a and subgrade 3b, the total area of BMV land within the scoping boundary is 3,436.96, representing 73.4 % of the total Site area. The remaining Site area of 1,246.26 ha is non-BMV or non-agricultural use, representing 26.6 % of the total Site area.

12.3.9 The Provisional ALC data for the cable route search area and the Post 1988 ALC data for Beacon Fen North and Beacon Fen South are illustrated on Figure 12.1 and Figure 12.2, respectively.

Table 12.1 Agricultural Land Classification

ALC Grade	Beacon Fen North		Beacon Fen South		Cable Route Area		Total	
	Area (ha)	Percentage (%)	Area (ha)	Percentage (%)	Area (ha)	Percentage (%)	Area (ha)	Percentage (%)
Grade 1					337.51	9.2	337.51	7.21
Grade 2			7.39	1.46	2411.9	65.9	2419.3	51.66
Subgrade 3a	149.88	28.3	72.2	14.2			221.2	4.7
Subgrade 3b	366.8	69.7	421.98	83.4			788.78	16.7
Grade 3					904.2	24.6	904.2	19.2
Grade 4								
Grade 5								
Non-Agricultural	10.78	2	4.9	1			15.68	0.3
Total	**505.51**	**100**	**519.49**	**100**	**3,658.22**	**100**	**4,683.22**	**100**

Soil Resources

12.3.10 The Site is comprised of three areas. These are Beacon Fen North and Beacon Fen South and the Cable Route Area (which is to be refined to the Cable Route Corridor).

12.3.11 The Site comprises soils of Beccles 3 (711t) association, which are found in all three sections. They are typically seasonally waterlogged (Wetness Class III or IV) clay loams. Soils of the Ruskington (512c) association are mapped in Beacon Fen North and the Cable Route Area. These soils are occasionally waterlogged (Wetness Class II), sandy loam topsoils and brownish or reddish subsoils.

12.3.12 Soils of the Ragdale (712g) association are mapped in Beacon Fen South. These soils are seasonally waterlogged (Wetness Class III or IV) clay or clay loam topsoil over greyish brown subsoil.

12.3.13 Soils of the Wallasea 2 (813g) association are mapped in Beacon Fen North and the Cable Route Area. These soils are occasionally waterlogged (Wetness Class III or IV, when undrained), silty clay topsoils over greyish silty clay subsoils.

12.3.14 Beacon Fen North is located to the east of Ewerby residential area. The land in Beacon Fen North is currently used for arable agricultural production. Beacon Fen South is located west of Helpringham and runs up parallel to Burton Pedwardine. The land is also currently used for agricultural purposes, predominantly arable with a few fields for grazing.

12.4 Design Assumptions

12.4.1 Whilst no design assumptions are made, the following outlines embedded mitigation measure in relation to soils and agricultural land.

12.4.2 Defra's Construction Code of Practice for the Sustainable Use of Soils[35] and the updated Institute of Quarrying's Good Practice Guide for Handling Soils in Mineral Workings (2021)[36] provide guidance on soil management, handling, storage, replacement and mitigation for soil works on construction sites. As industry best practice, these will be implemented for the Proposed Development as embedded mitigation measures that will reduce the risk of likely significant adverse effects on the soil resources within the Site.

12.5 Potential Significant Effects

12.5.1 Table 12.2, below, provides a summary of the key issues to be considered in relation to soils and agricultural land.

Table 12.2 Summary of Likely Significant Effects

Receptor	Potential Effects	Scoped In
Construction Phase		
Agricultural Land	>20 ha of land temporarily lost from agricultural production. Depending on construction programme, may affect more than one cropping cycle on arable fields.	✓
Soil Resources	Degradation and damage to soil resources.	✓
Operational Phase		
Agricultural Land	Change in agricultural production from arable to (potentially) grazing.	✓

[35] Available at: https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites Accessed March 2022.
[36] Available at: https://f.hubspotusercontent30.net/hubfs/885685/Soils%20Guidance/IQ%20Soil%20Guidance%20Part%201.pdf Accessed March 2022.

Table 12.2 Summary of Likely Significant Effects		
Receptor	**Potential Effects**	**Scoped In**
Construction Phase		
Soil Resources	Potential for soils to provide other ecosystem services of benefit, including for biodiversity and carbon storage due to lower intensity land management.	✓
Decommissioning Phase		
Agricultural Land	>20 ha of land temporarily lost from agricultural production. Depending on construction programme, may affect more than one cropping cycle on arable fields.	✓
Soil Resources	Degradation and damage to soil resources.	✓

12.5.2 Further to the above, Table 12.3, below, provides details on the matters to be scoped out of further assessment within the EIA.

Table 12.3 Matters to be scoped out of the assessment	
Matter	**Rationale**
Agricultural Land Drainage	ALC assumes agricultural land drainage is in place, it will not directly impact the assessment of soils and agricultural land, but the potential economic and hydrological effects of the land management.
Land Holdings	The size of the land holdings and the potential impact on farm business/viability is a socio-economic assessment and will be considered, as appropriate, as part of the socio-economic assessment.

12.5.3 The Institute of Environmental Management and Assessment's (IEMA) 2022 'A New Perspective on Land and Soil in Environmental Impact Assessment[37]' details the sensitivity of topsoil and subsoil to structural damage based upon soil texture, field capacity days and wetness class. The following sensitivity assessment is based on the 'Agricultural Quality of Land at Bicker Fen' reports (north and south), which contain the results of the October 2022 soil survey carried out at the two solar array sites.

12.5.4 Based upon 'Table 4: Sensitivity of Soil Receptors' of the IEMA guidance, it is likely that the majority of soils present onsite have a Medium sensitivity and, thus, medium resilience to structural damage based upon the calculated >150 Field Capacity days and the presence of heavy clay loams, clay, sandy clay loams, and medium clay loams present in the topsoil and subsoils. These soils were also Wetness Class III. Where there was a medium sandy loam or medium sand present in the topsoil or subsoil and where Wetness Class II was recorded, the soil is likely of Low sensitivity and, thus, has a high resilience to structural damage.

[37] https://www.iema.net/resources/blog/2022/02/1https://www.iema.net/resources/blog/2022/02/17/launch-of-new-eia-guidance-on-land-and-soils7/launch-of-new-eia-guidance-on-land-and-soils.

12.5.5 Based upon Table 2 'Guidance on Proposed Receptor Sensitivity and Typical Soil Resource / Functions Description' of the IEMA guidance, the following potential sensitive receptors have been identified for the site:

- Agricultural Land of Grade 2, being of Very High Sensitivity.
- Agricultural Land of Subgrade 3a, being of High Sensitivity.
- Agricultural Land of Subgrade 3b, being of Medium Sensitivity.
- Soil Resources of wetness class 2 and 3 with heavy to medium clay loam texture, being of medium sensitivity.

12.5.6 The installation of the solar arrays on the sections of Subgrade 3a BMV land within Beacon Fen North and Beacon Fen South may be at risk if soils are mishandled. As such, best practice methodology, including the Institute of Quarrying 2021 'Good Practice Guide for Handling Soils' and DEFRA's 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites' will be adopted. The change in land use will include the temporary disruption of soil through cable installation within what will be the Cable Route Corridor.

12.6 Proposed Methodology

Agricultural Land Classification Surveys

12.6.1 Reconnaissance scale (i.e., 1 point per 5 ha) ALC surveys were undertaken at both Beacon Fen North and Beacon Fen South in 2022 by Land Research Associates, the findings of which are included within two standalone technical reports (see Appendix 3.1 and 13.2 at the rear of this Scoping Report).

12.6.2 At this time, the Cable Route Area has not been subject to an ALC survey. This land is currently in agricultural use, which will be able to continue as is once the cable is installed. As such, the final location for the cable route will not be affected by the Proposed Development, except (for any underground cabling) for a short number of weeks during the subsoil cable installation during construction and its removal at decommissioning. It is noted that some above ground / overhead cabling may be required.

Assessment

12.6.3 The results of the 2022 reconnaissance ALC surveys of the two solar array sites, in combination with a desk-based study of the Cable Route Area, will be used to establish the baseline in relation to soils and agricultural land at the Site. The 2022 IEMA guidance 'A New Perspective on Land and Soil in Environmental Impact Assessment' will be used to assess the potential impacts and associated risks to that may occur as

a result of the Proposed Development. This will draw upon the following, as appropriate:

Table 12.4 Receptor Sensitivity (Land)		
Receptor	**Sensitivity**	**Justification**
Soils supporting agricultural land quality of Grade 1 and 2	Very high	Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown (commonly including top fruit, soft fruit, salad crops and Winter harvested vegetables). Yields are high and less variable than on land of lower quality. Land with minor limitations that affect crop yield, cultivations or harvesting. Grade 2 may comprise soils that show difficulties with the production of more demanding crops (e.g. Winter harvested vegetables and arable root crops). The level of yield is generally high, but may be lower or more variable than Grade 1.
Soils supporting agricultural land quality of Subgrade 3a	High	Land capable of consistently producing moderate to high yields of a narrow range of arable crops (especially cereals) or moderate yields of a wide range of crops (including cereals, grass, oilseed rape, potatoes, sugar beet) and the less demanding horticultural crops.
Soils supporting agricultural land quality of Subgrade 3b	Medium	Land capable of producing moderate yields of a narrow range of crops (principally cereals and grass) or lower yields of a wider range of crops or high yields of grass that can be grazed or harvested over most of the year.
Soils supporting agricultural land quality of Grade 4 and 5	Low	Land with severe limitations that significantly restrict the range of crops and / or level of yields. Is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high, but there may be difficulties in utilisation.
Soils in non-agricultural or urban areas	Negligible	As per 'Low' sensitivity, but with indirect, tenuous and unproven links between sources of impact and soil functions (i.e. non-agricultural or urban). Built-up or 'hard' uses with relatively little potential for a return to agriculture.

Table 12.5 Magnitude of Change (Land)	
Magnitude	**Justification**
High	Permanent, irreversible loss of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading) over an area of more than 20 ha or loss of soil-related features (including effects from 'temporary developments'*).
Medium	Permanent, irreversible loss of one or more soil functions or soil volumes over an area of between 5 and 20 ha or loss of soil-related features (including effects from 'temporary developments'*).
Low	Permanent, irreversible loss over less than 5 ha or a temporary, reversible loss of one or more soil functions or soil volumes, or temporary, reversible loss of soil-related features.
Negligible	No discernible loss or reduction or improvement of soil functions or soil volumes that restrict current or proposed land use.
*Temporary developments can result in a permanent impact if resulting disturbance or land use change results in permanent damage to soils.	

Table 12.6 Receptor Sensitivity (Soil Resources - Loss)		
Receptor	**Sensitivity**	**Justification**
Soils with high risk of erosion and organic soils (peat)	High	Development on these soils should be avoided. If this is not possible, they require careful consideration and site-specific planning of construction methods (e.g. use of temporary working surfaces, sensitive storage, protection from drying out) in order to preserve their functions. Soils are of high biodiversity value. High importance as a carbon store and active role in carbon sequestration, which have little capacity to tolerate change. Increased mitigation requirements beyond standard measures are required for organically managed land.
Soils with moderate risk of erosion (organo-mineral soils: i.e., peaty soils or peaty gleys, peat < 50 cm)	Medium	Whilst standard mitigation measures will provide appropriate protection to these soils, damage is likely to occur if worked in less-than-ideal conditions (e.g. when above their plastic limit – the moisture state where soil begins to behave as a plastic material). The soils should be given appropriate consideration due to their importance for agricultural production.
Soils with low risk of erosion	Low	These soils are generally more resistant to damage and may be appropriately managed by standard good practice construction measures.

Table 12.7 Receptor Sensitivity (Soil Resources – Structural Damage)		
Receptor	**Sensitivity**	**Justification**
Soils with low resilience to structural damage	High	Soils with high clay and silt fractions (clays, silty clays, sandy clays, heavy silty clay loams and heavy clay loams) and organo-mineral and peaty soils where the Field Capacity Days (FCD) are 150 or greater. Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where the FCDs are 225 or greater. All soils in wetness class (WC) WCV or WCVI.
Soils with medium resilience to structural damage	Medium	Clays, silty clays, sandy clays, heavy silty clay loams, heavy clay loams, silty loams and organo-mineral and peaty soils where the FCDs are fewer than 150. Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where FCDs are fewer than 225. Sands, loamy sands, sandy loams and sandy silt loams where the FCDs are 225 or greater or are in wetness classes WCIII and WCIV.
Soils with high resilience to structural damage	Low	Soils with a high sand fraction (sands, loamy sands, sandy loams and sandy silt loams) where the FCDs are fewer than 225 and are in wetness classes WCI to WCII.

Table 12.8 Magnitude of Change (Soil Resources)		
Magnitude	**Loss of Soil Resources**	**Damage to Soil Resources**
High	<25 % of soil resources suitable for reuse and retained on-site.	Permanent change to the quality of the soil resource.
Medium	25-50 % of soil resources suitable for reuse and retained on-site.	Temporary/reversible change to more than 25 % the soil resource.
Low	51-95 % of soil resources suitable for reuse and retained on-site.	Temporary/reversible change to less than 25 % of the soil resource.
Negligible	>95 % of soil resources suitable for reuse and retained on-site.	No change to soil resource quality.
Percentages for Loss of Soil Resources and Damage to Soil Resources ensemble the percentage of land of the total Site area that is affected by the respective receptor category.		

Table 12.9 Classification of Effects (Land and Soil Resources)					
Sensitivity/ value of receptor	**Magnitude of Change**				
	High	**Medium**	**Low**	**Negligible**	**No Change**
Very High	Major (Significant)	Major (Significant)	Major or Moderate (Significant)	Minor (Not Significant)	Neutral (Not Significant)
High	Major (Significant)	Major or Moderate (Significant)	Moderate or Minor (Potentially Significant*)	Minor (Not Significant)	Neutral (Not Significant)

Table 12.9 Classification of Effects (Land and Soil Resources)					
Sensitivity/ value of receptor	**Magnitude of Change**				
	High	**Medium**	**Low**	**Negligible**	**No Change**
Medium	Major or Moderate (Significant)	Moderate (Significant)	Minor (Not Significant)	Minor (Not Significant)	Neutral (Not Significant)
Low	Moderate or Minor (Potentially Significant*)	Minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Neutral (Not Significant)
Negligible	Minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Neutral (Not Significant)
*Professional judgement will be used to determine the significance of the effect in the particular circumstances. Note: Major, Moderate or Minor effect have the potential to be adverse or beneficial.					

Cumulative Effects

12.6.4 Potential cumulative impacts (intra and / or inter-cumulative, as appropriate) will be identified and considered as part of the assessment.

12.7 Mitigation Measures

12.7.1 A site-specific SMP will be prepared based upon the findings of the reconnaissance reports. By following best practice guidance and implementing a site-specific SMP, it is anticipated that the impacts to soil resources would be minimal and that the Proposed Development will not result in a significant effect on soil resources. As the potential effects are not likely to be significant, no additional proposed mitigation is proposed.

13 SOCIO-ECONOMICS

13.1 Introduction

13.1.1 An assessment will be undertaken of the likely significant effects of the Proposed Development on the social and economic aspects near to the Site, including livelihood activities and land use. This section identifies at a high-level the potential risks and impacts to the existing socio-economic environment and presents those matters that are to be included within the socio-economic chapter of the Environmental Statement.

13.1.2 The main objectives of this section of the Scoping Report are to:

- Determine and delimit the Proposed Development's social Area of Influence (AOI);
- Present the applicable regulatory framework;
- Describe on a high-level the social baseline conditions and identify and present an initial consideration of potential sensitive receptors that may be affected due to the Proposed Development, supported by a site visit by WA in February 2023;
- Present the impact assessment and mitigation methodology that will be adopted in the Socio-economic Impact Assessment (SIA); and
- Detail which social aspects are to be considered in the SIA.

13.1.3 To achieve these objectives, the following components are presented:

- The available Proposed Development characteristics and associated facilities;
- The National planning policy and local plans that are relevant to the Proposed Development;
- The location of communities and farms (i.e., social receptors) within the AOI that are likely to be affected by the Proposed Development; and
- High-level characteristics of the potential impacts.

13.2 Area of Influence

13.2.1 The Proposed Development is located in the North Kesteven district within the Lincolnshire County. The footprint of the Proposed Development, including Beacon Fen North and Beacon Fen South, are located between the Town of Heckington and the Town of Sleaford, approximately 30km south from the City of Lincoln. The

Proposed Development's AOI will be defined in two levels: the Direct AOI and the Indirect AOI, as described below.

13.2.2 The Direct AOI is limited to the North Kesteven district and comprises the communities located within the Proposed Development area (i.e., Beacon Fen North, Beacon Fen South and the Cable Route Area), including a 500m buffer zone, as well as communities that may be affected by land use changes, access to recreation, impact on tourism and any other economic displacement. The Direct AOI is presented in Figure 13.1 Communities Locations.

13.2.3 The Indirect AOI will comprise communities potentially impacted by labour requirements for the Proposed Development, economic benefits and supply chain impacts, as well as traffic on roads connecting to the Proposed Development. The bigger settlements that are well-connected to the Proposed Development area mark an approximate border of the Indirect AOI, as presented in Figure 13.2 Indirect Area of Influence.

13.3 Legislation Context and Guidance

13.3.1 Legislation and guidance relating to socioeconomics, including livelihood activities and land use, and pertinent to the Proposed Development is listed, below. For the relevant planning policy, please refer to Appendix 1.1 at the rear of this Scoping Report.

- The Planning Act 2008
- The Town and Country Planning (Environmental Impact Assessment) Regulations 2017
- Social Impact Assessment: Guidance for Assessing and Managing the Social Impacts of Projects. Fargo ND: International Association for Impact Assessment (Vanclay, F., Esteves, A.M., Aucamp, I. & Franks, D. 2015)
- International Finance Corporation Performance Standards and Guidance Notes; performance standards 1, 2, 4, 5, 7 and 8
- The Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises
- United Nations Guiding Principles on Business and Human Rights

13.4 Current Baseline

13.4.1 This section provides a high-level understanding of the baseline conditions in the Proposed Development's AOI. A more in-depth baseline study will be prepared for the

assessment to inform the ES using, but not limited to, the 2011 and 2021 ONS[38] Census data. The key matters comprised in the full baseline study will be:

- Population and demographics;
- Household conditions and deprivation;
- Land use and livelihood activities;
- Local economies and unemployment;
- Access to services (e.g., education, water, sanitation and electricity, etcetera); and
- Tourism.

13.4.2 Owing to local policy and the potential for the visual aspects of solar farms to adversely impact upon tourism, a detailed understanding of tourism in the area will be included within the baseline studies undertaken to inform the EIA.

Baseline conditions

13.4.3 From 2011 to 2021, the population of North Kesteven increased by 9.6%, from around 107,800 in 2011 to around 118,100 in 2021. Between the last two censuses, the average (median) age of North Kesteven increased by two years, from 44 to 46 years of age.

13.4.4 Unemployment rose from 1.8 to 2.6%. The deprivation indicators for North Kesteven are equal or below the national average and significantly lower than the county deprivation number. In Lincolnshire, 35,3% of households are deprived in one dimension[39], 14.7% in two, 3.7% in three and 0.2% in four dimensions of deprivation. This means that 53.9% are potentially vulnerable households in terms of their access to resources or services that would enable them to adapt to external changes. The numbers for North Kesteven are 33.5%, 11.9%, 2.1% and 0.1%, respectively. This data shows that North Kesteven district could be facing less deprivation challenges than an average household in the Lincolnshire County.

13.4.5 Land use in the Proposed Development area is mostly agricultural and there are Public Rights of Way (PRoW) crossing parts of the Site, which was confirmed by a site visit

[38] Office for National Statistics.
[39] The dimensions of deprivation, according to ONS statistics, refer to the following high-level summaries of deprivation dimensions (for full details see ONS statistics): 1) unemployment or economically inactive, 2) not holding specific education qualifications, 3) adverse health conditions or persons with disabilities, 4) overcrowded or underheated household conditions.

conducted by WA in February 2023. These PRoWs will be mapped in the assessment to understand the potential effects to footpaths and mobility within the AOI.

13.4.6 The Central Lincolnshire Local Plan mentions Sustainable Rural Tourism as one of the policies and development goals. According to the draft policy from March 2022, some areas are 'honey pots' for tourism and the policy outlines the prevention of 'cluster' of tourism accommodation and infrastructure. As the Heckington Area is currently not one of the touristic hubs, there is scope for it to experience tourism growth via the spread of touristic accommodation across Lincolnshire.

13.4.7 Tourist attractions in the area include the Heckington Village Trust Railway & Heritage Museum, the Heckington Windmill (including a working windmill, tearoom, shop, 8 Sail Brewery and a bakehouse) and the Heckington Parish Church. To the south of the Site, a Swaton Vintage Day and World Egg Throwing Championships is organised every year.

13.4.8 There are other developments of national significance, as well as smaller scale developments planned within both the Indirect and Direct AOI. These will be defined within the ES.

13.5 Design Assumptions

13.5.1 The following outlines the design assumptions. Where possible, any known embedded mitigation measure and limitations are also identified.

13.5.2 For the purposes of scoping, the following design assumptions have been made:

- It is assumed that construction will last between 24 and 36 months. Whilst no details are available at this stage concerning the number of direct and indirect jobs expected or the potential use of accommodation camps onsite, this will be confirmed during the EIA;
- A buffer area of 500 m has been added to the Site boundary to identify potential communities and households (i.e., social receptors). The actual Health and Safety (H&S) buffer area is yet to be determined, but will be confirmed during the EIA;
- As seen on Figure 13.1, the Cable Route Area represents an indicative area within which the cable route corridor will be located. The indicative area will be refined ahead of the EIA in support of the DCO application, depending on the output of additional survey and assessment work. The location of the cables route will be determined and assessed during the EIA; and

- Mitigation measure requirements for environmental matters will be covered by other environmental aspect (e.g., Landscape, Visual Impact and Noise, etcetera), as necessary, and will not be covered in the Socio-Economic assessment.

13.6 Likely Significant Effects

13.6.1 Potential socio-economic impacts are based on the interactions between the expected Project activities and the people and communities (i.e. social receptors) in the AOI. Based on the current baseline information and the impact pathways that Project activities could have, resulting in changes to the socio-economic baseline, the Proposed Development could have effects on the following:

- Increased community exposure to noise, dust and traffic during construction activities;
- Restricted access to land and economic displacement of farming / grazing activities;
- Restricted access to recreation and mobility options through the loss of access to PRoWs;
- Generation of local employment, procurement of goods and services and contribution to economy; and
- Change of tourism profile of the area and reduction of touristic attraction.

13.6.2 Table 13.1, below, provides a summary of the key issues to be considered (scoped-in) within the assessment in relation to socio-economics.

Table 13.1 Summary of Likely Significant Effects

Receptor	Potential Effects	Scoped in
Construction Phase		
Communities and governments within the Direct and Indirect AOI, Local workforce	Generation of local employment, procurement of goods and services and contribution to economy	✓
Communities in the direct AOI	Increased exposure to noise	✓
Communities and governments within the Direct and Indirect AOI	Increased exposure to traffic	✓
Communities and governments within the Direct and Indirect AOI, Economically Active Population	Reduction of touristic attraction and change of tourism profile (landscape and visual impacts will be detailed in their respective chapter)	✓
Economically Active Population and communities in the direct	Restricted access to land and economic displacement of farming activities	✓

Table 13.1 Summary of Likely Significant Effects		
Receptor	**Potential Effects**	**Scoped in**
Construction Phase		
and indirect AOI		
Communities in the direct AOI	Restricted access to recreation (access to PRoWs)	✓
Communities and governments within the Direct and Indirect AOI, Economically Active Population	Influx of workers causing stress on local services	✓
Operational Phase		
Communities and governments within the Direct and Indirect AOI, Economically Active Population	Generation of local employment, procurement of goods and services and contribution to economy	✓
Communities and governments within the Direct and Indirect AOI, Economically Active Population	Reduction of touristic attraction and change of tourism profile	✓
Economically Active Population and communities in the direct and indirect AOI	Restricted access to land and economic displacement of farming activities	✓
Communities in the direct AOI	Restricted access to recreation (access to PRoWs in the panel area)	✓
Decommissioning Phase		
Communities and governments within the Direct and Indirect AOI, Economically Active Population	Loss of jobs created during the operational phase	✓
Communities in the direct AOI	Increased exposure to noise	✓
Communities in the direct and indirect AOI	Increased exposure to traffic	✓
Communities in the direct AOI, Farmers	Restricted access to land and economic displacement of farming activities (restricted grazing, cable removal)	✓
Communities in the direct AOI, Farmers	Restricted access to recreational areas and mobility options through footpaths (access to PRoWs)	✓

13.6.3 The socio-economic assessment will also consider the potential cumulative impacts from other developments (listed within Table 13.1), which may contribute to cumulative impacts on the communities in both AOIs. The assessment will, but not limited to, consideration of labour availability, visual impact and tourism, change of the sense of place, impact on available agricultural land, community exposure to traffic and noise, and the influx of workers.

13.6.4 Table 13.2, below, details the matters to be scoped out of further assessment within the EIA.

Table 13.2 Matters to be Scoped out of the assessment	
Matter	**Rationale**
Negative side-effects of local economic growth (price inflation, economic dependence on the Proposed Development).	Unlikely due to the scale and type of the Proposed Development.
Proposed Development-induced population immigration (leading to pressure on local services and infrastructure).	A large part of the workforce would likely come from the Direct and Indirect Area of Influence (AOI), a driving distance from their permanent accommodation, which would limit significant additional pressure on services. Owing to the nature of the Proposed Development, it is unlikely that there will be Proposed Development-induced immigration.
Physical displacement.	It is unlikely that Proposed Development activities will result in physical displacement of households or farms in the Proposed Development area. The land is mostly agricultural, and the final design of the cable routes and solar farms should omit any construction.

13.7 Proposed Impact Assessment Methodology

13.7.1 The methodology used for the evaluation of social impacts is presented below and will be aligned with the general EIA methodology. The SIA will use a two-stepped evaluation including a pre-mitigation and post-mitigation assessment to identify residual impacts. The pre-mitigation assessment assumes compliance of Proposed Development activities with standard industry practices. This methodological approach is compliant with the applicable framework and also consistent with international best practice guidelines and standards.

13.7.2 The level of effect will be determined via social receptor sensitivity and impact magnitude. An effect that is moderate or higher is considered to be 'Significant' (in EIA terms). Following the assessment of the pre-mitigation impact, the implementation of additional mitigation measures will be considered to re-assess the any residual impacts.

Receptor Sensitivity

13.7.3 In contrast with environmental receptors, the degree of sensitivity of social receptors is based on an individual or group's abilities and capacity to adapt to changes and maintain their quality of life, livelihood and health conditions. Sensitivity can be understood in terms of resilience to change (e.g., capacity to cope with socioeconomic changes) and the individual's access to resources to adapt to them. Sensitivity can be further determined by several factors such as a receptor's age, gender, ethnicity, access to employment opportunities, livelihood, education, health, level of marginalisation and dependence on natural or common resources. A qualitative definition of these is presented in Table 13.3, below.

Table 13.3 Social Receptor Sensitivity Scale	
Sensitivity of receptor	**Description of receptor**
Negligible	A social receptor with no need to adapt to change or has a high capacity to adapt completely and almost immediately. Receptor has no shortage of access to adequate resources (material, financial, social) and will have no difficulty adapting to changes.
Low	A social receptor with capacity and means to adapt to change and maintain/improve current conditions on its own after a certain time. Receptor has a high level of access to resources and has a high capacity to adapt to changes.
Medium	A receptor with limited capacity and means to adapt to change and maintain/improve current conditions. Adaptation may take time and/or may only be partial and can require support from mitigation measures. Receptor has some access to resources and retains capacity to partially adapt to changes.
High	An already vulnerable receptor with very little capacity and means to adapt to change and maintain/improve current conditions. Receptor has very limited access to resources, resulting in multiple levels of vulnerability that limits capacity to adapt to changes.

Impact Magnitude

13.7.4 In alignment with the environmental methodology, the magnitude of a potential social impact is a measure of the degree of change from the social baseline conditions and is comprised of different 'elements' that result in different magnitude levels. Each element is described in Table 13.4, below.

Table 13.4 Elements of Impact Magnitude	
Element	**Description**
Type	**Beneficial** (positive): An impact that is considered to represent an improvement to social baseline conditions or the introduction of a new desirable factor. **Adverse** (negative): An impact that is considered to represent an adverse change from social baseline conditions, or the introduction of a new undesirable factor.
Duration	**Short term**: Impacts that are predicted to last for a limited period (construction) or will cease within less than a year. **Medium term**: Impacts that are predicted to last through construction and the beginning part of operations or for a period of one to five years. **Long term**: Impacts that are estimated to occur throughout construction and operations or from six to the end of operations stage. **Very long term**: Impacts that affect a receptor during the development lifecycle and will remain post-closure.
Reversibility	**Reversible**: Impacts are predicted to be reversed after the end of the development activities or on application of mitigation. **Irreversible**: Impacts that cause a permanent change in the affected receptor or resource that endures substantially beyond the development lifetime.
Spatial Extent	**Local**: Include the Direct and Indirect Area of Influence. **Regional**: Include multiple districts or counties. **National**: Encompass most of the national territory. **International**: Encompass more than one country.

13.7.5 Following this step, a definition of the overall magnitude level is made considering the combination of elements is presented in Table 13.5, below.

Table 13.5 Magnitude of Change Scale (Social)	
Magnitude Level	**Description**
Negligible	Potential impact will not result in any measurable or perceivable changes to baseline conditions.

Table 13.5 Magnitude of Change Scale (Social)	
Magnitude Level	**Description**
Low	A potential impact that is unlikely to have a measurable effect on the wellbeing of people so that the baseline conditions will not be considerably affected.
Medium	A potential impact that is likely to be short or medium term (less than one year), spatially localised (likely to affect a small number of social receptors) and reversible.
High	Potential impact will result in measurable change on baseline conditions and is likely to affect a moderate number of social receptors, causing livelihood change on a moderate scale. May or may not be reversible depending on specific conditions.

13.7.6 The level of effect is defined through the matrix in Table 13.6, below.

Table 13.6 Level of Effect Matrix (Social)				
Receptor Sensitivity	**Magnitude of Change**			
	Negligible	**Low**	**Medium**	**High**
Negligible	Negligible	Negligible	Minor	Moderate
Low	Negligible	Minor	Minor	Moderate
Medium	Negligible	Minor	Moderate	Major
High	Minor	Moderate	Major	Major

Cumulative Effects

13.7.7 Potential cumulative impacts (intra and / or inter-cumulative, as appropriate) will be identified and considered as part of the assessment.

13.8 Potential Mitigation Measures

13.8.1 Indicative mitigation measures may include the following, where appropriate:

- Promoting local employment and local spending, targeting the most deprived areas;
- Limiting physical and economic displacement by allowing agriculture and grazing whenever possible and potentially reskilling agricultural workers to become solar farm maintenance workers during operations;
- Maintaining access to PRoWs whenever possible; and
- Maintaining access to touristic attractions in the area and limiting visual impact in touristic areas (e.g. around the Swaton Vintage Day area).

14 ASPECTS TO BE SCOPED OUT

14.1 Air Quality

14.1.1 Following the consideration of potential impacts upon air quality as a result of the Proposed Development, it is proposed that this aspect be scoped out of the EIA.

Baseline

14.1.2 The Site is located within the administrative area of NKDC, which is responsible for the management of local air quality. NKDC does not currently have any Air Quality Management Areas (AQMA) declared within its administrative boundary. The closest AQMA to the Site is the Haven Bridge AQMA, which is located approximately 13km east of the site and falls within the administrative boundaries of Boston Borough Council (BBC).

14.1.3 NKDC monitors air quality by means of 22 non-automatic nitrogen dioxide (NO_2) diffusion tubes located across its administrative area. The closest is the diffusion tube at Heckington, approximately 1.3km east of the cable area eastern boundary, which reported an annual mean NO_2 concentration of 15.8 µg/m^3 in 2021. This is well below the annual mean objective of 40 µg/m^3.

14.1.4 In the absence of representative background pollutant concentrations being available for the local area, background concentrations for NO_2 and particulate matter (PM_{10} and $PM_{2.5}$) have been obtained from the 2018-based default concentration maps provided by the Department for the Environment, Food and Rural Affairs (DEFRA) on their Local Air Quality Management (LAQM) webpages[40].

14.1.5 Background pollutant concentrations representative of the various site areas are 'low' (see Table 14.1, below), all being well below the relevant annual mean objectives / target levels of 40 µg/m^3 for NO_2 and PM_{10}, and 20 µg/m^3 for $PM_{2.5}$.

Table 14.1 Background pollutant concentrations for 2023* (µg/m^3)

Location	Grid reference	NO_2	PM_{10}
Beacon Fen North	514933, 348152	6.58	15.19
Northern Cable Corridor	512512, 344207	7.26	15.91
Beacon Fen South	512730, 340324	6.34	15.16
Southern Cable Corridor	516920, 337789	6.29	15.25
* Based upon the 2018 base maps and projected forward for the year 2023.			

Key Sensitive Receptors

14.1.6 A CEMP will be prepared to accompany the Development Consent Order (DCO) application for the Proposed Development. As part of this, potential sensitive

[40] Department for Environment, Food and Rural Affairs, Local Air Quality Management webpages (http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html).

receptors will be identified for the construction of the Proposed Development based upon a review of aerial photography, construction and decommissioning phasing plans and Ordnance Survey (OS) mapping. This will be undertaken with consideration to current guidance, including the following:

- Guidance on the Assessment of Dust from Demolition & Construction, Institute of Air Quality Management (IAQM) (2014).
- Guidance on Land-use Planning & Development Control: Planning for Air Quality, Environmental Protection UK (EPUK) / IAQM (2017).
- Local Air Quality Management Technical Guidance No. 22, Defra (2022).

Potential Air Quality Impacts

14.1.7 Whilst it is noted that the layout of Beacon Fen North and Beacon Fen South has yet to be determined, a residential buffer will be implemented. The potential air quality impacts as a result of the Proposed Development are considered to be:

- Impacts due to dust arising during the construction and decommissioning phases of the Proposed Development; and
- Impacts due to vehicle and plant emissions during the construction and decommissioning phases of the Proposed Development.

14.1.8 No adverse effects are anticipated during the operational phase of the Proposed Development due to the low number of anticipated vehicle movements (i.e., a small number of routine inspection / maintenance trips) and the nature of the Proposed Development. During the operational phase, the Proposed Development is expected to result in minimal alteration to the existing baseline in respect of air quality. No emissions are anticipated from the onsite infrastructure and there will be minimal vehicle movements to and from the Site. Therefore, consideration of air quality impacts during the operational phase is proposed to be scoped out for assessment.

14.1.9 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 IAQM guidance for assessing impacts from such activities. This is a screening assessment and risk-based qualitative assessment approach that is applied to air quality assessments throughout the UK. Mitigation measures will be identified and incorporated into the CEMP, as necessary, and overall, it is anticipated that incorporating air quality mitigation measures into the CEMP will negate the need for a specific air quality assessment chapter within the ES.

14.1.10 A review of Defra's online MAGIC[41] resource confirms that there are no locally, nationally or internationally designated sensitive habitat sites present within 50m of the Site boundaries or within 50m of trackout routes. In-line with the screening criteria provided within the IAQM guidance, it is, therefore, proposed that dust soiling impacts on designated sites can be scoped out of the assessment.

14.1.11 Construction and decommissioning-related plant emissions are anticipated to represent a small source of emissions relative to the local ambient conditions within the vicinity of the Site boundary. This is based on the scale of construction that will occur and the number of plant vehicles that will be required. Suitable mitigation measures for plant and motorised equipment will, however, be recommended based upon advice prescribed in the IAQM guidance and incorporated into the CEMP.

14.1.12 The anticipated number of vehicles that will be in operation during the construction and decommissioning phases of the Proposed Development have been considered in the context of the EPUK / IAQM guidance.

14.1.13 This guidance 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'. The predicted construction flows are well-below this criterion and are not expected to adversely affect air quality. It is, therefore, proposed that construction traffic is scoped out for assessment.

Mitigation Measures

14.1.14 Implementation of mitigation including a CEMP and Construction Transport Management Plan (CTMP) will ensure that construction vehicle management and good construction practice are carried out to minimise potential impacts to the environment in terms of changes to air quality and the generation of dust.

14.1.15 The CEMP and CTMP will include such measures as:

- All roads, temporary tracks and other routes will be dampened to prevent dust leaving the Site. Roads surrounding the Site will be cleaned, as necessary.
- Stockpiled material, where practicable will be enclosed, screened or dampened to eliminate dust generation.
- Hard surfaced roads will be constructed as soon as possible or at the earliest time that the build programme allows.

[41] Multi Agency Geographic Information for the Countryside (https://magic.defra.gov.uk/home.htm).

- Avoidance of activities that generate large amounts of dust during windy conditions;
- Ensure all vehicles switch off engines when stationary (i.e., no idling vehicles).
- Ensure vehicles entering and leaving the Site are covered to prevent the escape of materials during transport.
- Limitation of vehicle speeds, as the slower the vehicle speeds, the lower the dust generation.

14.1.16 Implementation of the CEMP and CTMP will ensure that air emissions are controlled and minimised and that any potential effects are negligible. Implementation of the CEMP and CTMP will also ensure that the Proposed Development' contribution to any cumulative effects will also be negligible.

14.1.17 The operational phase of the development will not result in the introduction of any new air pollutant or dust emission sources into the area. Therefore, the impact is deemed to be Neutral and any effects (including cumulative effects), negligible.

Summary

14.1.18 Based upon the above, it is proposed to scope out the need to undertake an air quality assessment as part of the EIA and, in turn, to scope out the need to prepare a specific air quality chapter as part of the ES. A CEMP will be prepared that will include mitigation measures intended to minimise potential air quality and / or dust impacts as a result of activities associated with the construction and decommissioning of the Proposed Development.

14.2 Ground Conditions

14.2.1 Following the consideration of potential impacts in relation to ground conditions as a result of the Proposed Development at the Site, it is proposed that an assessment be scoped out of the EIA. Rather, it is proposed that a standalone Phase 1 Ground Conditions Desk Study will be prepared and included as part of the ES that will accompany the application. This is expanded upon, below.

Current Baseline

14.2.2 An assessment of the current baseline conditions has been undertaken based upon a review of the following information:

- British Geological Survey (BGS) published 1:50,000 Solid and Drift Mapping.
- Defra MAGIC Interactive Map dataset (including aquifer designations, source protection zones and rivers).

- Coal Authority Interactive Viewer.
- Environment Agency Catchment Data Explorer.
- Zetica Unexploded Ordnance online mapping.
- Environment Agency Recorded Landfills online dataset.

Geology

14.2.3 Made Ground is not expected in substantial quantities / extents at the Site. This is based on the current agricultural land use, with only two small, localised areas (one in the west and one in the north of the Site) recorded by the BGS to contain 'artificial ground'. This is of an unknown origin, and it is noted that the northern area is currently occupied by a pond. Historical maps have not been consulted at this stage, however, which may identify additional areas of Made Ground. It is also expected that thin deposits of Made Ground will be present directly beneath the roads and tracks that cross the Site (i.e. materials that form part of the construction of the roads and tracks).

14.2.4 The eastern circa 2,000 ha of the Site is recorded to be underlain by clay and silt tidal flat deposits, which extend beyond the Site boundary to the north, east and south. The remainder of the Site is recorded to be underlain generally by diamicton till deposits, with localised areas of glaciofluvial sheet deposits (comprising sand and gravel), alluvium (comprising clay, silt, and sand and gravel deposits), and sand and gravel deposits of the Sleaford Sand and Gravel.

14.2.5 Across the majority of the Site, the superficial deposits are recorded to be underlain the Oxford Clay Formation (generally described by the BGS as 'silicate-mudstone, grey, generally smooth to slightly silty, with sporadic beds of argillaceous limestone nodules'). The exception is small areas in the east and north of the Site, where the superficial deposits are recorded to be underlain by solid geology of the West Walton Formation (generally described by the BGS are 'calcareous mudstone, silty mudstone and siltstone, with subordinate fine-grained sandstones and argillaceous limestone (cementstone) or siltstone nodules').

14.2.6 Three geological faults are present at the Site, all of which generally trend west to east.

14.2.7 No geological Sites of Special Scientific Interest (SSSI) are located within 2km of the Site boundary. There are no designated Groundwater Dependent Terrestrial Ecosystems within 2km of the Site boundary.

14.2.8 The Site is not located within a chalk dissolution area, Coal Mining Reporting Area or a brine pumping area.

Hydrogeology

14.2.9 The superficial deposits in the east of the Site comprising clay and silt tidal flat deposits are classified as Unproductive Strata. The superficial deposits elsewhere at the site are variably classified as Secondary Undifferentiated Aquifers and Secondary A Aquifers. The solid strata beneath the Site and surrounding areas are classed as Unproductive Strata.

14.2.10 The Site is located entirely within the 'Black Sluice Internal Drainage Board (IDB) draining to the South Forty Foot Drain' Nitrate Vulnerable Zone (NVZ), which covers land surrounding the Site in all directions. The Site is not located within a drinking water safeguard zone. The groundwater within the Site and surrounding areas is classed as 'low vulnerability', based on the MAGIC Interactive Map groundwater vulnerability mapping.

14.2.11 The southwest corner of the Site, to the south of Helpringham village, includes land that forms part of a groundwater Source Protection Zone I (Inner Protection Zone), as well as parts of the Zone II (Outer Protection Zone) and Zone III (total catchment) areas that surround the Inner Protection Zone. It is unclear at present which geological units groundwater is abstracted from within the Source Protection Zone. The Source Protection Zone I is recorded to be underlain by superficial deposits of glacial till, with small areas of glaciofluvial sand and gravel and alluvium. The immediately underlying solid geology is recorded to be the Oxford Clay Formation, but it is noted that a historical borehole record (available from the BGS) indicates the presence of limestone beneath this at around 36m depth, with groundwater encountered at around 76m. The remainder of the Site is not located within any Source Protection Zones (SPZ).

Hydrology

14.2.12 Surface water features are present in abundance across the Site, primarily in the form of land drains along the edges of field parcels. The South Forty Foot Drain is present in the east of the Site, orientated northeast to southwest. A second major drain is present in the north of the Site, orientated east to west. These drains connect into The Haven downstream and east of the Site. Scredington North Beck traverses part of the Site, immediately to the north of Helpringham. Two reservoirs are located in the centre of the Site, to the east of Little Hale village.

14.2.13 The assessment of the potential effects of the Proposed Development on surface water receptors is outside the scope of an assessment relating to Ground Conditions

and will, instead, be considered (as necessary) as part of the Water Resources assessment.

Environmental

14.2.14 There are no historical landfills recorded within the Site boundary. The closest recorded historical landfill is located northeast of Heckington, circa 1.1km from the Site boundary. This historical landfill is recorded to have accepted both commercial waste and liquid sludge, with inputs beginning in 1964. No permitted waste sites or authorised landfills, nor any areas of recorded current landfilling are recorded within the Site or surrounding areas.

Radon

14.2.15 The Site is indicated to lie entirely within a zone of low radon risk, with the highest radon potential indicated to be <1%, suggesting that less than 1% of homes in this area are at or above the action level for radon.

Mining

14.2.16 The Site and surrounding areas are not located within a Coal Mining Reporting Area or Development High Risk Area. Non-coal mining is not recorded within the Site or surrounding areas, based on the Coal Authority abandoned mines catalogue.

Unexploded Ordnance

14.2.17 The Site is indicated on Zetica's online risk mapping to be entirely within an area of low risk from unexploded ordnance (UXO). However, it is noted that the maps do record a UXO find adjacent to Bicker village, circa 2km east of Site.

Sensitive Receptors

14.2.18 The potential sensitive receptors relating to Ground Conditions are considered to be:

- Construction workers.
- Adjacent land users (i.e. residents, farmers) during construction.
- Future Site users – workers or maintenance staff.
- Buried structures or services.
- Groundwater within the superficial deposit aquifers (Secondary Undifferentiated and Secondary A).
- Surface water features present in abundance across the Site, including drains surrounding all field parcels or reservoirs within the centre of the Site (to be considered within the Water Resources Chapter of the ES).

Potential Effects

14.2.19 As a Phase 1 Desk Study has not been undertaken to date, the potential effects have initially been based on a review of publicly available data.

Construction

14.2.20 At this stage, it is considered that construction will involve the stripping of topsoil (where present) and the excavation of trenches along the cable route (should underground cables be used) or the installation of pylons (should overhead lines be used), as well as limited ground disturbance for the installation of the temporary solar panel foundations / anchors.

14.2.21 A Phase 1 Ground Conditions and Contamination Desk Study report will be prepared and included within the ES to be submitted with the DCO application. This will establish the nature and significance of any contaminant sources within the Site and surrounding areas, and will consider environmental ground instability risks based on the BGS GeoSure geohazards database. At this stage, based upon the review of publicly available data and subject to confirmation following completion of the Phase 1 Desk Study Report, there is considered to be a low likelihood of any significant effects relating to the Proposed Development.

14.2.22 It is anticipated that any potential effects associated with ground conditions and contamination at the Site will be effectively managed through the CEMP that will be prepared to accompany the application, the adoption of industry best practice and appropriate personal protective equipment (PPE) measures.

Operation

14.2.23 The nature of the Proposed Development is such that, during the operational phase, the regular and widespread use of machinery or vehicles is not anticipated. The Proposed Development is also not likely to introduce new risks to the sensitive receptors as it does not involve any substantial built development or permanent Site users.

14.2.24 There is potential for chemical attack on buried structures or services due to the presence of pyritic natural strata (for example, the Oxford Clay Formation) beneath the Site. This is a standard engineering design consideration that can be addressed by designing below ground materials to be suitable for the ground conditions.

14.2.25 Based on the review of publicly available data and the nature of the Proposed Development (i.e. photovoltaic solar arrays), there is considered to be a low possibility of significant risk to receptors during the operational phase. As with the potential

construction phase effects, this is subject to confirmation following completion of the Phase 1 Desk Study Report.

Summary

14.2.26 Based on the initial review of publicly available data and in consideration of the nature of the Proposed Development, there is considered to be a low risk to sensitive receptors during both the construction and operational phases of the Proposed Development. It would, therefore, be disproportionate and unnecessary to prepare a specific ground conditions chapter for inclusion within the ES. It is recognised, however, that there is a planning requirement to ensure that potential contamination and ground conditions risks have been fully considered and addressed (e.g. as required by the government's Land Contamination Risk Management Guidance and the relevant National Policy Statements for Energy). It is, therefore, intended to produce a standalone Phase 1 Ground Conditions Desk Study for inclusion within the ES. This will ensure that a proportionate level of information and assessment is provided.

14.3 Human Health

14.3.1 Following the consideration of potential impacts in relation to human health as a result of the Proposed Development, it is proposed that a health assessment can be scoped out of the EIA and the ES. This is expanded upon, below.

Introduction

14.3.2 Health is defined by the World Health Organisation (WHO) as "*a state of complete physical, mental and social wellbeing and not merely an absence of disease or infirmity*"[42]. An assessment of health considers potential impacts on population health due to changes to the wider determinants of health. These wider determinants or themes include health related behaviours (e.g. physical activity, diet and nutrition), social environment (e.g. housing, access, open space and community safety), economic environment (e.g. training and employment), biophysical environment (e.g. climate change and air quality) and institutional and built environment (e.g. health and social care services). The relevant determinants within the social environment, economic environment and biophysical environment are to be separately addressed in the ES to various extents under the applicable aspects.

14.3.3 A health screening exercise has been undertaken (see Appendix 14.1) to inform this Scoping assessment in accordance with the Central Lincolnshire Healthy Planning

[42] Constitution of the World Health Organisation (1946).

Checklist. The conclusion of the screening exercise and this Scoping assessment is that the Proposed Development is only anticipated to potentially result in limited impacts on human health, focused during the construction phase and, to a similar extent, the decommissioning phase. These effects are not anticipated to be significant in EIA terms and, therefore, it is proposed that this aspect is to be scoped out for further assessment as part of the EIA. Rather, potential impacts on human health will be considered, where relevant, within other aspects scoped into the EIA for inclusion within the ES and supporting documentation (e.g. CEMP and any other similar management plans).

Baseline Conditions

Lincolnshire and North Kesteven

14.3.4 The Site is located within the county of Lincolnshire, the unitary authority of North Kesteven and within the ward boundaries of Kirkby la Thorpe and South Kyme, Heckington Rural, and Osbournby. Each of these wards is considered in detail below.

14.3.5 The latest Local Authority Health Profile data for Lincolnshire[43] and North Kesteven[44], published by Public Health England (PHE) provide the most recent summary of health of the population in the area.

14.3.6 The Health Profiles illustrate that health is varied in Lincolnshire when compared to the England average, whilst in North Kesteven health is largely similar or better than the England average. North Kesteven is one of the least deprived districts / unitary authorities in England, however, circa 9% (1,841) children live in absolute low income families and 11.5% (2,354) live in relative low income families. Life expectancy for both men and women is higher than the England average.

Health Inequalities

14.3.7 Life expectancy is 5.5 years lower for men and 3.8 years lower for women in the most deprived areas of North Kesteven than in the least deprived areas.

Child Health

14.3.8 In Year 6, 20.3% (270) of children are classified as obese, which is better than the average for England. The rate for admission episodes for alcohol-specific conditions among those under 18 is 21.8 (per 100,000 population), which is not significantly

[43] https://fingertips.phe.org.uk/profile/health-profiles/data#page/1/gid/1938132701/pat/6/par/E12000004/ati/402/are/E10000019/yrr/3/cid/4/tbm/1. Accessed 16/03/2023.
[44] https://fingertips.phe.org.uk/profile/health-profiles/data#page/1/gid/1938132701/ati/401/iid/90366/age/1/sex/1/cat/-1/ctp/-1/yrr/3/cid/4/tbm/1. Accessed 16/03/2023.

different to the average for England. This represents 15 admissions per year. Levels of teenage pregnancy and GCSE attainment (average attainment 8 score) are not significantly different to the average for England. The smoking in pregnancy rate is worse than the England average.

Adult Health

14.3.9 The rate for admission episodes for alcohol-related conditions is 433 (per 100,000 population), which is better than the average for England. This represents 548 admissions per year. The rate for emergency hospital admissions for intentional self-harm is 117.5 (per 100,000), also better than the average for England. This represents 130 admissions per year.

14.3.10 Estimated levels of excess weight in adults (aged 18+) and physically active adults (aged 19+) are similar to the England average.

14.3.11 The rates of new sexually transmitted infections, homelessness, violent crime (hospital admissions for violence) and new cases of tuberculosis are lower than the England average.

14.3.12 The rates of cancer diagnosis at stages 1 and 2 and estimated dementia diagnosis (aged 65 and over) are worse than the England average.

Kirkby la Thorpe and South Kyme Ward

14.3.13 The Office for Health Improvement and Disparities' Local Health data for Kirkby la Thorpe and South Kyme[45] shows that, for the majority of health indicators, health in Kirkby la Thorpe and South Kyme is not significantly different to the England average. Several of the indicator factors for Kirkby la Thorpe and South Kyme Ward are considered significantly better for health and wellbeing than the England average. These are:

- Income deprivation;
- Child poverty;
- Older people in poverty;
- Older people living alone;
- Overcrowded houses;
- Unemployment;

[45] https://www.localhealth.org.uk/#bbox=507345,351547,10523,15433&c=indicator&selcodgeo=E05005627&view=map12. Accessed 16/03/2023.

- Emergency hospital emissions for all causes; and
- Emergency hospital emissions for Chronic Obstructive Pulmonary Disease.

14.3.14 There are three indicator factors that are considered to be significantly worse than the England average. These are:

- Limiting long-term illness or disability;
- Life expectancy at birth for females; and
- Deaths from all causes (all ages).

Heckington Rural Ward

14.3.15 The Office for Health Improvement and Disparities' Local Health data for Heckington Rural[46] shows that, for the majority of health indicators, health in Heckington Rural is not significantly different to the England average. Several of the indicator factors for Heckington Rural Ward are considered significantly better for health and wellbeing than the England average. These are:

- Income deprivation;
- Child poverty;
- Older people in poverty;
- Older people living alone;
- Overcrowded houses;
- Unemployment;
- Emergency hospital emissions for all causes;
- Emergency hospital emissions for coronary heart disease;
- Hospital admissions for alcohol attributable conditions (broad definition);
- Deaths from all causes, under 75 years;
- Deaths from all cancer, under 75 years; and
- Deaths from all causes considered preventable, under 75 years.

14.3.16 There are two indicator factors that are considered to be significantly worse than the England average. These are:

[46] https://www.localhealth.org.uk/#bbox=507345,351547,10523,15433&c=indicator&selcodgeo=E05005625&view=map12. Accessed 16/03/2023.

- Limiting long-term illness or disability; and
- Deaths from circulatory disease, under 75 years.

Osbournby Ward

14.3.17 The Office for Health Improvement and Disparities' Local Health data for Osbournby[47], shows that for the majority of health indicators, health in Osbournby is not significantly different to the England average. Several of the indicator factors for Osbournby Ward are considered significantly better for health and wellbeing than the England average. These are:

- Income deprivation;
- Child poverty;
- Older people in poverty;
- Older people living alone;
- Overcrowded houses;
- Unemployment;
- Emergency hospital emissions for all causes;
- Emergency hospital emissions for coronary heart disease;
- Emergency hospital emissions for Myocardial Infarction (heart attack);
- Hospital admissions for alcohol attributable conditions (broad definition);
- Life expectancy at birth for males;
- Deaths from all causes, under 75 years; and
- Deaths from respiratory diseases, all ages.

14.3.18 There are two indicator factors that are considered to be significantly worse than the England average. These are:

- Emergency admissions in children under 5 years old; and
- Incidence of prostate cancer.

[47] https://www.localhealth.org.uk/#bbox=507345,351547,10523,15433&c=indicator&selcodgeo=E05005635&view=map12. Accessed 16/03/2023.

Environmental Context

14.3.19 Wider baseline conditions of relevance to human health are (where applicable) outlined in the other sections of this Scoping Report under each environmental aspect, comprising:

- Access and Traffic;
- Agricultural Land
- Air Quality;
- Climate Change;
- Flood Risk and Drainage;
- Glint;
- Noise and Vibration;
- Landscape and Visual;
- Socio-economics;
- Waste; and
- Water Resources.

Scoping Assessment Methodology

14.3.20 The Infrastructure Planning (EIA) Regulations 2017 include a requirement for human health to be considered as part of the environmental aspects assessed within an EIA. The Regulations require the direct and indirect significant effects of the proposed development to be assessed with regards to human health. In November 2022, the Institute of Environmental Management and Assessment (IEMA) published guidance on 'Effective Scoping of Human Health in Environmental Impact Assessment' and 'Determining Significance for Human Health in Environmental Impact Assessment'.

14.3.21 The Central Lincolnshire Local Plan (adopted in 2017) includes the supporting document 'Health Impact Assessment for Planning Applications: Guidance Note (April 2017)', which details the requirements for Health Impact Assessment (HIA) to ensure that the impact of development on health and wellbeing is considered and responded to during the planning process. The first requirement is the completion of the Healthy Planning Checklist, which is recommended to be used a screening tool to assess the likely impacts of a proposal on health and to determine the requirements for a more detailed HIA.

14.3.22 The Healthy Planning Checklist has been used to undertake the screening exercise of potential health impacts arising from the Proposed Development and is included within Appendix 14.1 of this Scoping Report.

14.3.23 For the purposes of this assessment, the Proposed Development has been considered against the health themes set out within the Healthy Planning Checklist, which is designed to assess the likely health impacts of proposals against the following eleven themes / determinants of health:

- Construction;
- Healthy Homes;
- Active Travel and Connectivity;
- Access to Services and Social Infrastructure;
- Open Spaces, Access to Nature and Physical Activity;
- Healthy Foods;
- Community Safety;
- Equality, Social Relationships and Community;
- Employment;
- Environment and Resources; and
- Climate Change.

14.3.24 When examining the assessment criteria of these themes / determinants against the Proposed Development during the screening exercise, it is considered that the following matters are of relevance for this Scoping assessment in terms of potential adverse or beneficial effects:

- Construction; and
- Employment.

Potential Effects and Mitigation Measures

Sensitive Receptors

14.3.25 The following constitute the sensitive receptors that have been considered within this assessment:

- Residents living in the local area (existing and future);
- Site workers;

- People employed in the local area; and
- People passing through the local area, including visitors.

Potential Effects

Determinant / Theme: Construction

14.3.26 The Site does not lie within an Air Quality Management Area (AQMA) and, as identified in the Air Quality section of this Scoping Report, background pollutant concentrations representative of the Site are very low. A baseline noise survey is to be undertaken, but it is considered that existing noise levels are likely to be relatively low due to the predominantly rural nature of the Site.

14.3.27 Potential construction impacts in terms of dust, noise and vehicle emissions are associated with various health and wellbeing issues. Adverse effects include lung and heart disease relating to poor air quality, the contribution of noise to unhealthy living environments, general disturbance from excessively noisy activities and uses, and physical inactivity as a result of poor environment.

14.3.28 Periods of construction are anticipated to inevitably cause some disruption in terms of accessibility and travel in the local area due to construction traffic movements. Such disruption may have the potential to affect psychological health in terms of stress or anxiety related conditions, particularly for those commuting or travelling in proximity to the Site on a regular basis, as daily routines may be affected.

14.3.29 During the temporary construction and decommissioning phases of the Proposed Development, there is potential for impacts on health due to dust, noise, vehicle emissions and the risk of traffic accidents.

Mitigation

14.3.30 It is proposed that mitigation to minimise these potential impacts would be provided via a Construction Environmental Management Plan[48] (CEMP) and Construction Traffic Management Plan (CTMP). With these measures in place, it is considered that impacts on sensitive receptors will be negligible.

14.3.31 During the operational phase, it is anticipated that plant will be contained and noise emissions will be below statutory limits at nearby receptors, secured through the design of the Proposed Development. There is likely to be minimal vehicle generation relating to site workers undertaking maintenance during this operational phase. It is,

[48] A Decommissioning Environmental Management Plan (DEMP) would be prepared to minimise impacts during the decommissioning phase.

therefore, anticipated that there will be no likely significant effects on human health arising during the operational phase of the Proposed Development.

14.3.32 Both the Noise and Vibration and the Access and Traffic chapters of the ES will consider these potential effects of relevance to human health. A Travel Plan will also accompany the DCO application. As outlined in Section 14.1, any potential air quality effects are considered negligible and have been scoped out of the ES.

14.3.33 It is, therefore, not considered necessary to include a separate human health chapter for the consideration of these aspects of the Proposed Development.

Determinant / Theme: Employment

14.3.34 The Proposed Development is anticipated to create employment and supply chain opportunities during the construction, operational and decommissioning phases.

14.3.35 Access to employment opportunities is associated with various health and wellbeing issues. Research has demonstrated the links between employment and mental health whilst also having potential for subsequent benefits such as income to spend on leisure activities and a range of food options thus contributing towards physical health. Mental illness, poor self-esteem, physical inactivity, and health inequalities are also linked with unemployment and poverty. The availability of work is also considered to provide beneficial health effects to a range of receptors, so not only those of working age who are directly employed.

14.3.36 The Socio-economic chapter of the ES will consider generation of employment and increased business opportunities throughout the construction, operations and decommissioning phases of the Proposed Development. It is, therefore, not considered necessary to include a separate human health chapter for the consideration of these aspects of the Proposed Development.

Other Determinants / Themes

14.3.37 As illustrated in the screening exercise (Appendix 14.1), there is potential for limited effects in relation to some of the other determinants / themes set out in the Healthy Planning Checklist. These relate to accessibility of the Site in terms of existing Public Rights of Way (PRoW), contact with nature in terms of visual amenity and biodiversity, and fire risk when considering the battery storage. As set out in the screening exercise, it is considered that, with mitigation measures embedded in the design and forming part of management plans (e.g., CEMP), as will be considered across the other relevant environmental aspects of the ES, there will not be significant effects on human health.

Health Indicators

14.3.38 When considering the Proposed Development and likely mitigation measures against the Kirkby la Thorpe and South Kyme, Heckington Rural, and Osbournby Wards' health indicators that are significantly worse than the England average, it is considered that the proposals are not likely to contribute to an increased risk in these factors.

Summary

14.3.39 It is considered that the Proposed Development is unlikely to result in any significant adverse effects, including cumulatively, on human health for sensitive receptors or on the status of Kirkby la Thorpe and South Kyme, Heckington Rural, and Osbournby Wards' current health indicators. Potential effects of the Proposed Development of relevance to human health will be assessed elsewhere within in the EIA / ES, within the following aspects:

- Access and Traffic;
- Noise and Vibration;
- Water Resources;
- Flood Risk and Drainage;
- Climate Change; and
- Landscape and Visual.

14.3.40 Mitigation measures will be implemented (where required) to avoid the potential for adverse impacts relating to human health determinants. A CEMP and CTMP will form part of the DCO application. A Decommissioning Statement will be submitted as part of the DCO application. In addition, prior to decommissioning a DEMP will be prepared and agreed with the relevant Local Planning Authority.

14.4 Waste

14.4.1 A Waste Assessment considers the aims of international, national and local policy in regard to commitments to manage resources more efficiently, prevent and minimise waste, and increase overall recycling rates. Following the consideration of this aspect in relation to the Proposed Development, it is proposed that a waste assessment can be scoped out of the EIA and the ES. This is expanded upon, below.

14.4.2 To ensure the promotion of good practice and sustainable development, when selected, the Contractor will implement a Site Waste Management Plan (SWMP) as part of a CEMP throughout the detailed design and construction periods and through to operation of the new development.

14.4.3 The Developer will, therefore, seek to ensure that any / all waste generated in developing the Site is minimised or otherwise reused, recycled, recovered or, if necessary, disposed of in accordance with the waste hierarchy.

Legislation Context and Guidance

14.4.4 The legislative framework in relation to waste and resource management is summarised as follows:

- Legislative Framework:
- European Community (EC) Framework Directive for Waste, 2008/98/EC (the Waste Framework Directive);
- EC Landfill Directive, 1999/31/EC; and
- The Site Waste Management Plans Regulations 2008.
- National Policy:
- National Planning Policy; and
- National Planning Policy Framework, 2021 (NPPF).
- Local Policy:
- Central Lincolnshire Local Plan 2012-2036 (2017);
- Lincolnshire Minerals and Waste Local Plan (2006); and
- Southeast Lincolnshire Local Plan 2011-2035 (2019).
- Guidance:
- IEMA 'Materials and Waste in Environmental Impact Assessment – Guidance for a proportionate approach (2020); and
- Resources and Waste Strategy for England (2018).

14.4.5 The CEMP and SWMP will cover all the requirements for compliance with the above planning policy and legislation in relation to waste.

14.4.6 The principal objective of sustainable resource and waste management is to use material resources more efficiently and to reduce the amount of waste requiring final disposal by landfill. Where waste is generated, it should be managed in accordance with Defra's waste hierarchy[49] (as displayed in Figure 14.1, below). The waste hierarchy advocates an order of preference for the management of wastes.

[49] Department for the Environment, Food and Rural Affairs (Defra) (2013), Waste Management Plan for England

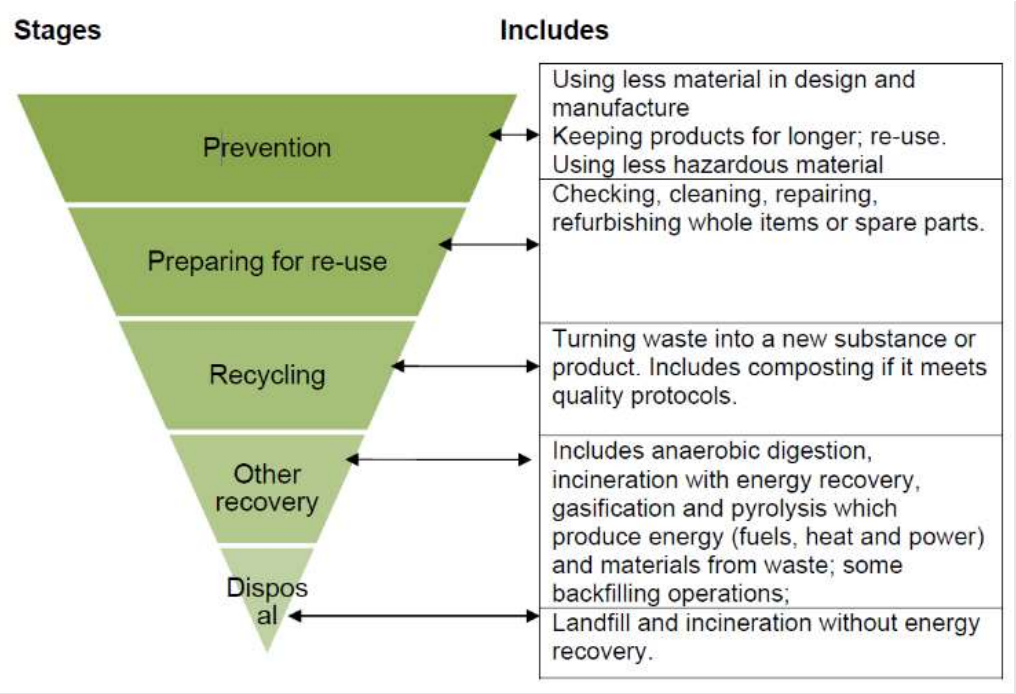

Figure 14.1 The Waste Hierarchy

14.4.7 Resource and waste management should actively contribute to the economic, social and environmental goals of sustainable development.

Potential waste arisings

Construction Phase

14.4.8 It is noted that large-scale earthworks are not anticipated for the Proposed Development. The electrical infrastructure, including PV modules, will be manufactured offsite and delivered for installation when required. Therefore, construction phase waste is anticipated to be minimal.

14.4.9 Any materials that are generated during construction are likely to include inert construction materials, as well as packaging (e.g. wood and plastic) and materials generated during such activities as the tarmacking of roads and parking areas, and concreting.

14.4.10 It is the intention that, where possible, any excavation materials will be reused onsite for landscaping and all other materials will be segregated and stored for onward processing and recycling as a priority. A detailed SWMP will be in place as part of the CEMP and the Contractor will be required to only order materials as and when required in order to reduce the risk of generating waste streams. Appropriate management of wastes during the construction through the SWMP will minimise the effect of waste generation during the operational phase.

Operational Phase

14.4.11 Owing to the nature of the Proposed Development, waste generation during the operational phase will be minimal (e.g. augmentation of a small number of units, which will be recycled for reuse wherever possible) and will not have a significant impact upon the local and regional waste management infrastructure. The likely waste to be produced from the operation / maintenance of the Site will be associated with potential equipment / panel replacements and workers carrying out onsite maintenance, which might include packaging, dry recycling, residual waste and potentially food waste. There is potential for airborne litter to leave the Site, but this will be limited by the provision of suitable litter bins throughout the Site; encouraging Site users to act responsibly.

Decommissioning Phase

14.4.12 The lifespan of the Proposed Development is anticipated to be approximately 60 years. A Decommissioning Statement will be submitted as part of the DCO application and, prior to decommissioning, a DEMP will be prepared and agreed with the relevant Local Planning Authority. Any waste generated from decommissioning at the end of life will be managed in accordance with the site management plans, and ultimately, the requirements of the DEMP.

Cumulative effects

14.4.13 Cumulative impacts with regards to waste and material management may occur when two or more major developments are under construction or are operational within the same catchment at the same time. Potential cumulative impacts include excessive increases in waste generation over a short timescale or cumulatively over time during the operational phase. As the waste generation from the both the construction and operational phases will be minimal, the effect is expected to be negligible.

Waste Management Proposals

14.4.14 The Proposed Development will not result in significant waste effects on the environment and it is, therefore, proposed to scope this aspect out of the EIA. To ensure the impact of waste generation is kept to a minimum, a SWMP will be developed to detail the mitigation measures to be implemented during the construction phase in order to minimise waste and to ensure that it is managed and disposed of appropriately.

14.4.15 The waste hierarchy offers opportunities for waste reduction and a long-term sustainable approach to the development during the construction phase.

14.4.16 Waste avoidance measures to be considered and applied (where suitable) will include:

- Re-use of any excavated materials (if any) for landscaping;
- Take back agreements with material suppliers to ensure that surplus materials are returned and offered for use at other development sites, as appropriate;
- Material storage areas will be secure, weatherproof, and with clearly identified segregation of incoming products and different waste streams; and
- Identification of, and discussion with local providers of, construction waste recycling capacity (and waste streams requiring specialist treatment) prior to works commencement.

Conclusion

14.4.17 The Proposed Development will not result in significant waste effects on the environment. Mitigation measures to avoid / reduce potential waste will be implemented (where required) during the construction, and it is considered that any waste generated during operation would be minimal (i.e. when damaged panels need replacing). Such waste, as with those generated during the decommissioning phase, can be easily managed through the site management plans including the SWMP, which is part of the wider CEMP and then the DEMP. Consideration should be given to the management and recycling of any panels and other components that are likely to need replacing when they reach end of life. However, at this stage, it is proposed that a waste assessment is scoped out from the EIA / ES.

14.5 Accidents and Disasters

14.5.1 The EIA Regulations requires a description of the expected significant adverse effects on the environment deriving from the vulnerability of the Proposed Development to risks of major accidents and disasters.

14.5.2 'Risk' can be defined as 'the likelihood of an impact occurring, combined with effect or consequence(s) of the impact on a receptor, if it does occur'. This could either be immediate or delayed. A 'Major Accident' can be defined as 'events that threaten immediate or delayed serious damage to human health, welfare and/or the environment', while a 'Disaster' can be defined as 'naturally occurring extreme weather events (e.g. storm, flood, temperature) or ground-related hazard events (e.g. subsidence, landslide, earthquake) with the potential to cause an event or situation'. Disaster and natural disaster are often used interchangeably.

14.5.3 Based on the above definitions, the Proposed Development will be designed to ensure that the likelihood of it resulting in/causing a Major Accident is low and the

vulnerability of the Proposed Development to Disasters is low. Potential risks will be assessed within the relevant chapters of the ES and mitigation measures implemented within the Proposed Development where necessary.

14.5.4 Table 14.2 below sets out the accidents and disasters of relevance to the Proposed Development (based on the location of the Site and proposed land use), and how these will be mitigated.

Table 14.2: Consideration of major accidents and/or disasters

Major accident/disaster type	Description
Extreme weather events	The Proposed Development could be damaged by extreme weather events (exacerbated by climate change), including storms, snow, ice and heatwaves. However, resilience to extreme weather events will be incorporated within the design process, and the Proposed Development will be constructed in accordance with relevant regulations and guidance.
Flooding	A Flood Risk Assessment will be produced, which will inform the drainage design for the Proposed Development to ensure flood risk within the Site or surrounding area is managed appropriately. The drainage will be designed to accommodate potential extreme flood events as a result of climate change.
Fire	Thermal runaway risks associated with certain types of batteries such as lithium ion are managed by monitoring and cooling systems designed to regulate temperatures to within safe parameters. Battery manufacturers undertake extensive testing and analysis to assess fire risk, and the Proposed Development will adhere to all manufacturer safety recommendations. A further measure to be adopted is the installation of systems to detect and suppress fire, and the Proposed Development design will include adequate separation and ground covering between battery stations to ensure that an isolated fire would not spread and lead to a major incident.
Transport accidents	The Access & Traffic chapter will assess the Proposed Development's likely significant effects on traffic-related accidents and safety during the construction and decommissioning phases, including abnormal load movements.

14.5.5 Relevant measures included within the design of the Proposed Development to mitigate and manage the risks on environmental receptors of accidents and disasters, including the risk of battery fire, will be set out within the ES.

14.5.6 Based on the above, it is not considered that the Proposed Development is likely to result in any significant adverse effects on the environment deriving from the vulnerability of the Proposed Development to the risk of major accidents and/or disasters (relevant to the Proposed Development) beyond those already being considered within other technical chapters (including Access & Traffic, Water Resources, Flood Risk, Climate Change and Soils & Agricultural Land). As such it is not proposed to produce a specific accidents and disasters chapter.

14.6 Electric, Magnetic and Electromagnetic Fields

14.6.1 The use, generation, transmission and distribution of electricity can create power frequency electric, magnetic and electromagnetic fields ('EMF'). EMFs arise around electrical infrastructure such as electric cables and power lines, as well as equipment that uses electricity in domestic, industrial, and commercial settings. Magnetic fields are not blocked by the majority of materials, however, buildings, structures (such as fences) and vegetation can block electric fields. The strength of both magnetic and electric fields reduces as the distance from their source increases. The cable route search area avoids settlements and does not seek to deploy cable routes along public highways or public rights of way (although they may be traversed).

14.6.2 The 2012 Department for Energy and Climate Change guidance document 'Power Lines: Demonstrating compliance with EMF public exposure guidelines, A Voluntary Code of Practice' states that cables above 132kV have potential to cause EMF effects. Design measures will be incorporated within the Proposed Development to avoid the potential for EMF effects on receptors and these will be set out and explained within the ES. As such, a separate EMF ES chapter is not considered to be required.

14.7 Telecommunications, Television Reception and Utilities

14.7.1 Solar farms have the potential to affect existing utility infrastructure. 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 of the Proposed Development and appropriate protective provisions will be included in the DCO to ensure the protection of apparatus wherever any existing infrastructure has the potential to be affected by the Proposed Development.

14.7.2 Taking the above into account, the findings of the desk-based study and any required mitigation measures will be captured within the Proposed Development design and explained in the ES. Therefore a separate utilities ES chapter is not considered to be required.

14.8 Wind Microclimate

14.8.1 Likely significant wind effects are not anticipated given that the Proposed Development will not include large areas of public realm and outdoor amenity space where the public or site users will experience significant wind effects. The Proposed Development will not include any high-rise buildings or high-rise structures which

could influence wind patterns. Therefore, likely significant wind effects are not anticipated, and it is proposed that this topic will be scoped out of the ES.

14.9 Daylight, Sunlight and Overshadowing

14.9.1 The scale and massing of the Proposed Development will not cause changes to daylight or sunlight availability or cause overshadowing of residential development or amenity space. The description of development within the ES will set out how panel spacing has been designed to minimise shading of vegetated areas. It is therefore proposed to scope this topic out of the ES.

15 SUMMARY

15.1.1 This Scoping Report represents notification under Regulation 8(1)(b) of the EIA Regulations that the Applicant will undertake an EIA in respect of the Proposed Development and produce an ES to report the findings of the EIA.

15.1.2 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.

15.1.3 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.

15.2 Summary of Scope

15.2.1 Table 15.1 summarises the environmental aspects that have been scoped in or proposed to be scoped out of the EIA.

Table 15.1 Summary of Scope of the EIA

Scoped In	Scoped Out
Landscape & Visuals	Air Quality
Ecology	Ground Conditions
Cultural Heritage	Human Health
Access & Traffic	Waste
Noise & Vibration	Accidents & Disasters
Water Resources	Electric, Magnetic and Electromagnetic Fields
Flood Risk & Drainage	Telecommunications, Television Reception and Utilities
Climate Change	Wind Microclimate
Glint	Daylight, Sunlight and Overshadowing
Soils & Agricultural Land	
Socio-economics	

15.2.2 Further to the above, Table 15.2 provides a summary of the matters to be scoped out in relation to each aspect.

Table 15.2 Summary of matters to be scoped out of the assessment

Matter	Rationale
Landscape	
Effects on Grade II Registered Park and Garden - Aswarby Park	The landscape and visual effects are proposed to be scoped out on Aswarby Park Grade II Registered Park and Garden due to the lack of intervisibility between the Proposed Development due to the distance (approximately 5km) and screening provided by intervening vegetation.
Ecology	

Table 15.2 Summary of matters to be scoped out of the assessment	
Matter	**Rationale**
N/A	At this stage, it is not possible to identify impacts to scope out of the assessment. The results of the ongoing Preliminary Ecological Assessment (PEA) surveys and the subsequent refinement of the Cable Route Corridor will be used to scope-out impacts during the EIA. These will be detailed within the ES.
Cultural Heritage	
Archaeological assets	Direct physical effects on assets during the operation and decommissioning of the Proposed Development (as physical effects will only occur during the construction which will be mitigated as required)
Built Heritage Assets	Direct physical effects on assets beyond the site boundary on the basis that there will be no construction, operational or decommissioning activities beyond the site that could have a direct physical effect on heritage assets.
Historic Landscape	During the decommissioning phase the landscape will be restored to its original use and, as such, there will be no impacts to the Historic Landscape during this phase.
Access & Traffic	
Public Right of Way users	To be assessed in relation to other aspects of the EIA, as appropriate.
Operational phase effects	Not likely to be significant due to very low traffic flows.
Decommissioning phase effects	Potential effects and mitigation similar to construction phase, but baseline cannot be accurately predicted.
Noise & Vibration	
Baseline near Cable Route Area	Noise from the cable route would only be during construction, and it would be temporary work with construction activities so no significant impact anticipated. Therefore, at this stage where the actual cable route is not known, no baseline survey has been assumed for potential receptors surrounding the very wide potential Cable Route Area. This may be reviewed as the design of the actual cable route is refined.
Water Resources	
Water Framework Directive Assessment	The Environment Agency's '*Water Framework Directive Risk Assessments: How to Assess the Risk of your Activity*' (April 2016) identifies four stages to determine the need to undertake a full WFD assessment for a proposed development. For the purposes of this assessment, it is considered that a WFD assessment will not be required in support of the proposed development for the following reasons: • 'Stage 1 – Make sure that the assessment covers the receptors that are protected by WFD': the Site is located within the South Forty Foot Drain Operational Catchment. The Site is not located within a groundwaterbody. • 'Stage 2 - demonstrate that the activity supports the objectives of the local River Basin Management Plan ('RBMP')': the objectives of the river basin management plan for the Anglian River Basin District are listed under a program of measures implemented in order to meet the objectives of the WFD. Specifically, these focus on preventing a deterioration in the status of surface waters and groundwater and achieving 'good' status for all

Table 15.2 Summary of matters to be scoped out of the assessment	
Matter	**Rationale**
	waterbodies. The Proposed Development is unlikely to affect the implementation or effectiveness of these measures; • 'Stage 3 - investigate the risks on WFD receptors and possible ways of managing those risks': given the nature of the Proposed Development (solar), once operational, there will be very limited potential for adverse effects on the water environment to arise following the implementation of standard, best practice mitigation measures. During the construction and decommissioning phases of the project, adverse effects will be avoided or minimised through measures in a CEMP or equivalent (e.g. pollution prevention plan, sediment management plans and stand off from receptors). Therefore, any adverse effects from the Proposed Development can be mitigated and will not interfere with the waterbodies' objectives or its ability to maintain or achieve good WFD status; and • 'Stage 4 - show that it meets the sustainability criteria set out in Article 4(7) of the WFD': this stage is not required as the stage 3 requirements have been met. As it has been demonstrated above that a WFD assessment is not required, its requirement is proposed to be scoped out of the ES.
Climate Change	
N/A	N/A
Glint	
Construction	The installation works are temporary and it is not possible to model effects within the standard software. Although there is a slight risk of reflections from steel legs prior to mounting the panels on top, this is limited and adopting a progressive approach to installation should considerably limit these.
Decommissioning	The decommissioning works will be virtually the mirror opposite of installation. No different effects are expected to be present and all will be temporary.
Soils & Agricultural Land	
Agricultural Land Drainage	ALC assumes agricultural land drainage is in place, it will not directly impact the assessment of soils and agricultural land, but the potential economic and hydrological effects of the land management.
Land Holdings	The size of the land holdings and the potential impact on farm business/viability is a socioeconomic assessment.
Socio-economics	
Negative side-effects of local economic growth (price inflation, economic dependence on the Proposed Development).	Unlikely due to the scale and type of the Proposed Development.
Proposed Development-induced population immigration (leading to	A large part of the workforce would likely come from the direct and indirect AOI, a driving distance from their permanent accommodation, which would limit significant additional pressure on services. Owing to

Table 15.2 Summary of matters to be scoped out of the assessment	
Matter	**Rationale**
pressure on local services and infrastructure).	the nature of the Proposed Development, it is unlikely that there will be Proposed Development-induced immigration.
Physical displacement.	It is unlikely that Proposed Development activities will result in physical displacement of households or farms in the Proposed Development area. The land is mostly agricultural, and the final design of the cable routes and solar farms should omit any construction.
	A large part of the workforce would likely come from the Direct and Indirect Area of Influence (AOI), a driving distance from their permanent accommodation, which would limit significant additional pressure on services. Owing to the nature of the Proposed Development, it is unlikely that there will be Proposed Development-induced immigration.

15.3 Structure of the ES

15.3.1 The general structure of the ES is outlined, below.

Part A (Environmental Statement)

- Chapter 1: Introduction
- Chapter 2: The Site
- Chapter 3: The Proposed Development
- Chapter 4: Alternatives & Design Evolution
- Chapter 5: Consultation
- Chapter 6: Landscape & Visuals
- Chapter 7: Ecology
- Chapter 8: Cultural Heritage
- Chapter 9: Access & Traffic
- Chapter 10: Noise & Vibration
- Chapter 11: Water Resources
- Chapter 12: Flood Risk & Drainage
- Chapter 13: Climate Change
- Chapter 14: Glint
- Chapter 15: Soils & Agricultural Land
- Chapter 16: Socio-economics
- Chapter 17: Summary of Environmental Effects

Part B (Technical Appendices)

15.3.2 This will comprise of the standalone technical reports that will support the technical chapters.

- Arboricultural Assessment
- Flood Risk Assessment
- Heritage Statement
- Habitat Regulations Assessment
- Waste and Recycling Strategy
- Construction Environmental Management Plan
- Travel Plan
- Transport Assessment
- Construction Traffic Management Plan
- Statutory Nuisance Report
- Decommissioning Statement

Non-Technical Summary (NTS)

15.3.3 In accordance with the EIA Regulations, the ES will be summarised and evaluated in non-technical language within a Non-Technical Summary (NTS). This will be produced as a separate document so that it can be easily distributed to interested parties.

16 GLOSSARY

Terminology	Explanation
Above Ordnance Datum (aOD)	Ordnance Datum is the vertical datum used by ordnance survey as the basis for deriving altitudes on maps. Topography may be described using the level in comparison or 'above' ordnance datum.
Absolute Emissions (A_b)	Greenhouse gas emissions associated with the Proposed Development
Aged or veteran tree	A tree which, because of its great age, size or condition is of exceptional value for wildlife, in the landscape, or culturally.
Agricultural Land Classification	Agricultural Land Classification is a standardised method for classifying the quality of agricultural land in England and Wales into one of five grades: Grade 1 (excellent), Grade 2 (very good), Grade 3 (good to moderate), divided into Subgrades 3a (good) and 3b (moderate), Grade 4 (poor), and Grade 5 (very poor).
Air Quality Management Areas	Areas designated by local authorities because they are not likely to achieve national air quality objectives by the relevant deadlines.
Ambient	Background levels.
Ancient woodland	An area that has been wooded continuously since at least 1600 AD.
Aquifer	A body of permeable rock which can contain or transmit groundwater.
Baseline conditions	The conditions that would pertain in the absence of the proposed project at the time that the project would be constructed / operated / decommissioned.
Baseline Emissions (B_e)	Greenhouse gas emissions associated with an alternative development that delivers the same outputs as supplied by the proposed project
Bedrock	Bedrock more than 2.6 million years old, and generally underlying superficial deposits.
Best and most versatile agricultural land	Land in grades 1, 2 and 3a of the Agricultural Land Classification; agricultural land that it is important to retain free from development.
Biodiversity	The biological diversity of the earth's living resources. The total variability among organisms and ecosystems. In common usage, and within these Guidelines, biodiversity is used to describe the conservation of the natural environment, rather than describing the variation within it.
Birds and Habitats Directives	European Directives to conserve natural habitats and wild fauna and flora.
BGS	British Geological Survey
CEMP	Construction Environmental Management Plan
CH_4	Methane (greenhouse gas)
Climate change adaptation	Adjustments to natural or human systems in response to actual or expected climatic factors or their effects, including from changes in rainfall and rising temperatures, which moderate harm or exploit beneficial opportunities.
Climate change mitigation	Action to reduce the impact of human activity on the climate system, primarily through reducing greenhouse gas emissions.
CO_2	Carbon Dioxide (greenhouse gas)
CO_2e	Carbon Dioxide Equivalent. CO_2e is a unit of measurement to compare emissions from various greenhouse gas sources based on their warming potential.
Conservation Area	An area of special environmental or historical importance that is protected from changes by law.
Conservation objective (ecology)	Objective for the conservation of biodiversity (e.g. specific objective within a management plan or broad objectives of policy).
Cumulative effects	The summation of effects that result from changes caused by a development in conjunction with other past, present or reasonably foreseeable actions.
DMRB	Design Manual for Roads and Bridges. A comprehensive series of documents, including standards, specifications and standard details, for the design of new road infrastructure.
Designated heritage asset	A World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area designated under the relevant legislation.
DTM	Digital Terrain model
Ecosystem services	The benefits people obtain from ecosystems such as, food, water, flood and disease control and recreation.
Effect	A physical or measurable change to the environment attributable to the project.
Impact	The process whereby a change, which may be adverse, beneficial, or both, is brought about in the existing environment as a result of development activities.
Environment Agency	The EA is a non-departmental public body of the Department for Environment Food and Rural Affairs. Its purpose is, "to protect or enhance the environment, taken as a whole" (section 4, Environment Act 1995) to promote the objective of achieving sustainable development.
Exceptions Test	The Exceptions Test ensures that development is permitted in flood risk areas only in

Terminology	Explanation
	exceptional circumstances and when strict qualifying conditions have been met. It is carried out if the Sequential Test demonstrates that a development cannot be located in areas of low flood risk.
Fauna	All members of the animal kingdom: vertebrates (e.g. birds, mammals and fish) and invertebrates (e.g. insects).
Field Capacity Days	The number of days at which soil is saturated with water and any water from rainfall would infiltrate quickly under the force of gravity or create waterlogging.
Flood Zone 1	This zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding.
Flood Zone 2	This zone comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river, or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding in any year.
Flood Zone 3	This zone comprises land assessed as having between a 1 in 100 or greater annual probability of river (>>11%%), or a 1 in 200 or greater annual probability of sea flooding (>>00.5%%).
Flora	All members of the plant kingdom: higher ferns, ferns and fern allies, mosses and liverworts, algae and phytoplankton, fungi and lichens.
Geology	The scientific study of the origin, history and structure of the earth.
GLVIA	Guidelines for Landscape and Visual Impact Assessment
Greenhouse Gas (GHG)	Gases such as carbon dioxide, methane and nitrous oxide, that trap heat in the atmosphere.
Groundwater	All water which is below the surface of the ground in the saturated zone and in direct contact with the ground or subsoil.
ha	hectares
Heritage asset	A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage asset includes designated heritage assets and assets identified by the local planning authority (including local listing).
HGV	Heavy Goods Vehicle
Historic environment	All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora.
Historic environment record (HER)	Information services that seek to provide access to comprehensive and dynamic resources relating to the historic environment of a defined geographic area for public benefit and use.
Hydrology	The study of the movement, distribution, and quality of water.
Important ecological features	Ecological features requiring specific assessment within EcIA. Ecological features can be important for a variety of reasons (e.g. quality and extent of designated sites or habitats, habitat / species rarity).
Indirect Impacts	Impacts on the environment, which are not a direct result of the development but are often produced away from it or as a result of a complex pathway. Sometimes referred to as secondary impacts.
LA_{90},T	The "A weighted" noise level exceeded for 90 per cent of the specified measurement period (T).
LA_{eq},T	The "A weighted" equivalent continuous sound level – the sound level of a notionally steady sound having the same energy as the actual fluctuating sound over the same time period (T).
Land Use	What land is used for, based on broad categories of functional land cover, such as urban and industrial use and the different types of agriculture and forestry.
Lmax	The highest noise level recorded during a noise event or measuring period.
Landscape Character Area (LCA)	These are single unique areas which are the discrete geographical areas of a particular landscape type.
Landscape Character Assessment	The process of identifying and describing variation in the character of the landscape, and using this information to assist in managing change in the landscape. It seeks to identify and explain the unique combination of elements and features that make landscape distinctive. The process results in the production of a Landscape Character Assessment.
Listed Building	A building, object or structure that has been judged to be of national importance in terms of architectural or historic interest and included on a special register.
Local planning authority	The public authority whose duty it is to carry out specific planning functions for a particular area.
Magnitude	A combination of the scale, extent and duration of an effect.
Methodology	The specific approach and techniques used for a given study.

Terminology	Explanation
Mitigation	Any process, activity or thing designed to avoid, reduce or remedy adverse environmental impacts likely to be caused by a development project.
N_2O	Nitrous Oxide (greenhouse gas)
NGR	National Grid Reference
Nitrate Vulnerable Zone (NVZ)	An area designated as being at risk from agricultural nitrate pollution.
Non Technical Summary	A report which briefly describes the main points discussed in the Environmental Statement in a clear manner, without the use of technical jargon and phraseology.
NOx	Nitrogen Oxides (greenhouse gas). The collective term used to describe various oxides of Nitrogen.
PRoW	Public Right(s) of Way. Footpaths (for walking, running, mobility scooters or powered wheelchairs); Bridleways (for walking, horse riding, bicycles, mobility scooters or powered wheelchairs); Restricted byways (for any transport without a motor and mobility scooters or powered wheelchairs); Byways open to all traffic (for any kind of transport, including cars, but mainly used by walkers, cyclists and horse riders).
Ramsar sites	Wetlands of international importance, designated under the 1971 Ramsar Convention.
RCP	Representative Concentration Pathway – RCPs are scenarios that describe different greenhouse gas concentrations to 2100.
Re	Relative Emissions. Difference between absolute emissions generated by the proposed project and the baseline emissions
Receptors	A component of the natural or man-made environment such as water, air, a building, or a plant that is affected by an impact.
Residual Effects	Those effects of a development that cannot be mitigated following implementation of mitigation proposals.
Scheduled Monument	A nationally important archaeological site or historic building, given protection against unauthorised change.
Sequential Test	A Sequential Test aims to steer new development to areas with the lowest probability of flooding by recommending that development is not allocated if there are reasonably available sites appropriate to the proposed development in areas with a lower probability of flooding.
Setting of a heritage asset	The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.
Site of Special Scientific Interest (SSSI)	Sites designated by Natural England under the Wildlife and Countryside Act 1981.
Soil Association	Soil association is a geographic grouping of soils identified by the name of the most frequently occurring soil series and by the combination of ancillary soil series. Soil associations are mapped as map units on the Soil Survey of England and Wales soil maps, each unit has got a number code indicating predominant major soil group, group and subgroup. For example, association 821b (Blackwood) is dominated by soil of the Blackwood series belonging to subgroup 8.21, the typical subdivision of soil group 8.2, Sandy gley soils, which are part of major group 8, Ground-water gley soils.
Soil series	Soil series is the lower categorical level of the soil classification used in England and Wales. Soils series are defined using a combination of three main properties, the broad type of parent material present (substrate type), the texture of the soil material (textural grouping) and the presence or absence of material with a distinctive mineralogy.
Special Areas of Conservation	Areas given special protection under the European Union's Habitats Directive, which is transposed into UK law by the Habitats and Conservation of Species Regulations 2010.
Special Protection Areas (SPA)	Areas which have been identified as being of international importance for the breeding, feeding, wintering or the migration of rare and vulnerable species of birds found within European Union countries. They are European designated sites, classified under the Birds Directive.
Water Framework Directive (WFD)	The WFD (more formally Directive 2000/60/EC) is designed to improve and integrate the way water bodies are managed throughout Europe. In the UK, it came into force on 22 December 2000, and was transposed into UK law (transposed) in 2003. Member States must aim to reach good chemical and ecological status in inland and coastal waters by 2015 subject to certain limited exceptions. The WFD is designed to enhance the status and prevent further deterioration of aquatic ecosystems and associated wetlands; promote the sustainable use of water; reduce pollution of water especially by 'priority' and 'priority hazardous' substances; and ensure progressive reduction of groundwater pollution. The WFD establishes a strategic framework for managing the water environment. It requires a

Terminology	Explanation
	management plan for each river basin to be developed every 6 years. The plans are based on a detailed analysis of the impacts of human activity on the water environment and incorporate a programme of measures to improve water bodies where required.
Worst Case Scenario	Principal applied where the environmental effects may vary e.g. seasonally to ensure the most severe potential effect is assessed.

APPENDICES

Appendix 1.1 Planning Policy Context

Appendix 1.1 Planning Policy Context

This Appendix provides an overview of the planning and energy policy of relevance to the Proposed Development, and where that policy identifies the need for the Proposed Development.

The application for development consent will include a Planning Statement that will set out in more detail the policy of relevance to the Proposed Development and include an assessment of how it complies with that policy.

The following planning and energy policy is considered to be of importance and relevance to the Proposed Development:

- Designated National Policy Statements for Energy (2011) (Overarching NPS for Energy, EN-1, and NPS for Electricity Networks Infrastructure, EN-5);
- The Consultation Draft National Policy Statements for Energy (2023);
- Other Energy and Climate Change Policy;
- The National Planning Policy Framework; and
- Local Planning Policy.

The main provisions of these policies relating to the Proposed Development are summarised below.

Further detail and analysis will be provided in the Planning Statement accompanying the DCO application.

National Policy Statements for Energy

Under the Planning Act 2008 regime, the policy framework for examining and determining applications for development consent is provided by National Policy Statement (NPSs). Section 5 of the Planning Act 2008 allows the relevant SoS to designate NPSs setting out national policy in relation to the types of NSIPs listed at Section 14 of the Act. The NPSs are the primary policy used by the relevant SoS to examine and determine applications for NSIPs.

Section 104 of the PA 2008 provides that where a NPS has effect, the SoS must determine the application in accordance with the relevant NPSs and appropriate marine policy documents (if any) having regard to any local impact report produced by the relevant local planning authority; any matters prescribed in relation to development of the description to which the application relates; and any other matters which the SoS thinks are both "important and relevant" to their decision, unless this would:

- lead to the UK being in breach of its international obligations;
- be in breach of any statutory duty that applies to the SoS;
- be unlawful;

- result in the adverse impacts of the development outweighing the benefits; or
- be contrary to any condition prescribing how decisions regarding an NSIP application are to be taken.

Section 105 of the PA relates to decision on applications where no NPS has effect, that is, where there is no NPS in place relating to the specific type of development. In such cases, Section 105 states that in deciding the application the SoS must have regard to any relevant local impact report produced by the relevant local planning authority; any matters prescribed in relation to development of the description to which the application relates; and any other matters which the SoS thinks are both important and relevant to their decision.

Designated NPSs

A number of NPSs have been designated in relation to energy infrastructure. These were published in July 2011 by the Secretary of State (SoS) for the Department for Energy and Climate Change (now Energy Security and Net Zero (DESNZ)).

The designated NPSs include an overarching NPS setting out general policies and assessment principles for energy infrastructure and a number of technology specific NPSs.

As identified above, the NPSs considered to be of importance and relevance to the Proposed Development are the Overarching NPS for Energy (EN-1); the NPS for Electricity Networks Infrastructure (EN-5); and Part 2 of EN-1 covers the Government's energy and climate change strategy, including policies for mitigating climate change. Section 4.8 of EN-1 sets out generic considerations that applicants and the former Infrastructure Planning Commission should take into account to help ensure that renewable energy infrastructure is resilient to climate change.

Part 3 of EN-1 'The need for new nationally significant energy infrastructure projects' defines and sets out the 'need' for nationally significant energy infrastructure. Paragraph 3.1.1 states that the UK needs all types of energy infrastructure covered by the NPS in order to achieve energy security at the same time as dramatically reducing greenhouse gas emissions. Paragraph 3.1.2 goes on to state that it is for industry to propose the type of energy infrastructure and that the Government does not consider it appropriate for planning policy to set targets for or limits on different technologies.

Notably, paragraph 3.1.3 stresses that the SoS should assess 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…"* (with the scale and urgency of that need being described in the relevant part of EN-1). Paragraph 3.1.4 confirms that the SoS should give substantial weight to the contribution that all projects

would make toward satisfying this need when considering applications under the PA 2008. As such, EN-1 is clear that the need that exists for new energy infrastructure is not open to debate or interpretation.

Part 4 of EN-1 sets out a number of 'assessment principles' that must be taken into account by applicants and the SoS in preparing and determining applications for nationally significant energy infrastructure. General points include (paragraph 4.1.2) the requirement for the SoS, given the level and urgency of need for the infrastructure covered by the energy NPSs, to start with a presumption in favour of granting consent for applications for energy NSIPs. This presumption applies unless any more specific and relevant policies set out in the relevant NPS clearly indicate that consent should be refused or any of the considerations referred to in Sections 104 or 105 of the PA 2008 (noted above) apply.

Other assessment principles include the matters to be covered within any Environmental Statement ('ES'); the Habitats and Species Regulations; the consideration of alternatives; criteria for 'good design'; grid connection; climate change adaptation; pollution control and environmental regulatory regimes; safety; health; common law and statutory nuisance and security, amongst others.

Part 5 of EN-1 deals with the 'Generic Impacts' of energy infrastructure. These include impacts that occur in relation to all or most types of energy infrastructure in addition to others that may only be relevant to certain technologies. Paragraph 5.1.2 stresses that the list of impacts is not exhaustive and that applicants should identify the impacts of their projects in the ES in terms of both those covered by the NPSs and others that may be relevant. Generic impacts include land use; socio-economics; air quality and emissions; noise and vibration; dust, odour, artificial light, steam and smoke; traffic and transport; civil and military aviation; biodiversity and geological conservation; historic environment; landscape and visual; water quality and resources; flood risk and waste, amongst others. In relation to each of the generic impacts listed within Part 5, guidance is provided on how the applicant should assess these within their application and also the considerations that the SoS should take into account in decision-making.

In addition to the assessment principles and generic impacts covered by EN-1, EN-3 sets out the assessment and technology-specific information for renewable energy generating stations. While not covering solar PV the general considerations are likely to be important and relevant.

Paragraph 1.1.1 of EN-3 highlights the importance of generating electricity from renewable sources, which states *"Electricity generation from renewable sources of energy is an important element in the Government's development of a low-carbon economy. There are*

ambitious renewable energy targets in place and a significant increase in generation from large-scale renewable energy infrastructure is necessary to meet the 15% renewable energy target".

Paragraph 2.4.2 states that *"Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology".*

EN-5 sets out the factors (e.g. those influencing site selection) and 'assessment and technology specific' considerations to be taken into account in the preparation and assessment of applications for gas pipelines and electricity network infrastructure, including relevant environmental matters.

Draft revised NPSs

Draft revised NPSs for energy infrastructure were published by the Government for consultation in September 2021, partly in response to the Government's legally binding commitment to achieve net zero in terms of greenhouse gas emission by 2050. In March 2023, Department for Energy Security & Net Zero published the 'Consultation Response: Planning for New Energy Infrastructure, Draft National Policy Statements for energy infrastructure'. This Consultation Response document reiterates (at page 9) the profound and urgent need for electricity infrastructure and the role of renewable energy, stating:

"The overarching need case set out in the EN-1 document is clear that there is an urgent requirement for new electricity infrastructure and that renewables will play a key part in meeting government's commitments on net zero and energy security".

The Government have also launched a further consultation on updated versions of draft revised EN-1 to EN-5 – running from 30 March 2023 to 25 May 2023. This further consultation seeks views on various matters relating to renewables, carbon capture and hydrogen, oil and gas pipelines and electricity networks, including *"strengthening the electricity networks NPS to include more detail on the role of strategic planning of networks, which considers the network as a whole, rather than just individual transmission projects".*

While the current suite of NPSs for energy infrastructure remain relevant Government policy and have effect for the purposes of the Planning Act 2008, it is considered that the draft revised NPSs are important and relevant to the Proposed Development. As yet, no date has been set for the designation of the revised energy NPSs. The Applicant considers it probable that they will be designated before the anticipated submission of the DCO application for the Proposed Development (Q1 2024).

The following draft revised NPSs are considered to be important and relevant (and will, when designated, have effect for the purposes of the Planning Act 2008):

- Draft Overarching National Policy Statement for Energy (EN-1);
- Draft Renewable Energy Infrastructure (EN-3); and,
- Draft National Policy Statement for Electricity Networks Infrastructure (EN-5).

Paragraph 2.1.2 of draft revised EN-1 (2023) states that *"To produce enough energy required for the UK and ensure it can be transported to where it is needed, a significant amount of infrastructure is needed at both local and national scale. High quality infrastructure is crucial for economic growth, boosting productivity and competitiveness".*

Paragraph 3.3.20 of draft revised EN-1 (2023) emphasises that there is an urgent need for new electricity generating capacity to meet the energy objectives. Paragraph 3.3.56 of draft revised EN-1 (March 2023) is clear that *"…all the generating technologies mentioned above* [including solar] *are urgently needed to meet the Government's energy objectives".*

Indeed, paragraph 3.3.20 of draft revised EN-1 (2023) confirms that *"wind and solar are the lowest cost ways of generating electricity, helping reduce costs and providing a clean and secure source of electricity supply (as they are not reliant on fuel for generation)".* The Government's own analysis[1], as cited in draft revised EN-1, confirms that a secure, reliable, affordable, net zero consistent system in 2050 is likely to be composed predominantly of wind and solar.

Paragraph 3.10.1 in the draft revised EN-1 (2023) reiterates the Government's commitment to "sustained growth in solar capacity to ensure that we are on a pathway that allows us to meet net zero emissions", confirming that solar is a key part of the government's strategy for low-cost decarbonisation of the energy sector. Paragraph 3.10.4 notes that solar farms are one of the most established renewable electricity technologies in the UK and the cheapest form of electricity generation.

Draft revised EN-3 (2023) specifically considers large scale solar photovoltaic development (>50 MW in England and >350MW in Wales), and the impacts and other matters which are specific to this technology.

Paragraph 3.10.2 4 of draft revised EN-3 (2023) confirms that the government expects a five-fold increase in solar deployment by 2035 (up to 70GW), as asserted in the British Energy Security Strategy[2]. Indeed, paragraph 3.10.4 of draft revised EN-3 (2023) recognises the key

[1] See https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-securitystrategy

[2] See https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy

role of solar farms in developing renewable technologies, stating *"…solar farms are one of the most established renewable electricity technologies in the UK and the cheapest form of electricity generation".*

Draft revised EN-5 (2023) recognises that new electricity networks are required for electricity generation, storage and interconnection infrastructure are vital to achieving the nation's transition to net zero while maintaining energy security. Offshore networks form connections to the onshore network in the East of England.

Paragraph 1.1.4 highlights the key role of new electricity networks, stating *"… the supporting onshore and offshore transmission infrastructure and related network reinforcements, are viewed by the government as being a critical national priority (CNP) and should be progressed as quickly as possible".* To support the this, it is important to effectively plan the network to ensure the appropriate investment and the right kind of technology is in place.

Paragraph 1.1.6 goes onto confirm that *"the DESNZ-led Offshore Transmission Network Review (OTNR) and the Ofgem-led Electricity Transmission Network Planning Review (ETNPR) seek to deliver more strategic onshore and offshore transmission network planning, considering the networks as a whole, rather than just individual transmission projects."* Paragraph 1.1.7 explains that this approach ensures that network development can allow decarbonisation targets to be met in the most efficient and timely manner. It also seeks to strike a balance between *"costs to consumers, timely delivery and the minimisation of community and environmental impacts of new network infrastructure from an early stage of network planning".*

Energy and Climate Change Policy

As noted above, Sections 104 and 105 of the Planning Act 2008 set out the matters that the SoS must have regard to in determining applications for development consent, which can include any other matters which the SoS thinks are *"important and relevant"* to their decision. Other matters that the SoS may consider important and relevant include recent UK energy and climate change policy.

The Proposed Development will support the overarching objective of the Government to continue transitioning the UK to a low carbon economy and meeting the legally binding target of net zero greenhouse gas emissions by 2050. The recent energy and climate change policy that is relevant includes:

- A Green Future: Our 25 Year Plan to Improve the Environment (January 2018);
- Net Zero: Opportunities for the Power Sector (March 2020);
- National Infrastructure Strategy (November 2020);

- The Energy White Paper (December 2020);
- Net Zero Strategy: Build Back Greener (October 2021);
- British Energy Security Strategy (April 2022); and,
- Powering Up Britain (March 2023).

These policy documents are considered below.

A Green Future: Our 25 Year Plan to Improve the Environment (January 2018)

The 25 Year Environment Plan sets out the government's 25-year plan to improve the environment within a generation. It aims to deliver cleaner air and water in our cities and rural landscapes, protect threatened species and provide richer wildlife habitats. It calls for an approach to agriculture, forestry, land use and fishing that puts the environment first.

It sets out ten goals which include the achievement of and management of pressures by providing: clean air; clean and plentiful water; thriving plants and wildlife; reduced risk of harm from environmental hazards like flooding and drought; the more sustainable and efficient use of resources from nature; enhanced beauty, heritage and engagement with the natural environment; mitigation and adaption to climate change; minimisation of waste; management of exposure to chemicals; and enhanced biosecurity.

Net Zero: Opportunities for the Power Sector (March 2020)

In June 2019 the Government raised the UK's ambition on tackling climate change by legislating for a net-zero greenhouse gas emissions target for the whole economy by 2050. Decarbonising the power sector is integral to achieving this goal and requires major investment in proven technologies, such as solar, which are supported by planning policy at local and national level.

The National Infrastructure Commission (NIC), official advisor to the Government on infrastructure, has subsequently produced a report, 'Net Zero: Opportunities for the Power Sector, in March 2020, which sets out the infrastructure required in order to meet the 2050 target, including the amount of new renewable energy development that would need to be deployed. Importantly, the NIC recommends the generation mix is up to around 90% renewables. The report recommends that across all scenarios significant solar, onshore wind, and offshore wind, with between 129-237 GW of renewable capacity is in operation by 2050, including:

- 56-121 GW of solar;
- 18 -27 GW of onshore wind; and
- 54 - 86 GW of offshore wind.

The above requires an increase in installed capacity, including up to nine times more solar than is currently installed in the UK, which is presently around 14.1GW according to the Solar photovoltaics deployment, August 2022 published by the Department for Business, Energy & Industrial Strategy (BEIS).

Although the above figures are high-level, they demonstrate the broad amount of new infrastructure that is required. The scale of this need is such that it must be shared throughout the UK and in recognition that climate change is a national and global issue.

National Infrastructure Strategy (November 2020)

The National Infrastructure Strategy (NIS) published in November 2020 sets out plans to transform UK infrastructure, with one of the aims being to put the UK on the path to meeting its net zero emissions target by 2050.

The NIS acknowledges that the UK's commitment to achieving net zero emissions by 2050 will require profound changes that will provide huge opportunities for the UK to 'build back better'. It also identifies that to deliver net zero, the share of generation from renewables needs to dramatically increase, and notes that greater generation capacity will need to come from onshore wind and solar.

To support this the Government has included solar in the latest Contracts for Difference Allocation Round (AR5) which opened on 30th March until 24th April 2023, to aid the deployment of low carbon electricity in Britain. A £205 million budget is available for AR5, in which £170 million is available for established technologies including solar photovoltaic (>5MW).

The Energy White Paper (December 2020)

The Energy White Paper 'Powering our Net Zero Future' ('EWP'), was presented to Parliament in December 2020 and builds on the Ten Point Plan. At the core of the EWP is the commitment to tackle climate change and achieve net zero. The EWP seeks to put in place a strategy for the wider energy system that transforms energy, supports a green recovery and creates a fair deal for consumers (page 4).

The EWP identifies the Government's aim for a fully decarbonised, reliable, and low-cost power system by 2050, which builds upon the Clean Growth Strategy and is consistent with other energy publications such as the British Energy Security Strategy. The EWP specifically states that the future energy generation mix for the UK system is *"likely to be composed predominantly of wind and solar".*

As part of the Energy NPS review process as set out in the EWP a suite of draft revised Energy NPSs were issued for consultation on 6th September 2021.

The EWP (pages 16 to 17) provides an overview of the Government's key commitments to put the UK on a course to net zero. These are grouped under a number of headings and include:

"SUPPORT A GREEN RECOVERY FROM COVID-19 …

- *Increasing the ambition in our Industrial Clusters Mission four-fold, aiming to deliver four low-carbon clusters by 2030 and at least one fully net zero cluster by 2040.*
- *Investing £1 billion up to 2025 to facilitate the deployment of CCUS in two industrial clusters by the mid-2020s, and a further two clusters by 2030, supporting our ambition to capture 10Mt per year by the end of the decade."*

Chapter 2 'Power' of the EWP sets out how it is proposed to decarbonise the power sector in terms of generation of electricity. This includes an expansion of other low-cost renewable technologies in addition to offshore wind. This proposal is aligned with the Ten Point Plan which suggests continuing to hold regular Contracts or Difference (CfD) auction rounds every two years to bring forward a range of low-cost renewable technologies. Subject to projects coming forward, the intention is to double the capacity awarded in the last round with the aim to deploy around 12GW of low-cost renewable generation.

Chapter 5 'Industrial Energy' sets out the goal for emissions from industry to fall by around 90% from today's levels by 2050. In order to achieve this (page 118) the Government:

"…will:

- *Create a sustainable future for UK manufacturing industry through improved energy efficiency and the adoption of clean energy technologies".*

The EWP confirms that manufacturing and refineries, which form the bulk of industrial emissions, still account for around 1% of the UK's greenhouse gas emissions. About half of those emissions are concentrated in the UK's six major industrial clusters.

In order to transform industrial energy, the EWP (page 122) states that we cannot rely on energy efficiency alone to reduce emission in line with the Government's 2050 goal. Manufacturing industry will also need to capture its carbon for onward transport and storage and switch from using fossil fuels to low-carbon alternatives.

In order to bring about change in the industry, the EWP includes a commitment (page 124) to increase the 'Industrial Clusters Mission' to support the delivery of four low-carbon industrial clusters by 2030 and at least one fully net zero cluster by 2040.

<u>Net Zero Strategy: Build Back Greener (October 2021)</u>

The 'Net Zero Strategy: Build Back Greener' expands on key commitments in the EWP and sets out the next steps the Government proposes to take to cut emissions, seize green

economic opportunities and leverage further private investment into net zero. The Strategy sets an indicative delivery pathway for emissions reductions to 2037 by sector. It is intended to put the UK on the path for Carbon Budget 6 and ultimately on course for net zero by 2050.

The Strategy recognises the importance of the UK power generation, stating that "*"By 2035 the UK will be powered entirely by clean electricity, subject to security of supply; […] 40 GW of offshore wind by 2030, with more onshore, solar and other renewables – with a new approach to onshore and offshore electricity networks to incorporate new low carbon generation and demand in the most efficient manner that takes account of the needs of local communities […]"*

<u>British Energy Security Strategy (April 2022)</u>

The British Energy Security Strategy was published in April 2022 largely in response to soaring energy prices as a result of a sudden surge in demand following the COVID-19 pandemic, compounded by the Russian invasion of Ukraine. Much of the focus of the Energy Strategy is upon costs to consumers, but it also looks at improved energy efficiency, reducing the amount of energy we need and addressing the underlying vulnerability to international oil and gas prices by reducing the UK's dependence on imported oil and gas.

The Strategy states that the Government will be supportive on the effective use of land by encouraging large scale projects to locate on previously developed, or lower value land, where possible, and to ensure projects are designed to avoid, mitigate, and where necessary, compensate for the impacts of using greenfield sites. The Government will also support solar that is co-located with other functions (for example, agriculture, onshore wind generation, or storage) to maximise the efficiency of land use.

<u>Powering Up Britain (March 2023)</u>

The DESNZ published 'Powering up Britain' and constituent documents in March 2023 which include "Powering up Britain: Energy Security Plan" and "Powering Up Britain: Net Zero Growth Plan".

"Powering up Britain" sets out the Government's priority to be energy independent in light with the invasion in Ukraine. It highlights the Government's mission to replace fossil fuels with renewable energy including solar. In terms of power generation, it recognises that solar has a huge potential to help decarbonise the power sector. It sets out a goal to quintuple solar power by 2035, up to 70GW, enough to power around 20 million homes, stating that *"Government seeks large scale solar deployment across the UK, looking for development mainly on brownfield, industrial and low/medium grade agricultural land".*

To achieve the ambitions in delivering solar renewables set out in 'Powering up Britain', the 'Powering up Britain: Energy Security Plan' sets out the steps that the DESNZ is taking to ensure the UK is more energy independent, secure and resilient. Key commitments include publishing action plans this year on reducing the development time for transmission network projects and on accelerating electricity network connections; publishing the revised version of the energy National Policy Statements which underline the national need for new energy infrastructure; and, accepting the Independent Review of Net Zero recommendation that the Government should commit to outlining a clear approach to gas vs. electricity 'rebalancing' by the end of 2023/4 and should make significant progress affecting relative prices by the end of 2024.

The 'Powering Up Britain: Net Zero Growth Plan' further sets out the long-term decarbonisation trajectory and how it can improve the UK's competitiveness, deliver an industrial renaissance and level up the whole of the country. This plan responds to the expert recommendations made in the Independent Review of Net Zero report. One of the recommendations accepted is establish a solar government-industry taskforce and publish a solar roadmap which sets out a clear step by step deployment trajectory to achieve 70GW of solar by 2035, with the intention to provide certainty to investors in the solar industry.

National Planning Policy Framework

The National Planning Policy Framework ('NPPF'), introduced in March 2012 (updated July 2021), sets out the Government's planning policies for England. It is a material consideration in planning decisions. Although paragraph 5 of the NPPF confirms that NSIPs are to be determined in accordance with the decision-making framework of the PA 2008 and relevant NPSs, decisions on NSIPs should also take account of any other matters that are *"relevant"*, which may include the NPPF. The NPPF is supported by the Planning Practice Guidance (PPG), which provides more detailed guidance on various aspects of planning.

Section 2 'Achieving sustainable development' confirms (paragraph 7) that the purpose of the planning system is to contribute to the achievement of sustainable development, summarised as *"meeting the needs of the present without compromising the ability of future generations to meet their own needs".* Paragraph 8 goes on to identify three overarching objectives to the achievement of sustainable development, which are interdependent and need to be pursued in mutually supportive ways. These are:

- **an economic objective** – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;

- **a social objective** – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and
- **an environmental objective** – to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

Central to the NPPF is 'a presumption in favour of sustainable development', which is set out in Paragraph 11. The NPPF is supportive of infrastructure projects. One of the methods of fulfilling the objective of sustainable development listed at paragraph 8 under 'a) an economic objective' is through the *"provision of infrastructure"*.

Paragraph 152 in Section 14 'Meeting the challenge of climate change, flooding and coastal change' states that:

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

Paragraph 158 states that when determining application for renewable and low carbon development, there should be no requirement for applicants to demonstrate the overall need for renewable or low carbon energy and that applications for renewable or low carbon development should be approved if their impacts are (or can be made) acceptable.

NPPF policies of particular relevance include:

- building a strong, competitive economy;
- making effective use of land;
- meeting the challenge of climate change, flooding and coastal change; and
- conserving and enhancing the natural environment.

Adopted Local Planning Policy

The local planning policy relevant to the Proposed Development comprises the following:

North Kesteven District Council

- Central Lincolnshire Local Plan (adopted 2017).

Boston Borough Council & South Holland District Council

- South East Lincolnshire Local Plan (adopted 2019).

Lincolnshire County Council

- The Lincolnshire Minerals and Waste Plan (Core Strategy and Development Management Policies adopted 2016 and Site Locations adopted 2017)

Policy Designations

The key planning allocations/designation and related policies (based upon the relevant policies maps) that apply to the Site are set out below:

Central Lincolnshire Local Plan Policies Map (adopted 2017)

- No policy designations of interest

Emerging Central Lincolnshire Local Plan Regulation 19 Proposed Submission Policies Map (2022)

- Locations suitable in principle for large scale wind turbines (Policy 14)

South East Lincolnshire Local Plan Policies Map (adopted 2019)

- Designated countryside

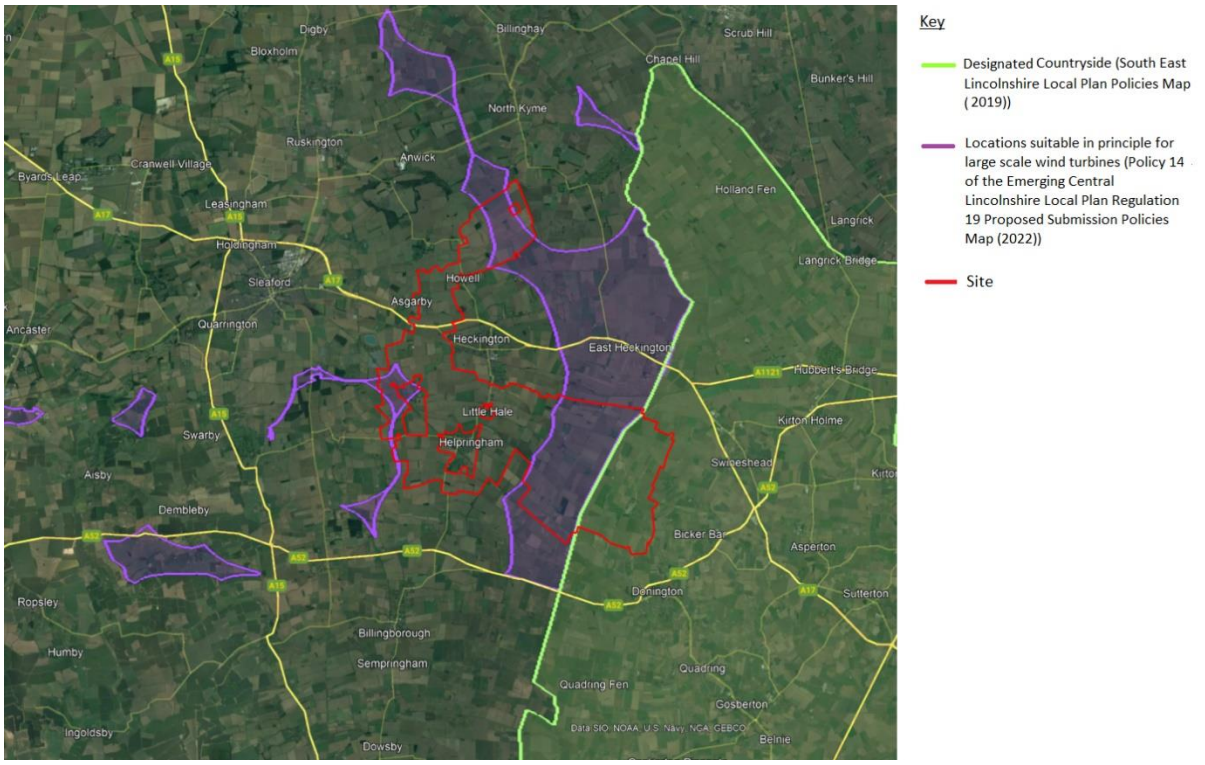

Figure 1: Policy Designations

Emerging Local and Neighbourhood Planning Policy and Non Planning Policy

Central Lincolnshire Local Plan Review (2022)

The Local Plan Review was submitted to the Planning Inspectorate on 8 July 2022. The examination was held between 15th November and 16th December 2022. Consultation on the Recommended Main Modifications, Additional 'Minor' Modifications and Recommended Policies Maps Modifications was held between 13th January and 24th February 2023. The Inspector's Report and Schedule of Main Modifications were received by the Central Lincolnshire Joint Strategic Planning Committee on 29th March 2023.

North Kesteven Neighbourhood Plans

Ewerby and Evedon Neighbourhood Plan's proposed boundary will potentially cover the Beacon North site. According to the NKDC Neighbourhood Plan Progress Tracker dated 13th October 2022, this neighbourhood plan is currently at Stage 1 Initial Neighbourhood Plan Discussion only and is unlikely to be at an advanced stage by the submission of the DCO application.

The tracker indicates Neighbourhood Plans are also in development for the following although no mapping is available:

- Swaton;
- Little Hale;
- Great Hale;
- Scredington;
- Helpringham;
- Burton Pedwardine;
- Kirby La Thorpe;
- Asgarby & Howell; and
- Heckington.

Lincolnshire Minerals and Waste Local Plan

LCC is currently preparing a new Minerals and Waste Local Plan which is at a very early stage and expected to be adopted in winter 2024.

Lincolnshire County Council Non Planning Policy

- Lincolnshire County Council Green Masterplan 2020 – 2025 (adopted 2020)
- Lincoln Transport Strategy 2020-2036
- Lincolnshire County Council Local Transport Plan 5
- Joint Lincolnshire Flood Risk and Water Management Strategy 2019-2050

- Lincolnshire County Council Highway and Flood Authority, Development Road and Sustainable Drainage Specification and Construction (adopted March 2021)

Key Adopted Local Planning Policies

Central Lincolnshire Local Plan (2017)	Policy Consideration
Policy LP14: Managing Water Resources and Flood Risk	*"Development proposals should take account of the best available information from all sources of flood risk and by site specific flood risk assessments; and, there is no unacceptable increased risk of flooding to the development site or to existing properties…"*
Policy LP18: Climate Change and Low Carbon Living	Development proposals will be considered more favourably if the scheme could provide renewable energy infrastructure.
Policy LP19: Renewable Energy Proposals	*"Proposals will be assessed on their merits, with the impacts, considered against the benefits of the scheme, taking account of the surrounding landscape and townscape; heritage assets; ecology and diversity… and agricultural land classification."* *"Renewable energy proposals which will directly benefit a local community, have the support of the local community and / or are targeted at residents experiencing fuel poverty, will be particularly supported".*
Policy LP25: The Historic Environment	*"Development proposals should protect, conserve and seek opportunities to enhance the historic environment of Central Lincolnshire".*
Policy LP28: Sustainable Urban Extensions	*"…Each new urban extension proposal must, where applicable, demonstrate availability and deliverability of the proposed scheme; … consider the Agricultural Land Classification of the site, and where higher quality agricultural land exists on one part of the site compared with another, then, if possible, utilise such land (or part of such land) for productive use, such as community orchards and allotments; and, demonstrate that the unnecessary sterilisation of minerals has been avoided"*
Policy LP55: Development in the Countryside	Part G emphasises the importance of *"Protecting the best and most versatile agricultural land"*. It states *"Proposals should protect the best and most versatile agricultural land so as to protect opportunities for food production and the continuance of the agricultural economy. With the exception of allocated sites, development affecting the best and most versatile agricultural land will only be permitted if there is insufficient lower grade land available at that settlement (unless development of such lower grade land would be inconsistent with other sustainability considerations); the impacts of the proposal upon ongoing agricultural operations have been minimised through the use of appropriate design solutions; and, where feasible, once any development which is permitted has ceased its useful life the land will be restored to its former use, and will be of at least equal quality to that which*

	existed prior to the development taken place (this requirement will be secured by planning condition where appropriate)."

South East Lincolnshire Local Plan (2019)	**Policy Consideration**
Policy 4: Approach to Flood Risk	Development proposed within an area at risk flooding will be permitted, where, it can be demonstrated that there are no other sites available at a lower risk of flooding (i.e. that the sequential test is passed); its benefits to the community outweigh flood risk; and, is supported with a site-specific flood risk assessment.
Policy 29: The Historic Environment	*"Where a development proposal would affect the significance of a heritage asset (whether designated or non-designated), including any contribution made to its setting, it should be informed by proportionate historic environment assessments and evaluations"*
Policy 31: Climate Change and Renewable and Low Carbon Energy	*"With the exception of Wind Energy the development of renewable energy facilities… on existing or proposed structures will be permitted provided, individually, or cumulatively, there would be no significant harm to visual amenity, landscape character or quality, or skyscape considerations; residential amenity…; highway safety (including public rights of way); agricultural land take; heritage assets including their setting; and the natural environment".*

Emerging Local Planning Policy

Central Lincolnshire Local Plan Review Proposed Submission (2022) (Main Modifications (March 2023) Incorporated)	**Policy Consideration**
Policy S5: Development in the Countryside	Part G "Agricultural, forestry, horticultural or other rural land-based development" states *"Proposals which will help farms modernise and/or adapt to funding changes or climate change will be supported in principle and any such proposals will be considered against relevant design, landscape and natural environment policies in this plan. Where permission is required, development proposals for buildings required for agriculture or other rural land based development purposes will be supported where: a) It is demonstrated that there is a functional need for the building which cannot be met by an existing, or recently disposed of, building; b) the building is of a scale that is proportionate to the proposed functional need; c) the building is designed specifically to meet the functional need identified; d) the site is well related to existing buildings in terms of both physical and functional location,*

	design and does not introduce isolated structures away from existing buildings; and e) significant earthworks are not required, and there will be no harm to natural drainage and will not result in pollution of soils, water or air."
Policy S14: Renewable Energy	This policy supports the transition to a net zero carbon future. It states *"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: i. 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; and highway safety and rail safety; and ii. The impacts are acceptable on aviation and defence navigation system/communications; and iii. 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…"* It goes on to state that *"Proposals for solar thermal or photovoltaics panels and associated infrastructure to be installed on existing property will be under a presumption in favour of permission unless there is clear and demonstrable significant harm arising. Proposals for ground based photovoltaics and associated infrastructure, including commercial large scale proposals, will be under a presumption in favour unless there is clear and demonstrable significant harm arising; or, the proposal is (following a site specific soil assessment) to take place on Best and Most Versatile (BMV) agricultural land and does not meet the requirements of Policy S67; or, the land is allocated for another purpose in this Local Plan or other statutory based document (such as a nature recovery strategy or a Local Transport Plan), and the proposal is not compatible with such other allocation."* *"Proposals for ground based photovoltaics should be accompanied by evidence demonstrating how opportunities for delivering biodiversity net gain will be maximised in the scheme taking account of soil, natural features, existing habitats, and planting proposals accompanying the scheme to create new habitats linking into the nature recovery strategy."*
Policy S48: Walking and Cycling Infrastructure	*"Development proposals should facilitate active travel by incorporating measures suitable for the scheme from the design stage… Proposals will a) protect, maintain and improve existing infrastructure, including closing gaps or deficiencies in the network and connecting communities and facilities; b) provide high quality attractive routes that are safe, direct, legible and pleasant and are integrated into the wider network; c) ensure the provision of appropriate information, including signposting and way-finding to encourage the safe use of the network; d) encourage the use of supporting facilities, especially along principle cycle routes; e) make provision for secure cycle parking facilities in new developments and in areas with high visitor numbers*

	across Central Lincolnshire; and f) consider the needs of all users through inclusive design."
Policy S67: Best and Most Versatile Agricultural Land	*"Proposals should protect the best and most versatile agricultural land so as to protect opportunities for food production and the continuance of the agricultural economy.* *With the exception of allocated sites, significant development resulting in the loss of the best and most versatile agricultural land will only be supported if:* *The need for the proposed development has been clearly established and there is insufficient lower grade land available at that settlement (unless development of such lower grade land would be inconsistent with other sustainability considerations); and b) The benefits and/or sustainability considerations outweigh the need to protect such land, when taking into account the economic and other benefits of the best and most versatile agricultural land; and c) The impacts of the proposal upon ongoing agricultural operations have been minimised through the use of appropriate design solutions; and d) Where feasible, once any development which is supported has ceased its useful life the land will be restored to its former use (this condition will be secured by planning condition where appropriate).* *Where proposals are for sites of 1 hectare or larger, which would result in the loss of best and most versatile agricultural land, an agricultural land classification report should be submitted, setting out the justification for such a loss and how criterion b has been met."*

Appendix 5.1 Ecology Legislation

Appendix 5.1 Ecology Legislation

Legislative context for biodiversity	
Legislation	**Implications**
The Environment Act 2021	The Environment Act (passed in November 2021) translates aspects of the Government publication "A Green Future: Our 25 Year Plan to Improve the Environment" into legislation. The Environment Act, once the relevant provisions are commenced (which has not yet occurred at the time of writing) makes it mandatory for the vast majority of development projects to deliver a 10% Biodiversity Net Gain (BNG) as a condition to gaining consent. Further secondary legislation is required to apply the BNG requirement to NSIP developments. Previous consultation has set the expectation that a BNG requirement will be imposed on NSIP projects from November 2025, with the level of the requirement detailed within a BNG Statement(s) (subject to prior publication) but presently expected to be set at the same 10% level.
Conservation of Habitats and Species Regulations 2017 ("the Habitats Regulations")[1] as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019	These regulations transposed Council Directive 92/43/EEC on the conservation of natural habitats and wild flora and fauna ('the Habitats Directive') into national law. They also transpose elements of Council Directive 2009/147/EC on the conservation of wild birds ('the Birds Directive'). The Habitats Regulations provide the framework for the protection of Natura 2000 sites (now referred to as the national site network following the amendments that came into force on 31 December 2020), and for certain flora and fauna (known as European Protected Species (EPS)). The regulations set out the process with regard to the assessment of development. The Proposed Development may result in effects on constituents of the national site network and EPS which require assessment in line with the Habitats Regulations.
Natural Environment and Rural Communities Act 2006 ('the NERC Act')[2]	The NERC Act (amongst other matters) places a duty to conserve biodiversity on public authorities in England. This requires local authorities and government departments to have regard to the purposes of conserving biodiversity in a manner that is consistent with the exercise of their normal functions. The NERC Act also places a duty on the Secretary of State to maintain lists of species and habitats which are regarded as being of principal importance for the conservation of biodiversity in England. These Habitats of Principal Importance (HPI) and Species of Principal Importance (SPI) are used to guide decision makers in implementing their duties to have regard to the conservation of biodiversity in England when carrying out their normal functions. The Proposed Development may result in effects on HPI and SPI in England.
Countryside and Rights of Way Act 2000 ('the CRoW	The CroW Act, amongst other elements, details further measures for the management and protection of Sites of Special Scientific Interest (SSSI) and strengthens wildlife enforcement legislation.

[1] The Conservation of Habitats and Species Regulations 2017 (No. 1012).
[2] Natural Environment and Rural Communities Act 2006, c.16.

Legislative context for biodiversity	
Legislation	**Implications**
Act')[3]	The Proposed Development may result in effects on SSSIs and protected flora and fauna.
The Hedgerows Regulations 1997 ('the Hedgerow Regulations')[4]	The Hedgerows Regulations facilitate the protection of hedgerows growing in or adjacent to common land, protected land or land used for agriculture, forestry or the breeding and keeping of horses, ponies, or donkeys. The Proposed Development may result in effects on hedgerows deemed important by the Hedgerows Regulations.
Protection of Badgers Act 1992 ("the Protection of Badgers Act")[5]	The Protection of Badgers Act consolidated and improved protection for badgers. It specifically makes it an offence to kill, injure or take a badger, or damage or interfere with a sett unless a licence has been obtained from a statutory authority. The Proposed Development may result in effects on badgers and their setts.
Wildlife and Countryside Act 1981 (as amended) (WCA)[6]	The WCA consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats ('the Bern Convention') and Council Directive 79/409/EEC on the conservation of wild birds (Birds Directive). Amongst other matters it provides protection for wild birds, certain flora and fauna and sets the framework for the protection and management of SSSIs. The Proposed Development may result in effects on SSSIs and protected flora and fauna
The European Union (EU) Water Framework Directive (2000/60/EC) (WFD) as enacted into domestic law by the Water Environment (Water Framework Directive (England and Wales) Regulations 2017 (as amended)	A fundamental requirement of the WFD is to attain 'Good Ecological Status', or 'Good Ecological Potential' within each defined water body by December 2027 at the latest and to ensure that any deterioration in status is prevented.

[3] Countryside and Rights of Way Act 2000, c.37.
[4] The Hedgerows Regulations 1997 (No.1160).
[5] Badger Act 1992, c.51.
[6] Wildlife and Countryside Act 1981.

Appendix 5.2 Ecology Planning Policy

Appendix 5.2 Ecology Planning Policy

Planning policy context for biodiversity	
Policy reference	**Implications**
Draft Overarching National Policy Statement for Energy (EN-1)[1]	Paragraph 4.5.2 of Draft EN-1 states: "*Although achieving biodiversity net gain is not an obligation for projects under the Planning Act 2008, energy NSIP proposals should seek opportunities to contribute to and enhance the natural environment by providing net gains for biodiversity where possible. Applicants are encouraged to use the most current version of the Defra biodiversity metric to calculate their biodiversity baseline and inform their biodiversity net gain outcomes and to present this data as part of their application. Biodiversity net gain should be applied in conjunction with the mitigation hierarchy and does not change or replace existing environmental obligations*".
	Paragraph 5.4.3 of Draft EN-1 states: "*Where the development is subject to EIA the applicant should ensure that the ES clearly sets out any effects on internationally, nationally, and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity. The applicant should provide environmental information proportionate to the infrastructure where EIA is not required to help the Secretary of State consider thoroughly the potential effects of a proposed project.*"
	Paragraph 5.4.4 of Draft EN-1 states: "*The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests*" and "*The applicant is encouraged to consider how their proposal can contribute towards Biodiversity Net Gain in line with the ambition set out in the 25 Year Environment Plan*".
	Paragraph 5.4.8 of Draft EN-1 states: "*The Habitats Regulations set out sites for which an HRA will assess the implications of a plan or project, including Special Areas of Conservation and Special Protection Areas. As a matter of policy, the following should be given the same protection as sites covered by the Habitat's Regulations: (a) potential Special Protection Areas and possible Special Areas of Conservation; (b) listed or proposed Ramsar sites; and (c) sites identified, or required, as compensatory measures for adverse effects on other HRA sites*".
	Paragraph 5.4.10 of Draft EN1 states: "*Development on land within or outside a SSSI, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits (including need) of the development in the location proposed clearly outweigh both*

[1] Draft Overarching National Policy Statement for Energy (EN-1) (2021).

Planning policy context for biodiversity	
Policy reference	**Implications**
	its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of SSSIs. The Secretary of State should use requirements and/or planning obligations to mitigate the harmful aspects of the development and, where possible, to ensure the conservation and enhancement of the site's biodiversity or geological interest."
	Paragraph 5.4.12 of Draft EN-1 states: "*Sites of regional and local biodiversity and geological interest, which include Regionally Important Geological Sites, Local Nature Reserves and Local Wildlife Sites, are areas of substantive nature conservation value and make an important contribution to ecological networks and nature's recovery. They can also provide wider benefits including public access (where agreed), climate mitigation and helping to tackle air pollution. National planning policy expects plans to identify and map Local Wildlife sites, and to include policies that not only secure their protection from harm or loss but also help to enhance them and their connection to wider ecological networks. The Secretary of State should give due consideration to such regional or local designations. However, given the need for new nationally significant infrastructure, these designations should not be used in themselves to refuse development consent. Development will still be expected to comply with the biodiversity and geological conservation requirements set out in this NPS."*
	Paragraph 5.4.13 of Draft EN-1 states: "*Ancient woodland is a valuable biodiversity resource both for its diversity of species and for its longevity as woodland. Once lost it cannot be recreated. The Secretary of State should not grant development consent for any development that would result in its loss or deterioration unless the benefits (including need) of the development, in that location clearly outweigh the loss of the woodland habitat. Aged or 'veteran' trees found outside ancient woodland are also particularly valuable for biodiversity and their loss should be avoided. Where such trees would be affected by development proposals the applicant should set out proposals for their conservation or, where their loss is unavoidable, the reasons why. Applicants should provide a suitable compensation strategy in instances where proposals would result in the loss or deterioration of ancient woodland and ancient or veteran trees."*
	Paragraph 5.4.16 of Draft EN-1 states: "*Other species and habitats have been identified as being of principal importance for the conservation of biodiversity in England and Wales and thereby requiring conservation action.89 The Secretary of State should ensure that these species and habitats are protected from the adverse effects of development by using requirements, planning obligations, or licence conditions. The Secretary of*

Planning policy context for biodiversity	
Policy reference	**Implications**
	State should refuse consent where harm to the habitats or species and their habitats would result, unless the benefits (including need) of the development outweigh that harm. In this context the Secretary of State should give substantial weight to any such harm to the detriment of biodiversity features of national or regional importance which it considers may result from a proposed development" and that "*Proposals should also consider any opportunities to maximise the restoration, creation, and enhancement of wider biodiversity. Consideration should be given to improvements to, and impacts on, habitats and species in, around and beyond developments, for wider ecosystem services and natural capital benefits, beyond those under protection and identified as being of principal importance. This may include considerations and opportunities identified through Local Nature Recovery Strategies, and national goals and targets set through the government's strategy for nature for example.*"
	Paragraph 5.4.18 of Draft EN-1 states: "The applicant should include appropriate mitigation measures as an integral part of the proposed development. In particular, the applicant should demonstrate that: • during construction, they will seek to ensure that activities will be confined to the minimum areas required for the works • the timing of construction has been planned to avoid or limit disturbance to birds during the breeding season • during construction and operation best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised, including as a consequence of transport access arrangements • habitats will, where practicable, be restored after construction works have finished • mitigation measures should take into account existing habitats and should generally seek opportunities to enhance them, rather than replace them. Where practicable, mitigation measures should seek to create new habitats of value within the site landscaping proposals."
	Paragraph 5.4.19 of Draft EN-1 states "*Applicants should consider producing and implementing a Biodiversity Management Strategy as part of their development proposals. This could include provision for biodiversity awareness training to employees and contractors so as to avoid unnecessary adverse impacts on biodiversity during the construction and operation stage.*"
	Paragraph 5.4.22 of Draft EN-1 states: "*Any habitat creation or enhancement delivered for biodiversity net gain should generally be maintained for a minimum period of 30 years.*"

Planning policy context for biodiversity	
Policy reference	**Implications**
Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)[2]	In the section on Solar Photovoltaic Generation paragraph 2.50.2 states "*The applicant's ecological assessments should identify any ecological risk from developing on the proposed site…The assessment may be informed by a 'desk study' of existing ecological records, an evaluation of the likely impacts of the solar farm upon ecological features, and should specify mitigation to avoid or minimise these impacts, and any further surveys required*."
	Paragraph 2.50.4 states "*The assessment should consider how security and lighting installations may impact on the local ecology. Where pole mounted CCTV facilities are proposed the location of these facilities should be carefully considered in order to minimise impact. If lighting is necessary, it should be minimised and directed away from areas of likely habitat."*
	Paragraph 2.50.5 states *"The assessment should consider how site boundaries are managed. If any hedges/scrub are to be removed, further surveys may be necessary to account for impacts. Buffer strips between perimeter fencing and hedges may be proposed, and the construction and design of any fencing should account for enabling mammal, reptile and other fauna access into the site if required to do so in the ecological report"*
	Paragraph 2.50.8 states "*The assessment should consider enhancement, management, and monitoring of biodiversity."*
	Paragraph 2.50.10 states *"Proposed enhancements should take account of the above factors and as set out in Section 5.4 of EN1 and aim to achieve environmental and biodiversity net gain in line with the ambition set out in the 25 Year Environment Plan. This might include maintaining or extending existing habitats and potentially creating new important habitats"*
National Planning Policy Framework (NPPF)[3]	Paragraph 174 of the NPPF requires planning policies and decisions to contribute to and enhance the natural and local environment by: protecting and enhancing sites of biodiversity value in a manner commensurate with their statutory status or identified quality in the development plan; recognising the wider benefits from natural capital and ecosystem services; and minimising impacts on, and providing net gains for, biodiversity.
	Paragraph 179 of NPPF requires that plans should identify, map and safeguard biodiversity interest and networks, including wildlife corridors, the hierarchy of designated sites, and areas identified by national and local, partnerships. They should also promote conservation, restoration and enhancement including HPI and SPI, as well as securing measurable net gain.
	Paragraph 180 of NPPF outlines that development on land within or

[2] Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) (2021).
[3] National Planning Policy Framework (2021).

Planning policy context for biodiversity	
Policy reference	**Implications**
	outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. If significant harm to biodiversity will result from a development that cannot be avoided, mitigated, or compensated for, permission will be refused unless the benefits of development outweigh impacts, or exceptional reasons and compensation apply, and opportunities to improve biodiversity should be in their design, especially where this can secure measurable net gains or enhance public access.
	Paragraph 181 of NPPF outlines that potential, possible, listed or proposed sites, and those that are an identified compensatory measure, are to be protected as the equivalent designation.
	Paragraph 182 of NPPF outlines those potential impacts on sites requiring appropriate assessment will be considered ahead of the presumption for sustainable development.
Central Lincolnshire Local Plan (2017)	Policy LP20 (Green infrastructure network) states *"The Central Lincolnshire Authorities will aim to maintain and improve the green infrastructure network in Central Lincolnshire by enhancing, creating and managing multifunctional green space within and around settlements that are well connected to each other and the wider countryside.* *Development proposals which are consistent with and help deliver the opportunities, priorities and initiatives identified in the latest Central Lincolnshire Green Infrastructure Study and Biodiversity Opportunity Mapping Study, will be supported."*
	Policy LP21 (Biodiversity and Geodiversity) sets out the local authorities approach to protection of ecological networks and designated sites, minimising impacts on biodiversity and delivering a net gain in biodiversity.

Appendix13.1 Agricultural Quality of Land at Bicker Fen North, Lincolnshire (Land Research Associates, 2023)

AGRICULTURAL QUALITY OF LAND AT BICKER FEN NORTH LINCOLNSHIRE

Report 2077/2

18th January, 2023

Land Research ASSOCIATES
www.lra.co.uk

AGRICULTURAL QUALITY OF LAND AT BICKER FEN NORTH, LINCOLNSHIRE

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Report 2077/2

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18th January, 2023

1.0 Introduction

1.1 This report provides information on the agricultural quality of land to the north-east of Sleaford, near the villages of Howell and Ewerby, Lincolnshire. The site comprises 526.6 ha of mainly arable land, with lesser areas of grassland, reservoirs and woodlands. The site is slightly undulating at an elevation of approximately 5-15 m AOD

1.2 1:50,000 BGS geological information shows the underlying geology of the site as Oxford Clay, with a superficial cover of glacial till, and with some tidal flat deposits in parts.

1.3 The National Soil Map[1] shows most of the land Beccles 3 Association comprising mainly slowly permeable seasonally waterlogged fine loamy over clayey soils developed in chalky till, with some similar soils with only slight seasonal waterlogging. Also noted are lesser areas of Ruskington Association: mainlydeep calcareous fine loamy and sandy soils affected by groundwater, and Wallasea 2 Association, comprising stoneless clay soils developed in marine alluvium.

[1] Hodge C.A.H. *et al* (1984). *Soils and their use in Eastern England.* Soil Survey Bulletin No 13

2.0 Agricultural Land Quality

2.1 To assist in assessing land quality, the former Ministry of Agriculture, Fisheries and Food (MAFF) developed a method for classifying agricultural land by grade according to the extent to which physical or chemical characteristics impose long-term limitations on agricultural use for food production. The MAFF Agricultural Land Classification (ALC) system[2] classifies land into five grades numbered 1 to 5, with grade 3 divided into two sub-grades (3a and 3b). The system was devised and introduced in the 1960s and revised in 1988.

- The agricultural climate is an important factor in assessing the agricultural quality of land and has been calculated using the Climatological Data for Agricultural Land Classification.[3] The site data was calculated at five points across the site with no significant variation in the results. A representative selection of site data is given below from a central point (grid reference TF148485) for an average elevation of 10 m.

• Average annual rainfall:	562 mm
• January-June accumulated temperature >0°C	1425 day°
• Field capacity period (when the soils are fully replete with water)	105 days Mid Dec – late March
• Summer moisture deficits for:	wheat: 117 mm potatoes: 112 mm

2.2 There are no climatic limitations to agricultural land quality in this location.

2.3 A semi-detailed Agricultural Land Classification survey was conducted in October 2022 at selected intersections of a 100 m grid, giving an average density of approximately 1 observation per 5 ha. This density of survey is below that recommended by Natural England for planning applications, and is intended to give provisional grades only. During the survey soils were investigated via a combination of hand auger borings and small pits to a

[2] MAFF, (1988).*Agricultural Land Classification for England and Wales*: Guidelines and Criteria for Grading the Quality of Agricultural Land.

[3] *Climatological Data for Agricultural Land Classification*. Meteorological Office, 1989

maximum depth of 1.2 m. Survey logs and pit descriptions are recorded in an appendix to this report.

2.4 The survey was used in conjunction with the agro-climatic data above to classify the site using the revised guidelines for ALC issued in 1988 by MAFF[2].

Survey results

2.5 The distribution of the land grades is shown on Map 2 in an appendix to this report.

2.6 The majority of the land is dominated by heavy soils developed on glacial till. The soils are slowly permeable and are classed as subgrade 3b because of wetness/workability limitations, which restrict access for cultivations in late autumn and early spring.

2.7 On slightly higher ground, especially in the south of the site, the soils have either loamier or calcareous topsoils. This land is considered easier to work and the land is classed as subgrade 3a on wetness/workability.

2.8 In the east of the site some soils are developed in either marine deposits of clay and silt and are close to a pumping station, so tend to be in the regime of classic heavy fenland. Air photographs show distinct old creek patterns and the topography is undulating. While some soils have clay subsoils, these are well structured and tend to be more permeable than those on the glacial tills so are more workable. Silt hills or "roddons" on the creek patterns have relatively freely draining soils and in large areas would be classed as grade 1 or 2. The complex soil pattern in this area has led to its inclusion in land quality 3a with a pattern limitation.

2.9 Between the glacial till area and the alluvial areas are fen margin deposits often with sandy soils. Some of these are freely draining but slightly affected by groundwater, and the sandier types have limited reserves of available water to sustain crop growth and classed as subgrade 3b with a droughtiness limitation. Other soils with loamier layers are less droughty and the land is in subgrade 3a, and there are also areas of grade 2 land locally.

APPENDIX

DETAILS OF OBSERVATIONS
MAPS

Land at Bicker Fen North, Lincolnshire: Details of observations at each sampling point

Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
No	Depth (cm)	Texture	Stones (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling	(°)	Class	Grade	Main limitation
1	0-30	HCL	2	30-45	HCL	xxx	45-60 60-80	C C+chk stones	xxx xxx	0	III	3b	W
2	0-28	HCL	2	28-75	C	xxx	75-100	C+chk stones	xxx	0	III	3b	W
3	0-30	HCL	2	30-70	HCL-C	xxx	70-90	C+chk stones	xxx	0	II/III	3a/3b	W
4	0-31	HCL	2	31-40	HCL-C	xxx	40-55 55-70 70+	C C+chk stones stop on stones	xxx xxx	1	III	3b	W
5	0-30	SCL	2	30-70	SCL	xx(x)	70-100	SCL	xxx	0	II	2	W
6	0-30	HCL	2	30-40	HCL	xxx	40-70 70-90	HCL-C C+chk stones	xxx xxx	0	III	3b	W
7	0-30	HCL	1	30-50	C	xxx	50-80+	C+chk stones	xxx	0	III	3b	W
8	0-30	C	2	30-65	C	xxx	65-100	C+chk stones	xxx	0	III	3b	W
9	0-30	C	2	30-60	C	xxx	60-90	C+chk stones	xxx	0	III	3b	W
10	0-30	SCL	4	30-50	SCL-HCL	xxx	50-90	C+chk stones	xxx	0	III	3a	W
11	0-30	C	2	30-50	C	xxx	50-80+	C+chk stones	xxx	0	III	3b	W
12	0-30	HCL	1	30-40	C	xxx	40-80+	C+chk stones	xxx	0	III	3b	W
13	0-30	HCL-C	2	30-50 50-70	HCL-C ca C-HCL	xxx xxx	70-90+	C+chk stones	xxx	0	III	3b	W
14	0-30	ca HCL	2	30-45	ca C	xxx	45-70 70+	v cky C stop on stones	xxx	0	III	3a	W
15	0-28	HCL-C	2	28-50	C	xxx	50-80+	C+chk stones	xxx	0	III	3b	W
16	0-27	ca HCL	2	27-45	ca C	xxx	45-70 70+	v cky C stop on stones	xxx	0	III	3a	W
17	0-30	ca HCL	2	30-60	br ca C	xx	60-80	br C+chks	xxx	0	III	3a	W
18	0-30	HCL	1	30-50	C	xxx	50-70+	C+chk stones	xxx	1	III	3b	W
19	0-30	dk C	3	30-65	gr C	xxx	65-120	rb C	xxxx	0	III	3b	W
20	0-30	HCL	2	30-50	rb C	xxxx	50-100	ca gr C	xxxx	0	III	3b	W
21	0-28	HCL	3	28-55	C	xxx	55-80+	C+chk stones	xxx	0	III	3b	W
22	0-30	HCL	3	30-40	C	xx(x)	40+	stop on stones		1	III	3b	W
23	0-30	HCL	4	30-50	st SCL	xx	50+	stop on stones		1	III	3a	W,D
24	0-30	HCL-C	2	30-80	C	xxx	80-100	C+chk stones	xxxx	0	III	3b	W
25	0-30	HCL	2	30-50	C	xxx	50-90	C+chk stones	xxx	0	III	3b	W
26	0-30	SCL	2	30-45	SCL	xxx	45-65 65-90	C C+chk stones	xxx xxx	0	III	3a	W
27	0-30	C	2	30-65	C	xxx	65-100	C+chk stones	xxx	0	III	3b	W
28	0-28	C	0	28-80	dk C	xxx	80-90	gr C	xxx	1	III	3b	W

Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
No	**Depth (cm)**	**Texture**	**Stones (%)**	**Depth (cm)**	**Texture**	**Mottling**	**Depth (cm)**	**Texture**	**Mottling**	**(°)**	**Class**	**Grade**	**Main limitation**
29	0-30	HCL	3	30-45	C	xxx	45-90	C+chk stones	xxx	2	III	3b	W
30	0-26	HCL	2	26-60	C	xxx	60-90	C+chk stones	xxx	0	IV	3b	W
31	0-27	HCL	2	27-50	C	xxx	50-80+	C+chk stones	xxx	0	III	3b	W
32	0-26	C	2	26-70	C	xxx	70-90	C+chk stones	xxx	0	III	3b	W
33	0-26	C	4	26-80	C	xxx	80-100	C+chk stones	xxx	0	III	3b	W
34	0-25	HCL	3	25-65	C	xxx	65-100	C+chk stones	xxx	<1	III	3b	W
35	0-35	dk HCL-C	2	35-60	gr C	xxx	60-100	C+chk stones	xxx	<1	III	3b	W dist
36	0-30	(ca) HCL	1	30-70	gr C	xxxx	70-100	C+chk stones	xxxx	0	III	3b/3a	W
37	0-28	HCL-C	2	28-70	C	xxx	70-100	(chalky) C	xxxx	0	III	3b	W
38	0-28	C	3	28-60	C	xxx	60-90	C+chk stones	xxx	0	III	3b	W
39	0-32	C	3	32-40	HCL	xxx	40-70 70-100	rb C ca C +chks	xxx	0	III	3b	W
40	0-28	HCL	3	28-60	gr br C	xxx	60-100	rb C	xxx	0	III	3b	W
41	0-30	C	3	30-70-	rb C	xxx	70-100	gr C	xxxx	0	III	3b	W
42	0-27	C	3	27-50	C	xxx	50+	stop on stones		0	III	3b	W
43	0-28	HCL	2	28-100	gr C	xxx				0	III	3b	W
44	0-27	C	2	27-60	C	xxx	60-90	C+chk stones	xxx	0	III	3b	W
45	0-30	HCL	2	30-65	C	xxx	65-100	(chky) C	xxx	0	III	3b	W
46	0-28	C	2	28-90	rb C	xxx	90-110	ca gr C	xxxx	0	III	3b	W
47	0-30	C	3	30-90	rb C	xxx				0	III	3b	W
48	0-30	HCL	3	30-50	gr C	xxx	50-80+	C+chk stones	xxx	0	III	3b	W
49	0-30	HCL	2	30-50	grb C	xxx	50-70	C+chk stones	xxx	0	III	3b	W
50	0-30	dk HCL	2	30-50	gr C	xxx	50-80	ca C	xxx	0	IV	3b	W
51	0-28	HCL-C	2	28-100	br C	xxx				0	III	3b	W
52	0-32	SCL	2	32-55	C	xxx	55-70+	C+chk stones	xxx	0	III	3a	W
53	0-33	HCL	2	33-40	C	xxx	40-80+	C+chk stones	xxx	0	III	3b	W
54	0-30	ca HCL	2	30-65	C+chk stones	xxx	65-100	rb C	xxx	0	III	3b	W
55	0-28	HCL	2	28-45	C	xxx	45-60 60+	C+chk stones stop on stones	xxx	0	III	3b	W
56	0-30	C	2	30-80	rb C	xxx				0	III	3b	W
57	0-30	ca HCL	3	30-80	C+chk stones	xxx				0	III	3a	W
58	0-30	HCL	2	30-55	C	xxx	55-80	C+chk stones	xxx	0	III	3b	W
59	0-30	HCL-SCL	1	30-80	C	xxx				0	III	3b/3a	W
60	0-28	MCL	2	28-60	C	xxx	60-90	gr C	xxxx	0	III	3a	W
61	0-28	SCL	2	28-50	MSL	xx	50-80+	C+chk stones	xxx	0	II	2/30	W
62	0-30	C-HCL	2	30-80	rb C	xxx				0	III	3b	W
63	0-30	SCL	2	30-65	SCL	xxx	65-95 95+	MSL stop on gravel	xx	0	II	2	W

Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
No	Depth (cm)	Texture	Stones (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling	(°)	Class	Grade	Main limitation
64	0-32	HCL	2	32-60	grb C	xxx	60-90	rb C	xxx	0	III	3b	W
65	0-30	HCL-C	1	30-90	rb C	xxx				0	III	3b	W
66	0-30	HCL	2	30-50	C	xxx	50-70	C+chk stones	xxx	0	III	3b	W
67	0-28	ca HCL	2	28-50	v chky C	xxxx	50+	stop on stones		0	III	3a	W
68	0-30	dk C	1	30-70	gr C	xxx	70-90	HCL	xxx	0	III	3b	W
69	0-32	dk HCL	2	32-50	gr C	xxx	50-100	rb C+chks?	xxx	0	III	3b	W
70	0-30	dk C	1	30-60	gr C	xxx	60-100	ca C	xxxx	0	III	3b	W
71	0-26	C	2	26-100	rb C	xxx				0	IV	3b	W
72	0-30	C	2	30-65	C	xxx	65-90+	C+chk stones	xxx	0	III	3b	W
73	0-30	dk C	1	30-50 50-62	C SCL	xxx xxx	65-80 80-120	C+S MSL	xxx xxx	0	III	3b	W
74	0-28	dk C	1	28-80	C	xxx	80-100 100-120	MS gr C	xxx xxx	0	II/III	3a/3b	W
75	0-30	HZCL	1	30-100	banded ZCL	xxx				0	I/II	2/3a	W
76	0-30	HCL-C	0	30-60	C	xxx	60-100	rb C	xxx	0	II/III	3a/3b	W
77	0-30	dk C	0	30-60	C	xxx	60+	stop on tile		0	II/III	3a/3b	W
78	0-30	HCL	2	30-45	C	xxx	45-80	C+chk stones	xxxx	0	III	3b	W
79	0-30	SCL-MCL	2	30-45	SCL	xxx	45-90	rb C	xxx	0	III	3a	W
80	0-30	dk HCL	0	30-55	SCL-MSL	xxx	55-80	ca rb C	xxx	0	III	3a	W
81	0-30	HCL	0	30-80	C+S banded	XXX				0	II/III	3a/3b	W
82	0-33	HCL	2	33-40 40-55	HCL-C MSL	xxx o-x	55-90 90-110	LMS MS	x xxx	0 0	III	3a	W
83	0-30	SCL	2	30-75	C	xxx	75-120	SCL-MS	xxxx	0	III	3a	W
84	0-28	,SL	1	28-110	(st) MS	xx				0	II	3b	D
85	0-30	LMS	1	30-70	st MS	x	70+	stop on stones		0	II	3b	D
86	0-30	MSL	2	30-100+	LMS-MS	x				0	II	3a	D
87	0-35	SCL	2	35-60	C+S	xxx	60-75 75-100	MS C+chk stones	xxx xxx	0	II/III	2/3a	W
88	0-30	HCL	0	30-40	HCL-C	xx	40-90	LMS	xxx	0	II	3a	W
89	0-30	SCL-MCL	1	30-70	LMS	xx	70-90	(st) MS		0	II	3a	D
90	0-35	HCL	2	35-60	rb C	xxx	60-90 90-120	LMS st MS	xx	0	II/III	3b	W
91	0-30	HCL	2	30-70	rb C	xxx	70-90 90-120	MSL MS+gravel	xxx xxx	0	III	3b	W
92	0-30	dk C	2	30-60	rb C	xxx	60-100	gr C	xxx	0	III	3b	W
93	0-30	dk C	2	30-55	rb C	xxx	55-100	C+chk stones	xxx	0	II/III	3a/3b	W
94	0-30	C	1	30-110	rb C	xxx	good structure			0	I/III	3b	W
95	0-30	C	0	30-75	rb C	xxx	75-110	MS	xxx	0	III	3a/3b	W

Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
No	**Depth (cm)**	**Texture**	**Stones (%)**	**Depth (cm)**	**Texture**	**Mottling**	**Depth (cm)**	**Texture**	**Mottling**	**(°)**	**Class**	**Grade**	**Main limitation**
96	0-27	C	0	27-40	MSL	0	40-65 65	(h) MS st MS	xxx xxx	0 0	II II	3a 3a	W W
97	0-28	HZCL	1	28-50	C	xxx	50-75 75-110	(h) MSL MS	o xxx	0	II/III	3a/3b	W
98	0-30	C	1	30-70	rb C	xxx	70-100 100-120	MSL MS	o xxx	0	II/III	3a/3b	
99	0-25	SCL	1	25-40	SCL	xxx	40-50 80-90+	MSL C+chk stones	xxx xxx	0	II/III	2/3a	W
100	0-28	SCL	2	28-50	SCL	xxx	50-90+	SBC	xxx	0	III	3a	W
101	0-35	HCL-SCL	2	35-50	SCL	xxx	50-80+	C+chk stones	xxx	0	III	3a	W
102	0-30	ca HCL	2	30-70	C+chk stones	xxx	70+	stop on stones		<1	III	3a	W
103	0-30	C	1	30-90	gr C	xxx				0	III	3a	W
104	0-33	HCL	1	33-45	SCL	xxx	45-120	MS	xxx	<1	II	3a	W,D
105	0-30	ca HZCL	0	30-70	HZCL banded	xxx	70-110	ZL	xxx	0	II	2	W
106	0-33	HCL-C	0	33-80	rb C	xxx				0	III	3b	W
107	0-30	ca HCL	0	30-50	gr C	xxx	50-80	C+chk stones	xxx	0	III	3b(3a)	W
108	0-30	HCL	4	30-45	C	xxx	45-80+	C+chk stones	xxx	0	III	3b	W
109	0-30	SCL	3	30-50	C	xxx	50-80+	C+chk stones	xxx	0	III	3a	W
110	0-28	SCL	3	28-42	SCL	xxx	42-80+	C+chk stones	xxx	0	III	3a	W

Key to table

Mottle intensity:

o	unmottled
x	1-2% ochreous mottles and brownish matrix (or a few to common rusty root mottles (topsoils)[3]
xx	>2% ochreous mottles and brownish matrix and/or dull structure faces (slightly gleyed horizon)
xxx	>2% ochreous mottles and greyish or pale matrix or reddish matrix and >2% greyish, brownish or ochreous mottles or fmn concentrations (gleyed horizon)
xxxx	dominantly bluish matrix , often with some ochreous mottles (gleyed horizon)

Slowly permeable layers[4]

A depth underlined (e.g. 50) indicates the top of a slowly permeable layer
A wavy underline (eg 50) indicates the top of a layer bordering to extremely)
slowly permeable

Texture:

C - clay
ZC - silty clay
SC - sandy clay
CL - clay loam (H-heavy, M-medium)
ZCL - silty clay loam (H-heavy, M-medium)
SCL - sandy clay loam
SZL - sandy silt loam (F-fine, M-medium, C-coarse
SL - sandy loam (F-fine, M-medium, C-coarse)
LS - loamy sand (F-fine, M-medium, C-coarse)
S - sand (F-fine, M-medium, C-coarse)
P - peat (H-humified, SF-semi-fibrous, F-fibrous)
LP - loamy peat; PL - peaty loam

Wetness Class[5]

I (freely drained) to VI (very poorly drained)

Limitations:

W - wetness/workability
D - droughtiness
De - depth
St – stoniness
Sl – slope
F - flooding
T – topography/microrelief

Suffixes & prefixes

r-reddish, gn greenish, brbownish, gr-grey
o-organic,
(m, v, x)st (very slightly, slightly, extremely) stony
chky-chalky
[7](vsl, sl, m, v,x)(very slightly,slightly,moderately, very,

ca – calcareous

Other abbreviations

fmn –ferri-manganiferous concentrations
dist - disturbed soil layer;
R – bedrock (chky – Chalk, SST – Sandstone,
PLST – Limestone, MST – Mudstone, FeSt – Ironstone))

[1]Gley indicators in accordance with Hodgson, J.M. (1997) Soil survey Field Handbook (third edition) Soil Survey Technical Monograph No 5
[2]Texture in accordance with particle size classes in Hodgson (1997)
[3]Occasionally recorded in the texture box
[4]Permeability is estimated for auger borings and confirmed by full pit observations in accordance with the definitions in Hodgson (1997)
[5]Soil Wetness Classes are defined in Hodgson (1997)
[6]Stoniness classes as defined in Hodgson (1997)
[7]Calcareous classes as defined in Hodgson (1997)

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Bicker Fen North

Map

Map 1
Location of the observations

KEY

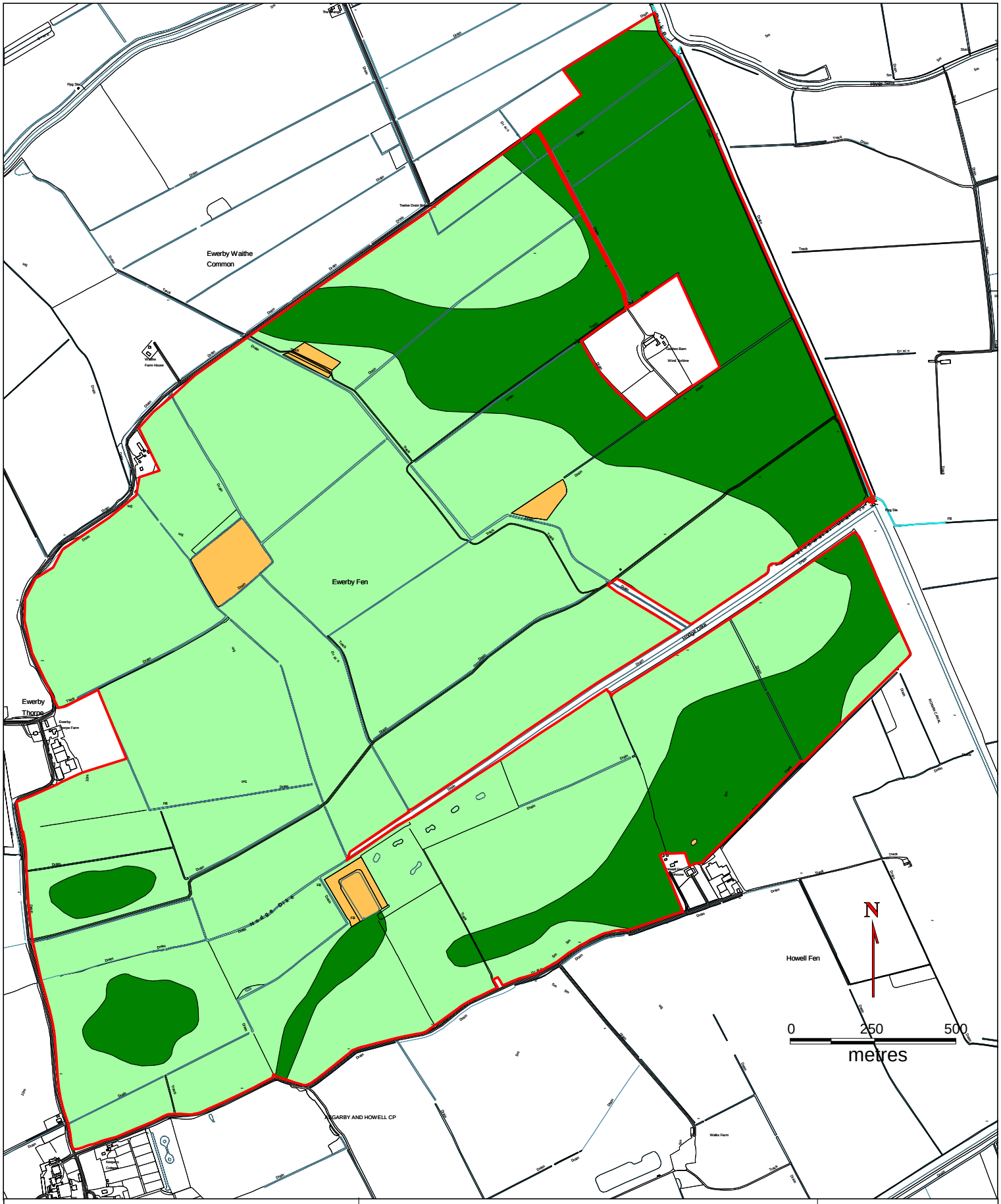
● Auger location

Survey area

Scale
1:15,000 at A4

Date
10/10/2022

Land Research Associates
Lockington Hall
Lockington
Derby DE74 2RH
Tel: 01509 670470



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Map

Map 2
Provisional ALC

KEY

- Mainly sub-grade 3a, some 2 and some 3b
- Mainly sub-grade 3b
- Principal areas of other land woodland, reservoirs etc
- Survey area

Scale
1:15,000 at A4

Date
10/10/2022

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Appendix 13.2 Agricultural Quality of Land at Bicker Fen South, Lincolnshire (Land Research Associates, 2023)

AGRICULTURAL QUALITY OF

BICKER FEN SOUTH

LINCOLNSHIRE

Report 2077/1

17th January, 2023

Land Research ASSOCIATES
www.lra.co.uk

AGRICULTURAL QUALITY OF LAND AT BICKER FEN,

LINCOLNSHIRE

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Report 2077/1

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17th November, 2023

1.0 Introduction

1.1 This report provides information on the agricultural quality of land to the south-east of Sleaford in Lincolnshire. The site comprises 506 ha of mainly arable land, with lesser areas of grassland and woodlands.

1.2 The site is generally level with areas of gentle slopes. The site has an average elevation of 10 m AOD. Some grassland in the centre of the site shows marked 'rigg and furrow' micro-topography.

1.3 1:50,000 BGS geological information shows the underlying geology of the site as Oxford Clay with a superficial cover of glacial till.

1.4 On the National Soil Map[1] shows the land Beccles 3 Association comprising slowly permeable seasonally waterlogged fine loamy over clayey soils developed in chalky till, with some similar soils with only slight seasonal waterlogging.

[1] Hodge C.A.H. *et al* (1984). *Soils and their use in Eastern England.* Soil Survey Bulletin No 13.

2.0 Agricultural Land Quality

2.1 To assist in assessing land quality, the former Ministry of Agriculture, Fisheries and Food (MAFF) developed a method for classifying agricultural land by grade according to the extent to which physical or chemical characteristics impose long-term limitations on agricultural use for food production. The MAFF Agricultural Land Classification (ALC) system[2] classifies land into five grades numbered 1 to 5, with grade 3 divided into two sub-grades (3a and 3b). The system was devised and introduced in the 1960s and revised in 1988.

2.2 The agricultural climate is an important factor in assessing the agricultural quality of land and has been calculated using the Climatological Data for Agricultural Land Classification.[3] The site data was calculated at five points across the site with no significant variation in the results. A representative selection of site data is given below from a central point (grid reference TF122409) for an average elevation of 10 m.

• Average annual rainfall:	606 mm
• January-June accumulated temperature >0°C	1428 day°
• Field capacity period (when the soils are fully replete with water)	118 days Early Dec – early April
• Summer moisture deficits for:	wheat: 115 mm potatoes: 109 mm

2.3 There are no climatic limitations to agricultural land quality in this location.

2.4 A semi-detailed Agricultural Land Classification survey was conducted in October 2022 at selected intersections of a 100 m grid, giving an average density of approximately 1 observation per 5 ha. This density of survey is below that recommended by Natural England for planning applications, and is intended to give provisional grades only. During the survey soils were investigated via a combination of hand auger borings and small pits to a

[2] MAFF, (1988).*Agricultural Land Classification for England and Wales*: Guidelines and Criteria for Grading the Quality of Agricultural Land.

[3] *Climatological Data for Agricultural Land Classification*. Meteorological Office, 1989

maximum depth of 1.2 m. Survey logs and pit descriptions are recorded in an appendix to this report.

2.5 The survey was used in conjunction with the agro-climatic data above to classify the site using the revised guidelines for ALC issued in 1988 by MAFF[2].

Survey results

2.6 The distribution of the land grades is shown on Map 2 in an appendix to this report.

2.7 The majority of the land is dominated by heavy soils developed on glacial till (see pit 80 in appendix). A typical profile comprises clay topsoil over dense slowly permeable clay. The combination of high clay content topsoil and imperfect drainage means this land has wetness and workability constraints that limit access with farm machinery most years so that usually only autumn sowings of arable crops are possible. This land is classed as subgrade 3b.

2.8 On parts of the site the soils have medium loamy topsoil (see pit 60 in appendix). The combination of moderate topsoil clay content and imperfect drainage mean land is accessible for cultivation in autumn and late spring most years. This land is classed as subgrade 3a due to wetness/workability.

2.9 In places the soils are permeable to depth with a coarse loamy topsoil. This land has less workability constraints and is classed as grade 2.

APPENDIX

DETAILS OF OBSERVATIONS
MAPS

Land at Bicker Fen South, Lincolnshire: Details of observations at each sampling point

Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
No	Depth (cm)	Texture	Stones (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling	(°)	Class	Grade	Main limitation
1	0-30	HCL	1	30-45	HCL	XXX	45-60 60-100	C C+chk stones	XXX xxx	0	III	3b	W
2	0-28	SCL	1	28-45	HCL	xxx	45-60 60-90	C C+chk stones	xxx xxx	0	III	3a	W
3	0-32	SCL	1	32-40	SCL	xx	40-70 70-90	HCL C+chk stones	xxx xxx	0	III	3a	W
4	0-30	HCL	1	30-60	HCL	xxx	60-90	C+chk stones	xxx	0	III	3b	W
5	0-30	HCL	1	30-40	HCL	xx	40-60 60-100	C C+chk stones	xxx xxx	0	II/III	3a/3b	W
6	0-30	SCL	1	30-50	C	xxx	50-100 100-120	SCL+cks C+chk stones	xx xxx	0	III	3a	W
7	0-30	HCL	1	30-45	HCL	xxx	45-60 60-100	C C+chk stones	xxx xxx	0	III	3b	W
8	0-28	SCL	1	28-40	SCL	xx	40-60 60-110	HCL HCL+chks	xxx xxx	0	II/III	3a/2	W
9	0-30	HCL	2	30-80	C	xxx	80-90 90-110	SCL+SL C+chk stones	xx xxx	0	III	3b	W
10	0-30	HCL	1	30-70	C	xxx	70-100+	C+chk stones	xxx	0	III	3b	W
11	0-30	HCL	2	30-90	st br SCL	xx	90-110	C+chk stones	xxxx	0	II	3a	W
12	0-30	HCL	3	30-60	C	xxx	60-80	C+chk stones	xxx	0	III	3b	W
13	0-30	HCL	2	30-90	HCL-C	xxx	90-110	C+chk stones	xxx	0	III	3b	W
14	0-30	HCL	2	30-40	HCL	xxx	40-70	C	xxx	0	III	3b	W
							70+	stop on stones					
15	0-30	MSL	2	30-55	MSL	xx	55-70	SCL	xxx	0	II	2	W
							70+	stop on stones					
16	0-30	SCL	2	30-40	HCL	xxx	60-80	SCL	xxx	0	III	3a	W
				40-60	C	xxx	80-120	C+chk stones	xxxx				
17	0-33	HCL	3	33-50	HCL	xxx	50-70	C	xxx	0	III	3b	W
							70-100	C+chk stones	xxx				
18	0-32	SCL	2	32-40	HCL	xxx	40-65	C	xxx	0	III	3a	W
							65-90	C+chk stones	xxx				
19	0-30	HCL-SCL	1	30-80	HCL	xxx	80+	stop on stones		0	III	3b(3a)	W
20	0-30	HCL	1	30-60	HCL	xxx	60-100	HCL+chks	xxx	0	III	3b	W
21	0-30	SCL	1	30-50	HCL	xxx	50-100	C+chk stones	xxx	0	III	3a	W
22	0-30	HCL-SCL	1	30-55	HCL	xxx	55-110	chkyHCL+SCL	xxx	0	III	3b/3a	W

Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
No	**Depth (cm)**	**Texture**	**Stones (%)**	**Depth (cm)**	**Texture**	**Mottling**	**Depth (cm)**	**Texture**	**Mottling**	**(°)**	**Class**	**Grade**	**Main limitation**
23	0-30	HCL	1	30-70	C	xxx	70-100	C+chk stones	xxx	0	III	3b	W
24	0-35	ca HCL	3	35-60	HCL	xxx	60-100	C	xxx	0	III	3b(3a)	W
25	0-30	SCL	1	30-55	SCL	xx(x)	55-90	C+chk stones	xxx	0	III	3a	W
26	0-30	SCL	3	30-50	SCL	xxx	50-90	C+chk stones	xxx	0	III	3a	W
27	0-30	SCL	3	30-40	SCL	xx	40-70 70-110	C C+chk stones	XXX	0	III	3a	W
28	0-30	SCL	3	30-40	SCL	xxx	40-55 55-100	C C+chk stones	xxx xxx	0	III	3a	W
29	0-30	SCL	2	30-60	SCL	xxx	60-100 100+	SCL stop on stones	xx	0	II	2	W
30	0-30	HCL	1	30-50	C	xxx	50-90	C+chk stones	xxxx	0	III	3b	W
31	0-25	HCL	2	25-35	HCL	xx	35-50 50-90	C C+chk stones	xxx xxx	0	III	3b	W
32	0-28	HC	1	28-45	HCL	xx	45-60 60-100	C C	xx(x) xxx	0	II/III	3a/3b	W
33	0-30	HCL	1	30-50	C	xxx	50-70 70+	C+chk stones stop on stones	xxx	0	III	3b	W
34	0-32	HCL	2	32-45	HCL	xx(x)	45-70 70-100	C C+chk stones	xx(x) xxx	0	II	3a	W
35	0-28	HCL	2	28-40	HCL	xxx	40-90 90-110	C C+chk stones	xxx xxx	0	III	3b	W
36	0-28	HCL	1	28-40	HCL	xxx	40-70 70-100	C C+chk stones	xxx xxx	0	III	3b	W
37	0-30	HCL	1	30-50	HCL	xx(x)	50-90 90-100	C C+chk stones	xxx xxx	0	III	3b/3a	W
38	0-30	HCL	2	30-40	HCL	xx	40-60 60-80	C C+chk stones	xxx xxx	1	II/III	3b/3a	W
39	0-30	HCL	2	30-50	C	xx(x)	50-80	C+chk stones	xxx	1	II/III	3b/3a	W
40	0-30	HCL-C	1	30-50	C	xxx	50-80	C+chk stones	xxx	0	III	3b	W
41	0-30	HCL	2	30-55	C	xxx	55-80+	C+chk stones	xx	1	III	3b	W
42	0-30	HCL	2	30-60	C	xxx	60-90	C+chk stones	xxx	<1	III	3b	W
43	0-33	HCL-SCL	2	33-40	HCL	xxx	40-60 60-80	C C+chk stones	xxx xxx	0	III	3b	W
44	0-30	ca C-HCL	1	30-40	ca C	xxx	40-80	C+chk stones	xxxx	1	III	3b	W
45	0-30	HCL	1	30-55	C	xxx	55-80	C+chk stones	xxx	<1	III	3b	W
46	0-30	HCL	1	30-45	HCL	xxx	45-80	C+chk stones	xxx	0	III	3b	W
47	0-30	HCL	1	30-45	C	xxx	45-80	C+chk stones	xxx	0	III	3b	W
48	0-28	HCL	1	28-40	HCL	xx	40-90	XCBC	xxx	0	II/III	3a/3b	W
49	0-30	HCL	1	30-80	C	xxx	80-100	C+chk stones	xxx	1	III	3b	W

Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
No	**Depth (cm)**	**Texture**	**Stones (%)**	**Depth (cm)**	**Texture**	**Mottling**	**Depth (cm)**	**Texture**	**Mottling**	**(°)**	**Class**	**Grade**	**Main limitation**
50	0-30	HCL	1	30-80	C	xxx	80-100	C+chk stones	xxx	0	III	3b	W
51	0-30	HCL	1	30-45	HCL	xx(x)	45-60 60-80	C C+chk stones	xxx xxx	0	III	3b	W
52	0-33	HCL	1	33-50	HCL	xxx	50-60 60-80	C C+chk stones	xxx xxx	0	III	3b	W
53	0-30	HCL	1	30-40	HCL	xxx	40-100	C	xxx	0	III	3b	W
54	0-30	HCL	1	30-50	HCL	xxx	50-70 70-90	C C+chk stones	xxx xxx	<1	III	3b	W
55	0-35	SCL	1	35-50	HCL	xxx	50-75 75-100	C C+chk stones	xxx xxx	0	III	3a	W
56	0-30	SCL	1	30-45	HCL	xx	45-70 70-90	C C+chk stones	xxx xxx	0	II	3a/2	W
57	0-30	MSL	1	30-55	MSL	x	55-100	br C	xxx	0	II	2	W
58	0-30	HCL	1	30-50	C	xxx	50-80	C+chk stones	xxx	0	III	3b	W
59	0-30	HCL	1	30-45	C	xxx	45-80		xxx	0	III	3b	W
60	0-28	SCL	2	28-43	HCL	xxx	43-76 76-90	C C+chk stones	xxx xxxx	0	III	3a	W
61	0-25	MCL	1	25-45	HCL	xxx	45-80 80-100	C C+chk stones	xxx xxx	0	III	3a	W
62	0-30	HCL	<5	30-100									
63	0-31	C	<5	31-100+	C	xxx				0	III	3b	W
64	0-30	C	<5	30-60	C	xxx	60-100+	C ca	xxx	0	III	3b	W
65	0-28	C	<5	28-100+	C	xxx				0	III	3b	W
66	0-31	C	<5	31-90+	C	xxx				0	III	3b	W
67	0-30	C	<5	30-100+	C	xxx				0	III	3b	W
68	0-29	C	<5	29-100+	C ca	xxx				0	III	3b	W
69	0-30	C	<5	30-100	C ca	xxx				0	III	3b	W
70	028	C	<5	28-95+	C	xxx				0	III	3b	W
71	0-31	C	<5	31-90+	C	xxx				0	III	3b	W
72	0-28	C	<5	28-39	C	xxx	39-100+	C ca	xxx	0	III	3b	W
73	0-30	C	<5	30-100+	C	xxx				0	III	3b	W
74	0-30	C	<5	30-60	C	xxx	60-90+	C ch	xxx	0	III	3b	W
75	0-30	C	<5	30-65	C	xxx	65-100+	C ch	xxx	1	III	3b	W
76	0-29	C	<5	29-40+	C	xxx	40+	drain?		2	III	3b	W
77	0-30	C	<5	30-90+	C	xxx				0	III	3b	W
78	Pit0-31	C	<5	31-90+	C sl ca	xxx				3	III	3b	W
79	0-29	C	<5	29-100+	C	xxx				0	III	3b	W
80	0-30	C	<5	30-60+	C	xxx				2	III	3b	W
81	0-29	C	<5	29-90+	C	xxx				2	III	3b	W

Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
No	Depth (cm)	Texture	Stones (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling	(°)	Class	Grade	Main limitation
82	0-30	C	<5	30-90+	C	xxx				1	III	3b	W
83	0-31	C	<5	31-60+	C ca	xxx				1	III	3b	W
84	0-28	C	<5	28-100+	C	xxx				0	III	3b	W
85	0-30	C	<5	30-100+	C	xxx				1	III	3b	W
86	0-29	C	<5	29-90+	C	xxx				0	III	3b	W
87	0-30	C	<5	30-100+	C ca	xxx				0	III	3b	W
88	0-28	C	<5	28-60+	C	xxx				1	III	3b	W
89	0-30	C	<5	30-100+	C	xxx				3	III	3b	W
90	0-30	C	<5	30-100+	C	xxx				2	III	3b	W
91	0-29	C	<5	29-35	C	o	35-100+	C	xxx	2	III	3b	W
92	0-30	C	<5	30-100+	C	xxx				3	III	3b	W
93	0-29	C	<5										
94	0-30	C	<5	30-100+	C	xxx				2	III	3b	W
95	0-30	C	<5	30-100+	C ca	xxx				1	III	3b	W
96	0-29	C	<5	29-98+	C	xxx				0	III	3b	W
97	0-31	C ca	<5	31-50	C ca	xxx	50-100+	C ch	xxx	0	III	3b/3a	W
98	0-33	C	<5	33-100+	C	xxx				0	III	3b	W
99	0-30	HCL	<5	30-100+	C	xxx				0	III	3b	W
100	0-30	C	<5	30-56	C	x	56-100+	C	xxx	0	III	3b	W
101	0-34	HCL	<5	34-70	C	xxx	70-100+	C ch	xxx	0	III	3b	W
102	0-32	HCL	<5	32-58	C	xxx	58-100+	C ch	xxx	0	III	3b	W
103	0-34	C	<5	34-60	C	xxx	60-85+	C ch	xxx	0	III	3b	W
104	0-30	C	<%	30-62	C	xxx	62-100+	MSL	xx(x)	0	III	3b	W
105	0-31	HCL/C	<5	31-90+	C	xxx				0	III	3b	W
106	0-30	C	<5	30-100+	C ca	xxx				2	III	3b	W
107	0-30	C	<5	30-100+	C ca	xxx				2	III	3b	W
108	0-30	C	<5	30-90+	C	xxx				0	III	3b	W
109	0-29	HCL	<5	29-90+	C	xxx				0	III	3b	W
110	0-31	C	<5	31-48	C	x	48-100+	C	xxx	2	II	3a	W
111	0-30	C	<5	30-100+	C	xxx				1	III	3b	W
112	0-31	HCL/C	<5	31-50	SC	xxx	50-100+	C	xxx	0	III	3b	W
113	0-30	HCL	<5	30-100+	C	xxx				0	III	3b	W
114	0-31	C	<5	31-100+	C	xxx				1	III	3b	W
115	0-30	C	<5	30-60+	C	xxx				0	III	3b	W
116	0-30	C	<5	30-40	C	xx	40-100+	C	xxx	0	III	3b	W
117	0-34	HCL/SCL	<5	34-100+	C	xxx				2	III	3b	W
118	0-34	C	<5	34-100+	C	xxx				2	III	3b	W
119	0-32	HCL	<5	32-100+	C ch	xxx				0	III	3b	W

Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
No	**Depth (cm)**	**Texture**	**Stones (%)**	**Depth (cm)**	**Texture**	**Mottling**	**Depth (cm)**	**Texture**	**Mottling**	**(°)**	**Class**	**Grade**	**Main limitation**
120	0-33	HC	<5	33-100+	C	xxx				2	III	3b	W
121	0-32	HCL	<5	32-100+	C	xxx				1	III	3b	W
122	0-31	HCL/C sl ca	<5	31-100+	C n ca	xxx				1	III	3b	W
123	0-32	C v sl ca	<5	32-100+	C ch	xxx				2	III	3b	W
124	0-30	HCL	<5	30-50	C	xxx	50+	Stopped on stone		1	III	3b	W
125	0-33	HCL	<5	33-44	C	xx	44-100+	C ca	xxx	0	III	3b	W
126	0-32	C	<5	32-100+	C	xxx				2	III	3b	W

Key to table

Mottle intensity:

o	unmottled
x	1-2% ochreous mottles and brownish matrix (or a few to common rusty root mottles (topsoils)[3]
xx	>2% ochreous mottles and brownish matrix and/or dull structure faces (slightly gleyed horizon)
xxx	>2% ochreous mottles and greyish or pale matrix or reddish matrix and >2% greyish, brownish or ochreous mottles or fmn concentrations (gleyed horizon)
xxxx	dominantly bluish matrix , often with some ochreous mottles (gleyed horizon)

Slowly permeable layers[4]

A depth underlined (e.g. 50) indicates the top of a slowly permeable layer
A wavy underline (eg 50) indicates the top of a layer bordering to extremely)
slowly permeable

Texture:

C - clay
ZC - silty clay
SC - sandy clay
CL - clay loam (H-heavy, M-medium)
ZCL - silty clay loam (H-heavy, M-medium)
SCL - sandy clay loam
SZL - sandy silt loam (F-fine, M-medium, C-coarse
SL - sandy loam (F-fine, M-medium, C-coarse)
LS - loamy sand (F-fine, M-medium, C-coarse)
S - sand (F-fine, M-medium, C-coarse)
P - peat (H-humified, SF-semi-fibrous, F-fibrous)
LP - loamy peat; PL - peaty loam

Wetness Class[5]

I (freely drained) to VI (very poorly drained)

Limitations:

W - wetness/workability
D - droughtiness
De - depth
St – stoniness
Sl – slope
F - flooding
T – topography/microrelief

Suffixes & prefixes

r-reddish, gn greenish, brbownish, gr-grey
o-organic,
(m, v, x)st (very slightly, slightly, extremely) stony
chky-chalky
[7](vsl, sl, m, v,x)(very slightly,slightly,moderately, very,

ca – calcareous

Other abbreviations

fmn –ferri-manganiferous concentrations
dist - disturbed soil layer;
R – bedrock (chky – Chalk, SST – Sandstone,
PLST – Limestone, MST – Mudstone, FeSt – Ironstone))

[1]Gley indicators in accordance with Hodgson, J.M. (1997) Soil survey Field Handbook (third edition) Soil Survey Technical Monograph No 5
[2]Texture in accordance with particle size classes in Hodgson (1997)
[3]Occasionally recorded in the texture box
[4]Permeability is estimated for auger borings and confirmed by full pit observations in accordance with the definitions in Hodgson (1997)
[5]Soil Wetness Classes are defined in Hodgson (1997)
[6]Stoniness classes as defined in Hodgson (1997)
[7]Calcareous classes as defined in Hodgson (1997)

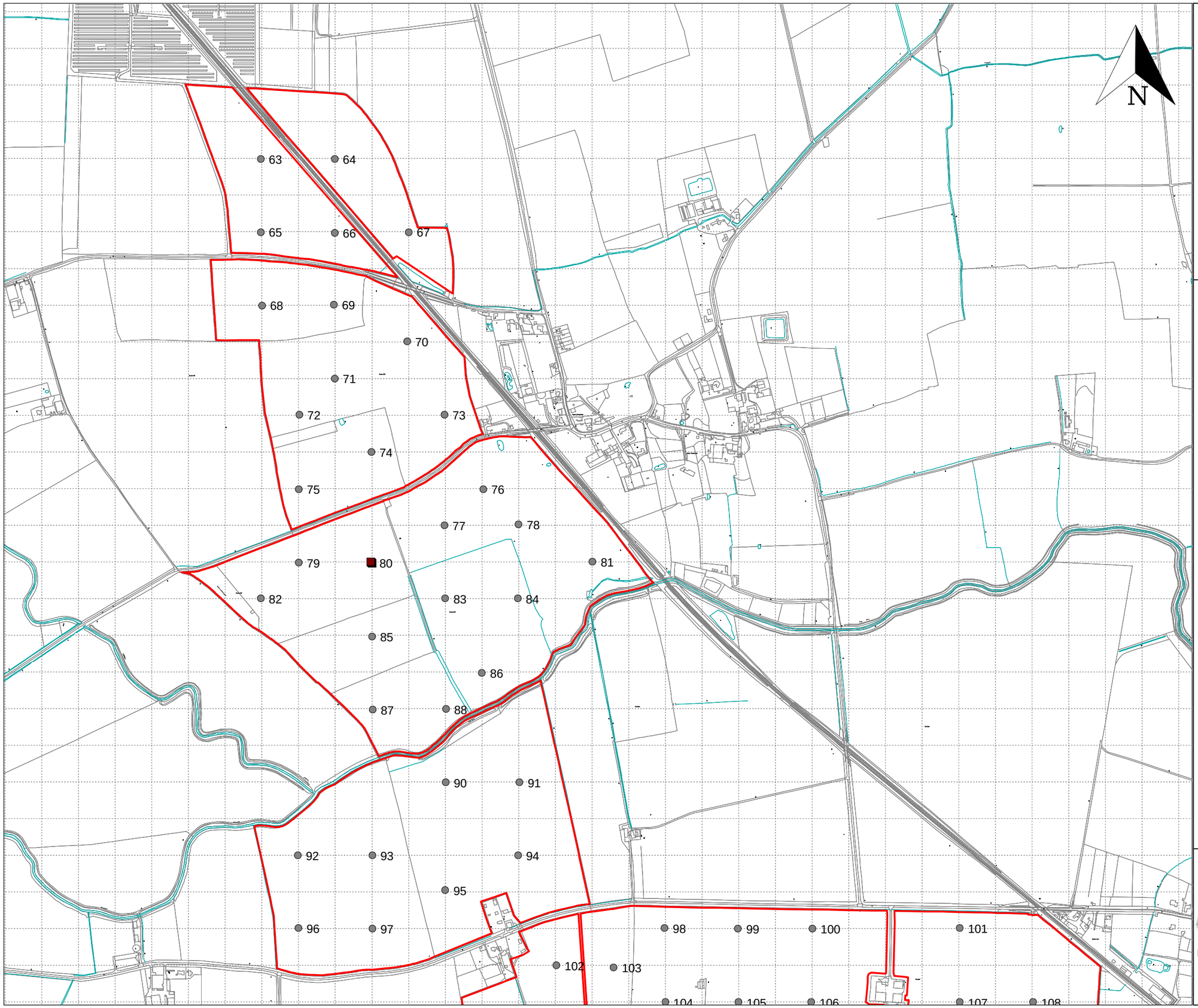
Soil pit descriptions – Bicker Fen South

Pit 30

0-28 cm	Brown to dark brown (10YR 4/3) medium clay loam; 1% small and very small mainly flint stones: well developed fine and medium subangular blocky structure; friable; abundant very fine fibrous roots; many fine pores; sharp smooth boundary to:
28-43 cm	Greyish brown (10YR 5/2) heavy clay loam with many fine strong brown (7.5YR 5/8) mottles; 1% small and very small flint stones; weakly developed medium angular blocky structure; friable to firm; common very fine fibrous roots; common fine pores; clear smooth boundary to:
63-76 cm	Greyish brown (10YR 5/2) clay with many fine strong brown (7.5YR 5/6) mottles; a few small angular flint stones; weakly developed coarse prismatic structure; firm: common fine fibrous roots; 0.5% fine pores; many ferri-manganiferous concentrations; clear smooth boundary to:
76-90+ cm	Grey (10YR 6/1) calcareous clay with many Strong brown (7.5YR 5/6) mottles; common small chalk and flint stones; structureless, massive; firm; a few fine fibrous roots; 0.1% fine pores.

Pit 80

0-30 cm	Dark greyish brown (10YR 4/2) clay; very slightly stony with small and medium flints; weakly developed medium and coarse angular blocky structure; very firm; 2% pores; few roots; non calcareous; smooth clear boundary to:
30-56 cm	Pale brown (10YR 6/3) clay with 2% yellowish brown (10YR 5/8) mottles; very slightly stony; weakly developed very coarse prismatic structure; very firm; <0.5% biopores; high packing density; non calcareous; smooth gradual boundary to:
56-120 cm	Light brownish grey (10YR 6/2) clay with 20% distinct grey (10YR 6/1) and reddish yellow (7.5YR 6/8) mottles; <0.5% biopores; slightly stony with small calcareous stones and flints; calcareous.



KEY

- Auger observation
- Soil/land grade description pit
- Survey area

Site:

Bicker Fen South

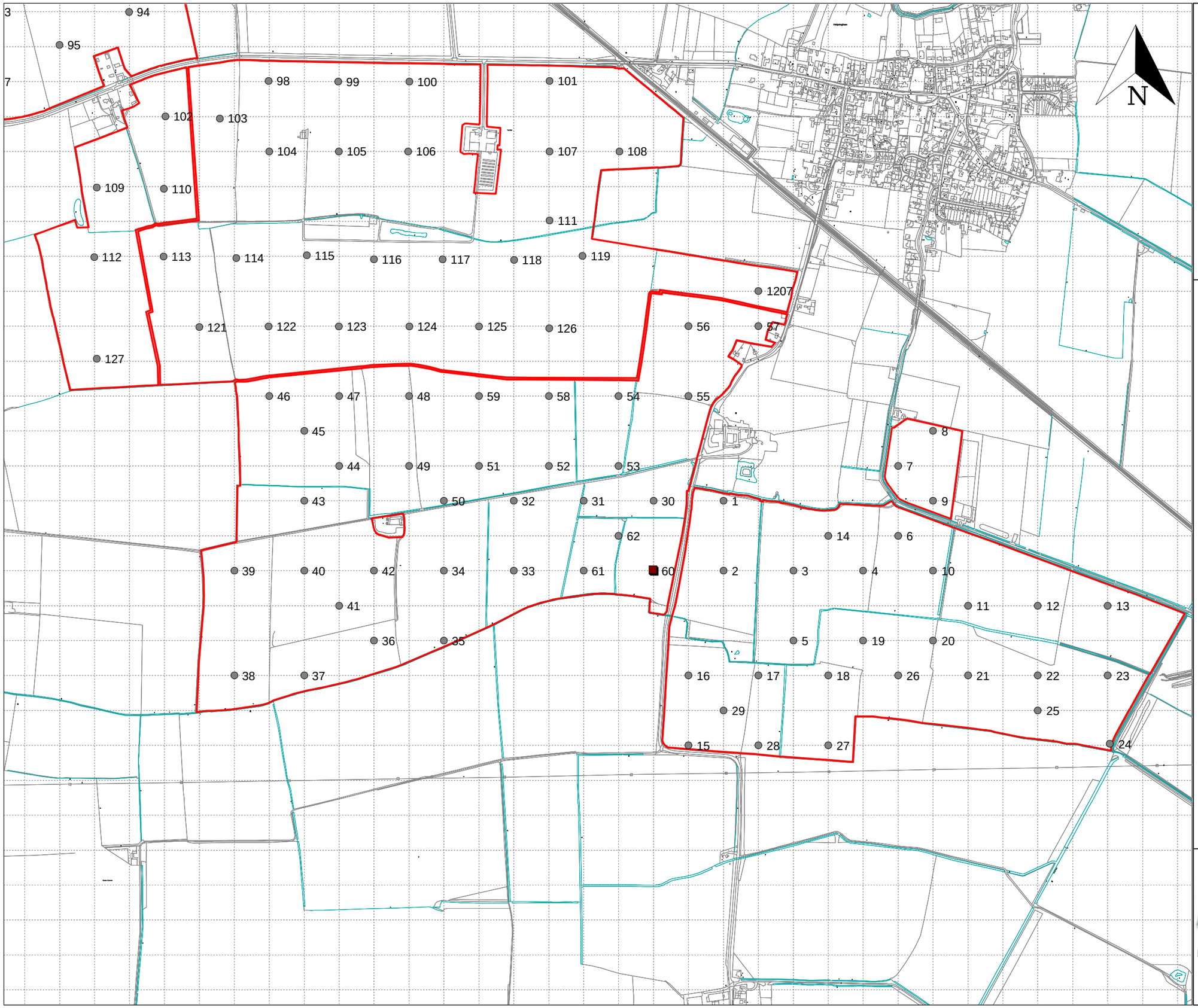
Map title:

Map 1A
Survey observations

Land Research Associates
Lockington Hall
Lockington
Derby DE74 2RH
01509 670570

Scale: 1:10,000

Date: 18/01/2023



KEY

- Auger observation
- Soil/land grade description pit
- Survey area

Site:

Bicker Fen South

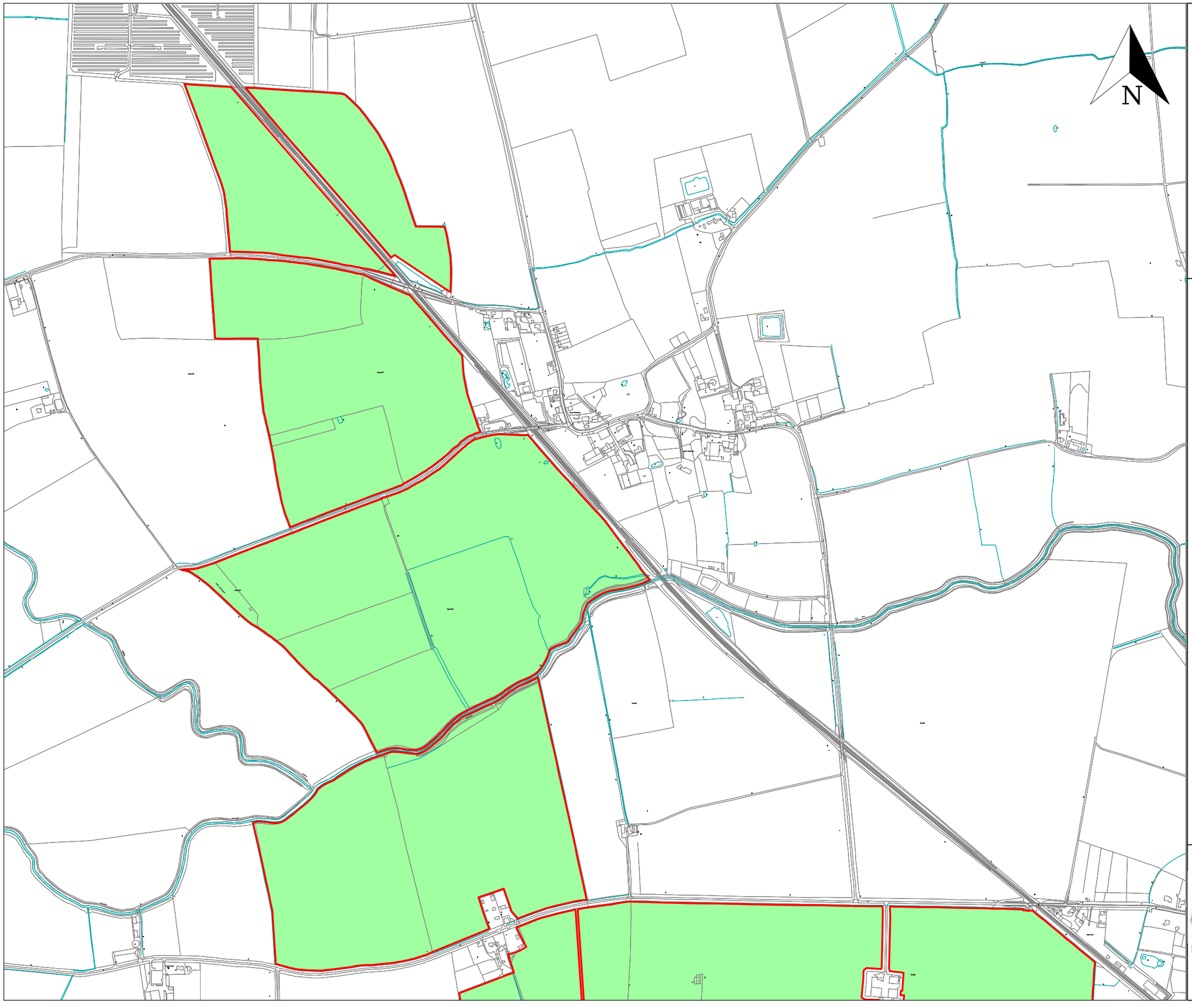
Map title:

Map 1B
Survey observations

Land Research Associates
Lockington Hall
Lockington
Derby DE74 2RH
01509 670570

Scale: 1:10,500

Date: 18/01/2023



KEY

Subgrade 3b

Survey area

Site:

Bicker Fen South

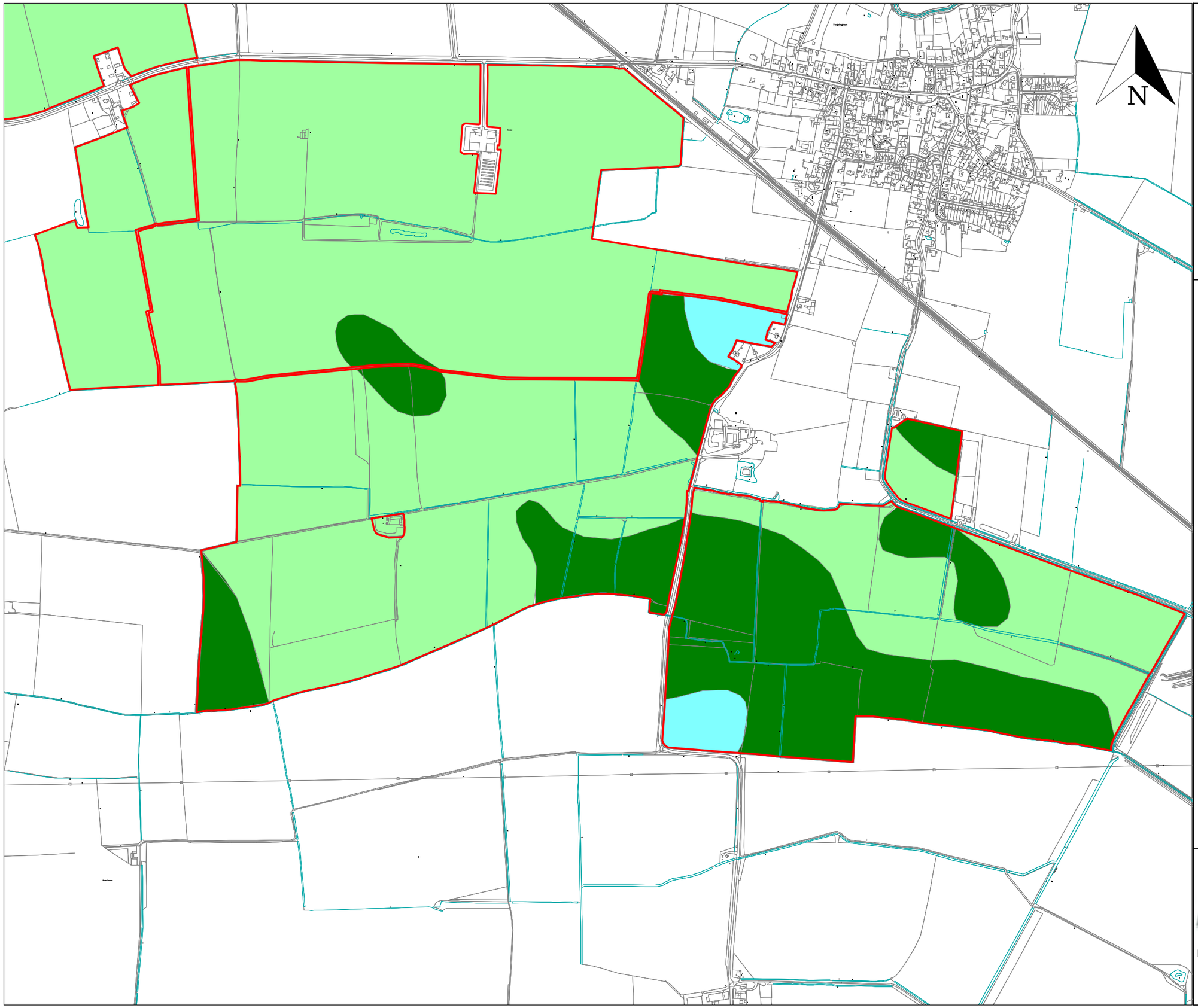
Map title:

Map 2A
Provisional Agricultural Land Classification

Land Research Associates
Lockington Hall
Lockington
Derby DE74 2RH
01509 670570

Scale: 1:10,000

Date: 18/01/2023



KEY

- Grade 2
- Subgrade 3a
- Subgrade 3b
- Survey area

Site:

Bicker Fen South

Map title:

Map 2B
Provisional Agricultural Land Classification

Land Research Associates
Lockington Hall
Lockington
Derby DE74 2RH
01509 670570

Scale: 1:10,500

Date: 18/01/2023

Appendix 14.1 Healthy Planning Checklist

Appendix 14.1 Healthy Planning Checklist

CENTRAL LINCOLNSHIRE HEALTHY PLANNING CHECKLIST

This Healthy Planning Checklist has been designed to quickly assess the potential health impacts of development proposals. The Checklist should be completed at pre-application stage and submitted with a planning application, Outline or Full, for all development proposals of 25 dwellings, or 0.5 hectares or more for non-residential developments. It can be used as a screening tool to decide whether a Rapid or Full HIA is required.

The Checklist table focuses on the wider determinants of health that are most relevant to the built environment and which can be influenced by planning decisions. It is split into the following sections and should be completed as follows:

Part 1 - Applicant and Scheme Details: To be completed as fully as possible by the applicant

Part 2 – Checklist:

Theme: The checklist is based on a list of 11 wider determinants of health relevant to planning. Guidance on the planning issues that may impact on health under each broad determinant, potential health impacts and examples of mitigation measures to improve health outcomes, is provided in the table following the Checklist.

Description of Impact: Briefly describe how the proposal impacts on the health and wellbeing of existing and future residents/users of the site/local area. Include information on which population groups are likely to be affected by the proposal (e.g. older people, children and young people, working age people) and when the impacts will take place (e.g. construction phase, operational phase).

Assessment of Impact: Identify whether the impact is positive, negative, neutral, or not known at this time.

Recommendation: Where an impact is identified, based on the description and assessment of impacts, include recommendations on how the proposal could minimise negative impacts and/or maximise positive impacts.

Part 3 – Checklist Outcome: To be completed by the applicant outlining how scheme will address any identified health impacts.

Part 1. Applicant and Scheme details	
Name of applicant	Beacon Fen Energy Park Ltd
Description of proposal	Beacon Fen Energy Park comprising the installation of solar photovoltaic (PV) generating panels and associated grid connection infrastructure which would allow for the generation of an anticipated 600 megawatts (MW).
Address of proposal	Land surrounding Heckington, between North Kyme and Donington, near Sleaford, Lincolnshire. The site is centred at National Grid Reference (NGR) TF 16348 42178.
Date assessment completed	March 2023

Part 2. Healthy Planning Checklist						
Theme	**Description of Impact**	**Assessment of Impact**				**Recommendation (to minimise or maximise impact)**
		Positive	**Negative**	**Neutral**	**Unknown**	
Construction	Potential for limited temporary impacts on human health due to construction vehicles and activity relating to dust, noise and vibration which can have a negative impact on mental health due to stress and sleep disturbance and physical health due to changes in air quality.		X			Mitigation measures will be implemented to minimise potential impacts during the construction phase which could affect human health. These measures will be implemented through a Construction Environmental Management Plan (CEMP) and Construction Traffic Management Plan (CTMP) submitted as part of the DCO application. Such measures are anticipated to include controls on construction hours and vehicle movements as well as wheel washing and avoidance of idling engines on site. Subsequently, with such mitigation measures in place, it is considered that the assessment of impact can be reduced to 'Neutral'. The Environmental Impact Assessment (EIA) for the proposed development will include an assessment of Access and Traffic, and Noise and Vibration

Part 2. Healthy Planning Checklist						
Theme	**Description of Impact**	**Assessment of Impact**				**Recommendation (to minimise or maximise impact)**
		Positive	**Negative**	**Neutral**	**Unknown**	
						as part of the Environmental Statement (ES) where potential impacts linked to human health will also be considered and mitigated for as necessary.
Healthy Homes	**Not applicable:** The proposals comprise a solar photovoltaic development with associated infrastructure, therefore no housing provision is included and this theme is scoped out of this screening assessment.					
Active Travel and Connectivity	The relevant aspects of this theme in relation to the proposed development are Public Right of Way (PRoW) access and traffic management measures as the majority of the site will not be accessible to the public. Where there are existing PRoWs on site, the construction and decommissioning phases have the potential to temporarily disrupt access via these routes, potentially increasing physical inactivity for those utilising these routes and potentially causing stress due to disruption and noise, leading to a negative impact on mental health.			X		During construction and decommissioning, existing PRoWs on site would be maintained for safe access where possible through appropriate signage and safety measures. These measures are anticipated to be implemented via a CEMP / Decommissioning Environmental Management Plan (DEMP) and CTMP. When designing the scheme, consideration will be given to existing PRoWs on site with the level of provision maintained, particularly where there may need to be PRoW diversion(s). Opportunities for enhancing the existing network will also be considered as part of the design, to provide a benefit to local users of network and promote physical activity. Traffic measures will be implemented in the vicinity of the site to minimise the potential for accidents involving pedestrians

Part 2. Healthy Planning Checklist						
Theme	**Description of Impact**	**Assessment of Impact**				**Recommendation (to minimise or maximise impact)**
		Positive	**Negative**	**Neutral**	**Unknown**	
	At the operational stage it is anticipated existing PRoW provision across the site will be maintained and where possible enhanced therefore presenting a positive impact on health through physical activity. Whilst traffic during the operational phase will be minimal, mainly comprising maintenance vehicles, the construction and decommissioning phases will result in a temporary increase in traffic in the vicinity of the site. An increase in vehicles has the potential to lead to road accidents involving pedestrians and cyclists, as well as potential for noise and vehicle emissions to have a negative impact on health.					and cyclists and to limit disruption on the local road network for these active travel users. Mitigation measures will be implemented via a CTMP. The EIA for the proposed development will include an assessment of Access and Traffic as part of the ES where potential impacts linked to human health will also be considered and mitigated for as necessary. Subsequently, with such mitigation measures in place, it is considered that the assessment of impact is 'Neutral' for this theme.
Access to Services and Social Infrastructure	**Not applicable:** The proposals comprise a solar photovoltaic development with associated infrastructure, therefore given the nature of the development no change in access to or demand for services and social infrastructure is anticipated and this theme is scoped out of this screening assessment.					
Open Spaces and Access to Nature	As well as PRoW access, as discussed above under 'Active Travel and Connectivity', the			X		The design of the scheme will include landscape and ecological mitigation and enhancement planting where necessary to limit potential impacts on visual amenity and to ensure biodiversity

Part 2. Healthy Planning Checklist						
Theme	**Description of Impact**	**Assessment of Impact**				**Recommendation (to minimise or maximise impact)**
		Positive	**Negative**	**Neutral**	**Unknown**	
	relevant aspect of this theme in relation to the proposed development is access to nature. The proposed development will comprise the installation of solar PV panels and associated infrastructure on land predominantly comprising agricultural use. Contact with nature can result in positive impacts on health such as reducing stress, lowering blood pressure and improving mental health. Conversely, a reduction in contact with nature can have the opposite effect on health.					net gain across the site. It is anticipated that a Landscape and Ecological Management Plan (LEMP) will form part of the DCO submission outlining the measures in place to mitigate and enhance nature. Subsequently, with such mitigation measures in place, it is considered that the assessment of impact is 'Neutral' for this theme. The EIA for the proposed development will include an assessment of Landscape and Visual, and Ecology as part of the ES where potential impacts linked to human health will also be considered and mitigated for as necessary.
Healthy Foods	The relevant aspect of this theme in relation to the proposed development is opportunities for food growing. The proposed development will comprise the installation of solar PV panels and associated infrastructure on land predominantly comprising agricultural use which therefore provides a food growing opportunity.			X		The design of the proposed development will avoid the use of Best and Most Versatile (BMV) land where possible. The long-term temporary nature of the development means only a very small percentage of the total site area will be lost to 'permanent' concrete bases and access tracks. As such, long-term the land will still be available for agricultural use and subsequently food growing opportunities. During the operational phase of the development it is anticipated the

Part 2. Healthy Planning Checklist						
Theme	**Description of Impact**	**Assessment of Impact**				**Recommendation (to minimise or maximise impact)**
		Positive	**Negative**	**Neutral**	**Unknown**	
	Development of agricultural land can reduce the potential for locally grown food which can promote healthy eating.					majority of land will remain available for agricultural use as grazing pasture. A Soils and Agricultural Land Classification report will accompany the DCO submission.
Community Safety	Perception and fear of crime can have potential negative impacts on mental health. Potential opportunities for crime can occur as a result of new development. In relation to the proposed development this could potentially include theft or vandalism during the construction, operational and decommissioning phases. Given the proposed development will comprise battery storage, one consideration will be perceived risk of fire which can have a negative impact on physical and mental health.			X		During the construction and decommissioning phases, vehicles and equipment on-site will be kept secure, and contained within the temporary compound where possible. Fencing is anticipated to be used to secure the compound during these phases. During the operational phase, the perimeter of the site will be secured using fencing such as standard stock fencing. It is also anticipated that CCTV cameras will be placed within the site which will be monitored regularly to ensure opportunities for people to commit crime are reduced. A CEMP and DEMP will form part of the DCO submission. To address the potential risk of battery fire, cooling systems will be used to maintain safe operating temperatures and minimise fire risk. It is anticipated the design of the scheme will include adequate separation distances between units so that in the unlikely event of a fire, this would not spread. A

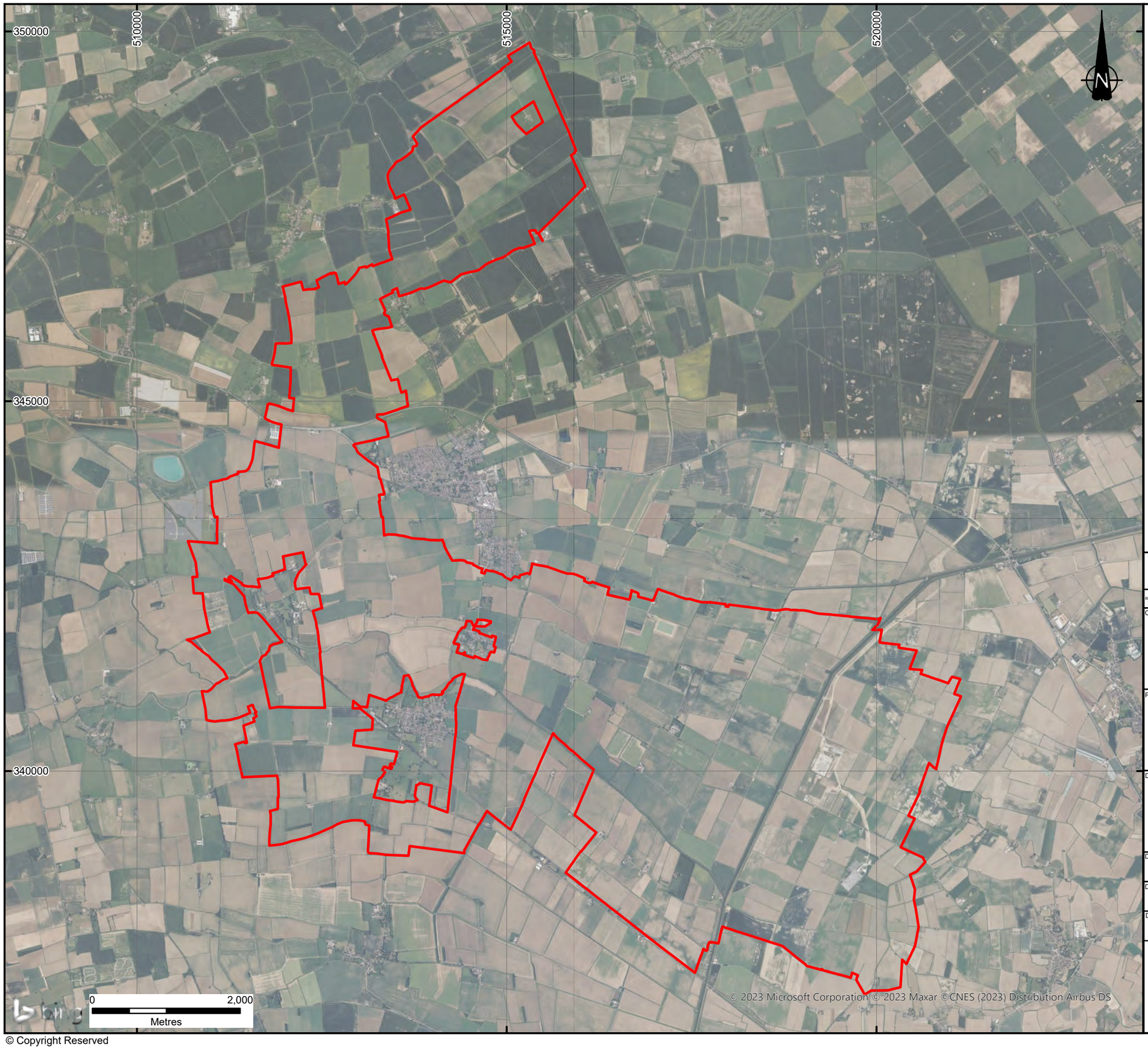
Part 2. Healthy Planning Checklist						
Theme	**Description of Impact**	**Assessment of Impact**				**Recommendation (to minimise or maximise impact)**
		Positive	**Negative**	**Neutral**	**Unknown**	
						management plan to ensure battery storage safety is anticipated to accompany the DCO submission.
Equality, Social Relationships and Community	**Not applicable:** The proposals comprise a solar photovoltaic development with associated infrastructure, therefore given the nature of the development aside from maintaining existing PRoW access, the site will not be accessible to the public and therefore this theme is scoped out of this screening assessment.					
Employment	The proposed development will generate employment opportunities during the construction, operational and decommissioning phases. Access to employment opportunities has positive impacts on human health, including improved mental health and wellbeing as well as providing an income from which it can be easier to lead a healthy lifestyle.	X				The scheme should seek to maximise training and employment opportunities for people living in the local area. Indirect benefits in terms of employment can also be achieved through use of local supply chains where feasible during construction and decommissioning, and local services during operation. The EIA for the proposed development will include an assessment of Socio-economics as part of the ES where potential impacts linked to human health will also be considered and mitigated for as necessary.
Environment and Resources	Potential negative impacts on physical and mental health can arise from vehicle / plant emissions in terms of noise and air pollution as well as the generation of waste. The potential impacts in relation to noise and air quality are discussed above under			X		A CEMP and DEMP will accompany the DCO submission, outlining the necessary mitigation measures required to ensure potential impacts during these temporary phases relating to noise and air quality and vehicle emissions are minimised. These documents will also consider waste management and it is anticipated a Site Waste Management

Part 2. Healthy Planning Checklist						
Theme	**Description of Impact**	**Assessment of Impact**				**Recommendation (to minimise or maximise impact)**
		Positive	**Negative**	**Neutral**	**Unknown**	
	'Construction'. Given the existing agricultural use of the site and the nature of the proposed development, the waste generated is not anticipated to be significant. The potential risk to health from contaminated land is anticipated to be low given the greenfield nature of the proposed development site.					Plan (SWMP) will be implemented, with consideration of the waste hierarchy principles.
Climate Change	Climate change can lead to more frequent storm and flood events, creating additional surface water flood risk. Flooding can have potential negative impacts on physical and mental health. Given the nature of the proposed development as a renewable energy project, the scheme will contribute to emissions savings during its operational phase which has associated health benefits.			X		The scheme is anticipated to comprise only minimal areas of impermeable surface and therefore is not anticipated to significantly increase the risk of flooding. A Flood Risk Assessment will accompany the DCO submission including a drainage strategy for the scheme. It is anticipated that sustainable drainage techniques will be utilised on site. The EIA for the proposed development will include an assessment of Climate Change as part of the ES where potential impacts linked to human health will also be considered and mitigated for as necessary.

Part 3. Checklist Outcome:

Conclusion	Applicant's Response	District Council/Public Health Comments
Are any changes proposed to the scheme to improve health outcomes and/or address negative impacts?	As outlined in this screening assessment, mitigation measures will be implemented through either the design or management of the scheme to reduce the potential for any negative health impacts during the different phases of the development. Given the early stage of the project, it is anticipated these measures can be implemented or factored in as the design of the scheme progresses or captured in management plans as appropriate.	
Will the proposal require further assessment via a Rapid or Full Health Impact Assessment?	It is considered that further assessment in respect of health impact in the form of a standalone assessment is not required for the proposed development due to the limited potential for health impacts. As demonstrated through this screening assessment, health impacts will be adequately considered through the various relevant aspects of the EIA scoped into the ES and mitigation measures will be implemented where identified as required.	

DRAWINGS



KEY

Site Boundary

Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023

REVISION	DETAILS	DATE	DRAWN	CHKD	APP'D
A	FIRST ISSUE	13/4/23	EL	GS	SR

CLIENT

BEACON FEN ENERGY PARK LTD

PROJECT

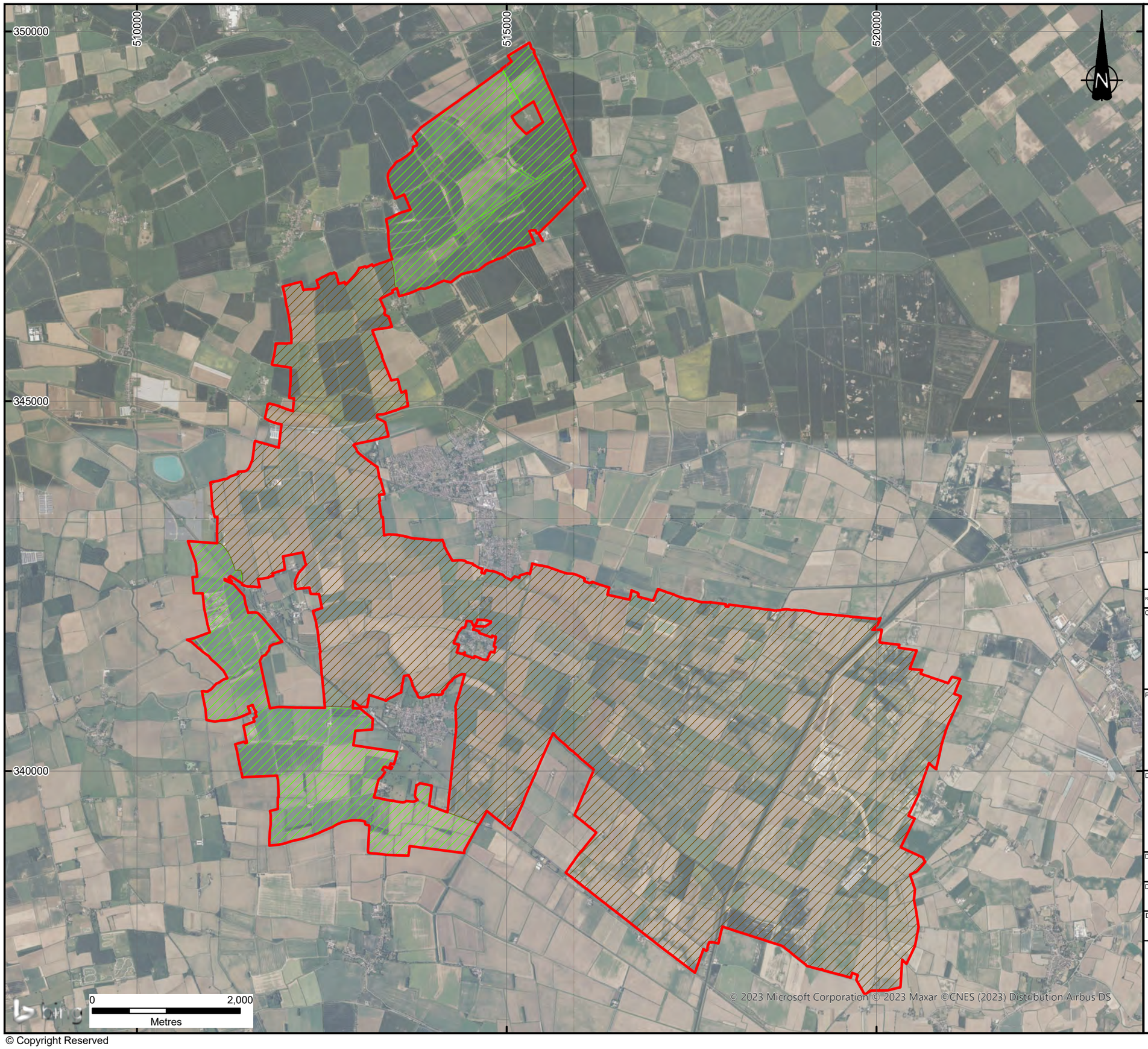
BEACON FEN ENERGY PARK

DRAWING TITLE

FIGURE 1.1
RED LINE BOUNDARY PLAN

DRG No.		REV
ST19595-041		A
DRG SIZE	SCALE	DATE
A3	1:50,000	14/04/2023
DRAWN BY	CHECKED BY	APPROVED BY
EL	GS	SR

wardell armstrong



KEY

- Site boundary
- Cable Route Search Area
- Northern and Sourthern Solar Array Sites

Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D
A	FIRST ISSUE	13/4/23	EL	GS	SR

CLIENT

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PROJECT

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DRAWING TITLE

FIGURE 1.2
INDICATIVE DEVELOPMENT AREAS

DRG No.		REV
ST19595-036		A
DRG SIZE	SCALE	DATE
A3	1:50,000	14/04/2023
DRAWN BY	CHECKED BY	APPROVED BY
EL	GS	SR

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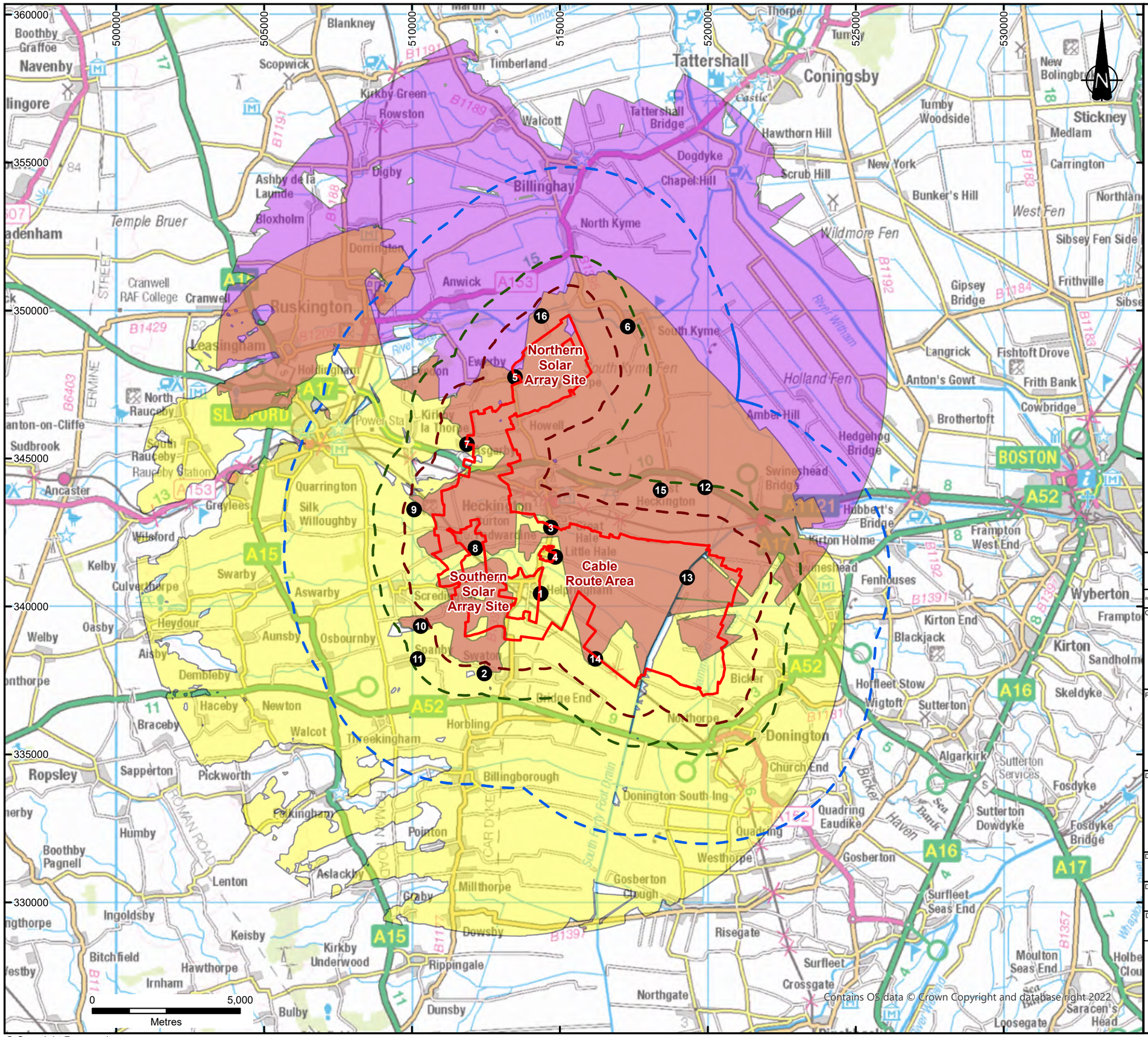

KEY

- Site Boundary
- 1 Km Study Area
- 2 Km Study Area
- 5 Km Study Area

Zone of Theoretical Visibility - Bare Ground

- North Site
- South Site
- Both Sites
- Selected Viewpoints

Notes:

Generated using Ordnance Surveys Terrain 5 Dataset which is based on 5m resolution Digital Terrain Model (DTM), incorporating the proposed Solar PV panels modelled across the site to a maximum anticipated height of 4.5m

Proposed scheme is derived from the proposed Red Line Boundary (RLB) areas with reference points included every 20m on a grid across the full extent of the RLB site. The ZTVS do not include associated buildings which are not known at this stage.

ZTV raster data was calculated using QGIS 3.22.8 Visibility Analysis tool with observer eye 2m above ground.

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D
A	FIRST ISSUE	13/04/23	RCB	LM	LG

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PROJECT

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DRAWING TITLE

FIGURE 4.1
BAREGROUND ZONE OF THEORETICAL VISIBILITY

DRG No.		REV
ST19595-010		A
DRG SIZE	SCALE	DATE
A3	1:125,000	14/04/2023
DRAWN BY	CHECKED BY	APPROVED BY
CT	LM	LG

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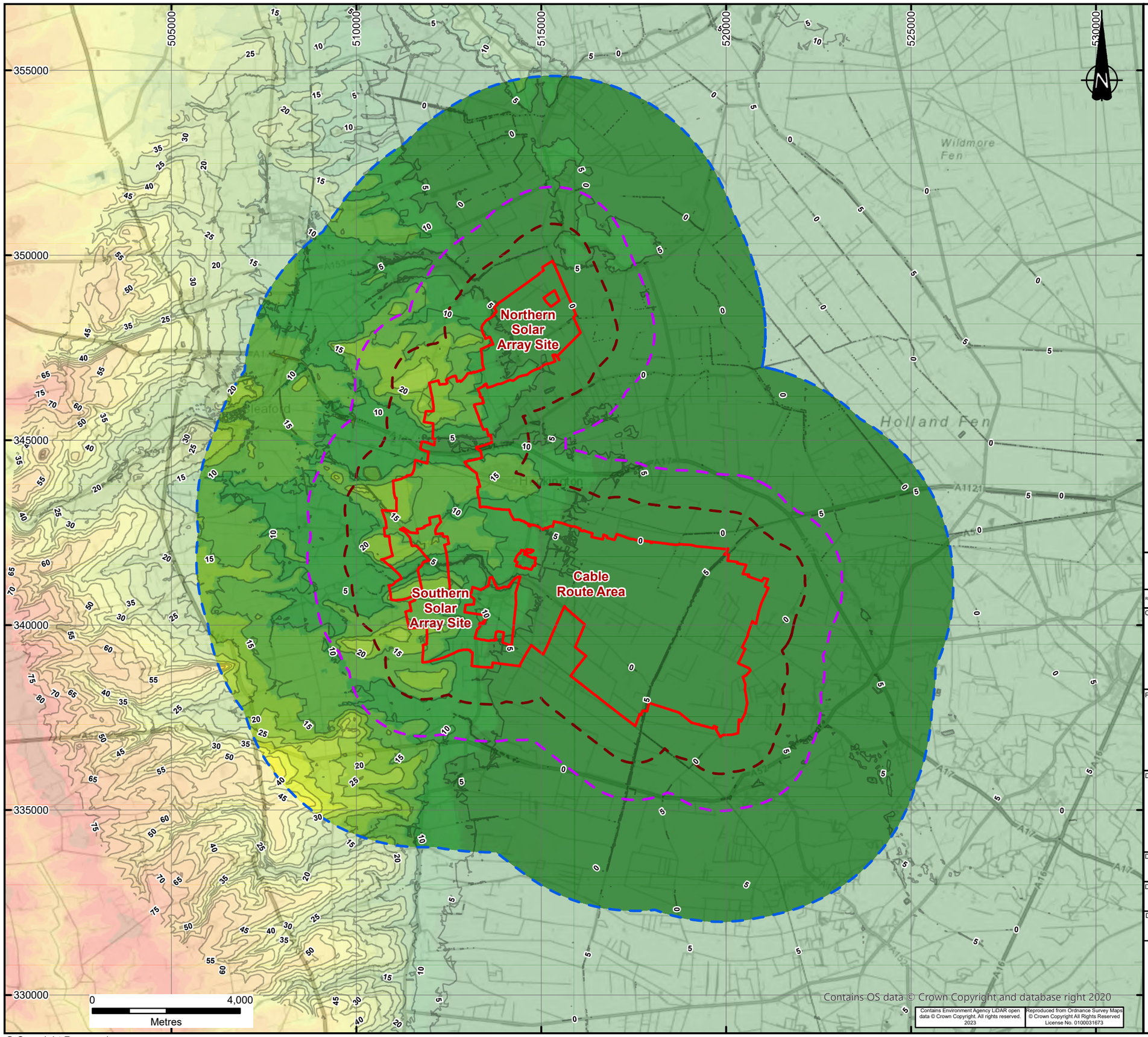

KEY

Site Boundary

Radius

- 1 Km Study Area
- 2 Km Study Area
- 5 Km Study Area

Elevation (mAOD)

0 - 5	50 - 55
5 - 10	55 - 60
10 - 15	60 - 65
15 - 20	65 - 70
20 - 25	70 - 75
25 - 30	75 - 80
30 - 35	80 - 90
35 - 40	90 - 100
40 - 45	100 - 115
45 - 50	115 - 130

Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023

Topography layer generated using Ordnance Surveys Terrain 5 Dataset which is based on 5m resolution Digital Terrain Model (DTM).

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A	FIRST ISSUE	13/04/23	RCB	LM	LG

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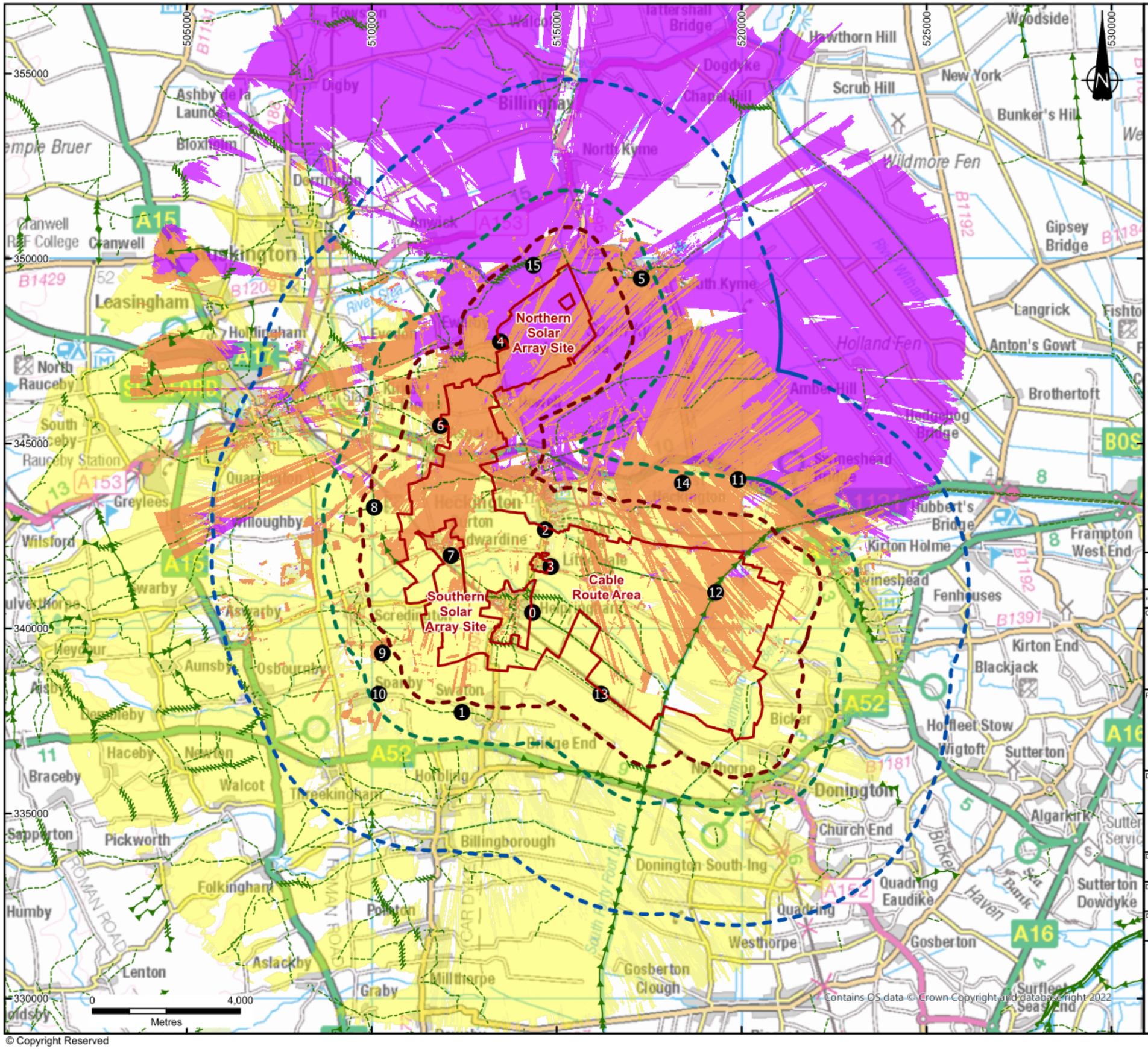
FIGURE 4.2
TOPOGRAPHY

DRG No.		REV
ST19595-013		A
DRG SIZE	SCALE	DATE
A3	1:100,000	14/04/2023
DRAWN BY	CHECKED BY	APPROVED BY
CT	LM	LG

wardell armstrong



KEY

- Site Boundary
- 1 km Study Area
- 2 km Study Area
- 5 km Study Area
- Selected Viewpoints
- North Site
- South Site
- Both Sites
- Byway Open to All Traffic
- Public Bridleway
- Public footpath
- Restricted Byway

Notes:

Generated using Ordnance Surveys Terrain 5 Dataset which is based on 5m resolution Digital Terrain Model (DTM), incorporating the proposed Solar PV panels modelled across the site to a maximum anticipated height of 4.5m

Proposed scheme is derived from the proposed Red Line Boundary (RLB) areas with reference points included every 20m on a grid across the full extent of the RLB site. The ZTV's include associated building locations based on OS Master Map data and their heights and Canopy data from National Tree Map data and their maximum heights.

ZTV raster data was calculated using QGIS 3.22.8 Visibility Analysis tool with observer eye 2m above ground.

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023
National Tree Mapping – © Bluesky International Limited

REVISION	DETAILS	DATE	DRAWN	CHKD	APPD
A	FIRST ISSUE	13/04/23	RCB	LM	LG

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DRAWING TITLE

FIGURE 4.3
SCREENED ZONE OF THEORETICAL VISIBILITY

DRG No.	REV
ST19595-015	A

DRG SIZE	SCALE	DATE
A3	1:100,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
CT	LM	LG

wardell armstrong

Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

The local LCAs at North and South Kesteven were digitised with the Regional sub-areas from district "Landscape Character Assessment Reports" (2007, 2007) publicly available documents provided by respective district councils.

The LCAs in Boston and East Lindsey Council areas were digitised from "Landscape Character Assessment of Boston Borough" (2009) and "East Lindsey District- Landscape Character Assessment- Part 2" (2009) respectively.

South Holland LCAs were digitised from the character zones identified in "The Historic Landscape Characterisation for Lincolnshire" (2011) and "South Holland District Council Strategic Landscape Capacity Study" (2003) documents supplied by the South Holland District council.

510000
520000
530000
350000
340000
330000
N
0
8,000
Meters
bing
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Limestone Heath
Woodhall Spa to Coningsby River Terrace
Mareham-Little Steeping Fenside Woodland&Farmland
East Lindsey
Central Lincolnshire Vale
North Kesteven
Stickney to Sibsey Reclaimed Fen
Fenland
Rauceby Hills
Southern Lincolnshire Edge
Central Clays and Gravels
Holland Reclaimed Fen
Wrangle to Cowbridge Settled Fen
Slea Valley
Wilsford Heath
Boston Borough Council Boundary
The Fens
Bicker to Wyberton Settled Fen
Upland Plateau Fringe
Frampton to Fosdyke Settled Fen
Kesteven Uplands
Fen Margin
South Holland Fens
Welland to Haven Reclaimed Saltmarsh
The Wash Farmlands

KEY

- Site Boundary
- 1 Km Study Area
- 2 Km Study Area
- 5 Km Study Area
- National Landscape Character Areas

Boston Landscape Character Areas

- Bicker to Wyberton Settled Fen
- Boston Borough Council Boundary
- Frampton to Fosdyke Settled Fen
- Holland Reclaimed Fen
- Wrangle to Cowbridge Settled Fen

East Lindsey Landscape Character Areas

- Stickney to Sibsey Reclaimed Fen
- Mareham-Little Steeping Fenside Woodland&Farmland
- Woodhall Spa to Coningsby River Terrace

North Kesteven Landscape Character Areas

- Central Clays and Gravels
- Fenland
- Limestone Heath
- Rauceby Hills
- Slea Valley
- Upland Plateau Fringe
- Wilsford Heath

South Kesteven Landscape Character Areas

- Fen Margin
- Kesteven Uplands
- Southern Lincolnshire Edge
- The Fens

South Holland Landscape Sub-Types

- South Holland Fens
- The Wash Farmlands
- The Wash Saltmarshes

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D
A	FIRST ISSUE	13/04/23	RCB	LM	LG

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FIGURE 4.4
LANDSCAPE CHARACTER FIGURE

DRG No	REV
ST19595-016	P0.07

DRG SIZE	SCALE	DATE
A2	1:75,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EK	LM	LG

wardell armstrong

Notes:

Boundaries are indicative.

510000 515000 520000 525000

350000 345000 340000 335000 330000

Northern Solar Array Site

Southern Solar Array Site

Cable Route Area

Holland Fen

Wildmore Fen

Heckington

0 4,000

Metres

KEY

- Site Boundary
- Local Nature Reserves
- Sites of Special Scientific Interest
- Ancient Woodland
- Other Woodland
- Country Parks
- Parks and Gardens
- Scheduled Monuments
- Heritage at Risk
- Byway Open to All Traffic
- Public Bridleway
- Public footpath
- Restricted Byway
- National Cycle Network
- Railway Track
- Water Courses

Notes:

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023

REVISION	DETAILS	DATE	DRAWN	CHKD	APPD
A	FIRST ISSUE	14/04/23	RCB	LM	LG

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FIGURE 4.5
SENSITIVE RECEPTORS
AND DESIGNATED AREAS

DRG No.		REV
ST19595-020		A
DRG SIZE	SCALE	DATE
A3	1:100,000	14/04/2023
DRAWN BY	CHECKED BY	APPROVED BY
EK	LM	LG

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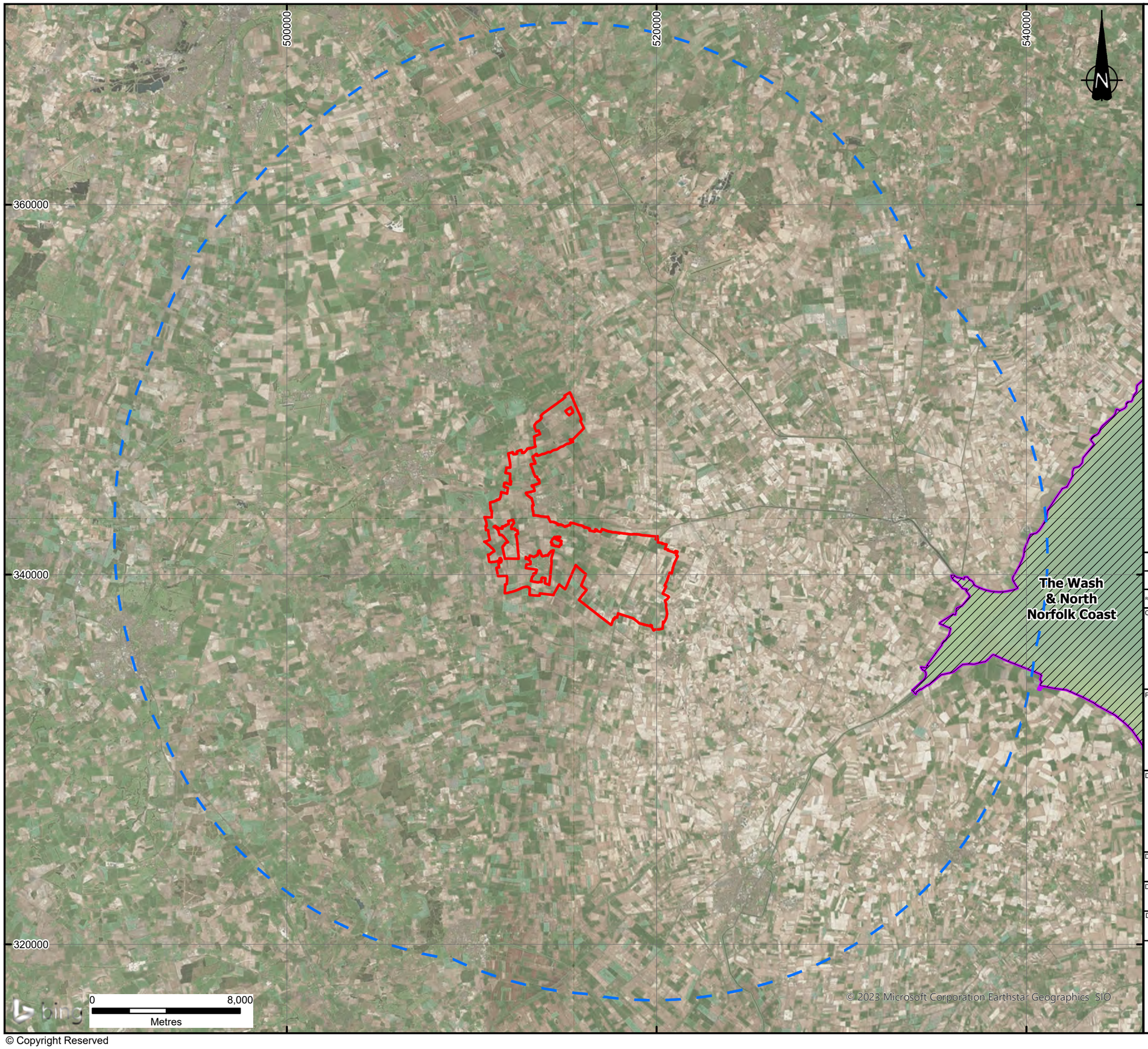

KEY

- Site Boundary
- 20km Search Area
- SAC
- SPA
- RAMSAR

Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023

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REVISION	DETAILS	DATE	DRAWN	CHKD	APP'D
B	BOUNDARY OF CABLE CORRIDOR REVISED	29/3/23	EL	TB	TB
A	FIRST ISSUE	22/3/23	EL	TB	TB

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FIGURE 5.1
INTERNATIONAL SITES WITHIN
20KM OF THE SITE

DRG No.	REV
ST19595-018	B

DRG SIZE	SCALE	DATE
A3	1:200,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	TB	TB

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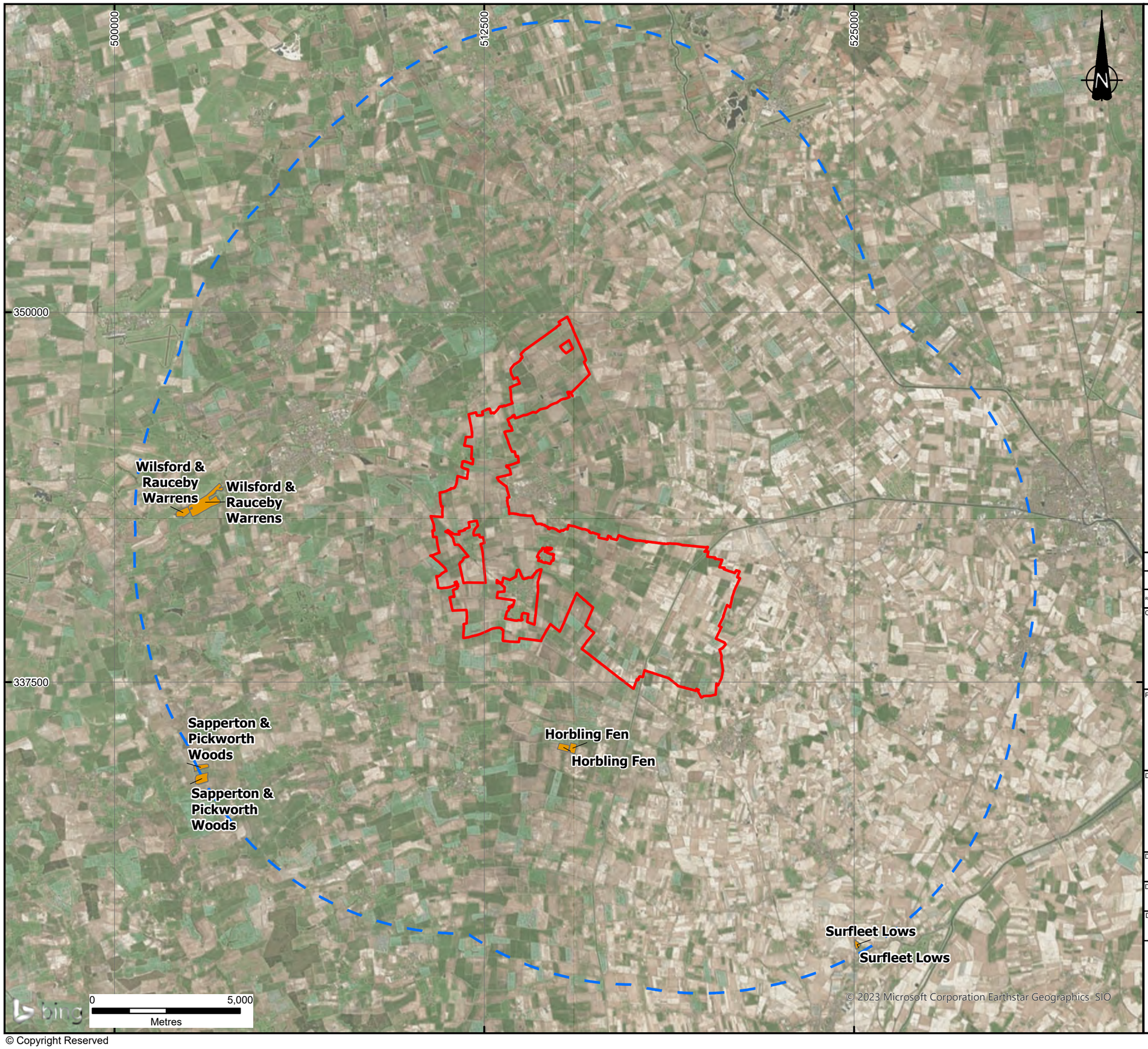

KEY

- Site Boundary
- 10km Search Area
- SSSI

Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023

REVISION	DETAILS	DATE	DRAWN	CHKD	APPD
B	BOUNDARY OF CABLE CORRIDOR REVISED	29/3/23	EL	TB	TB
A	FIRST ISSUE	22/3/23	EL	TB	TB

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DRAWING TITLE

FIGURE 5.2
SSSI WITHIN 10KM OF SITE

DRG No.		REV
ST19595-019		B
DRG SIZE	SCALE	DATE
A3	1:125,000	14/04/2023
DRAWN BY	CHECKED BY	APPROVED BY
EL	TB	TB

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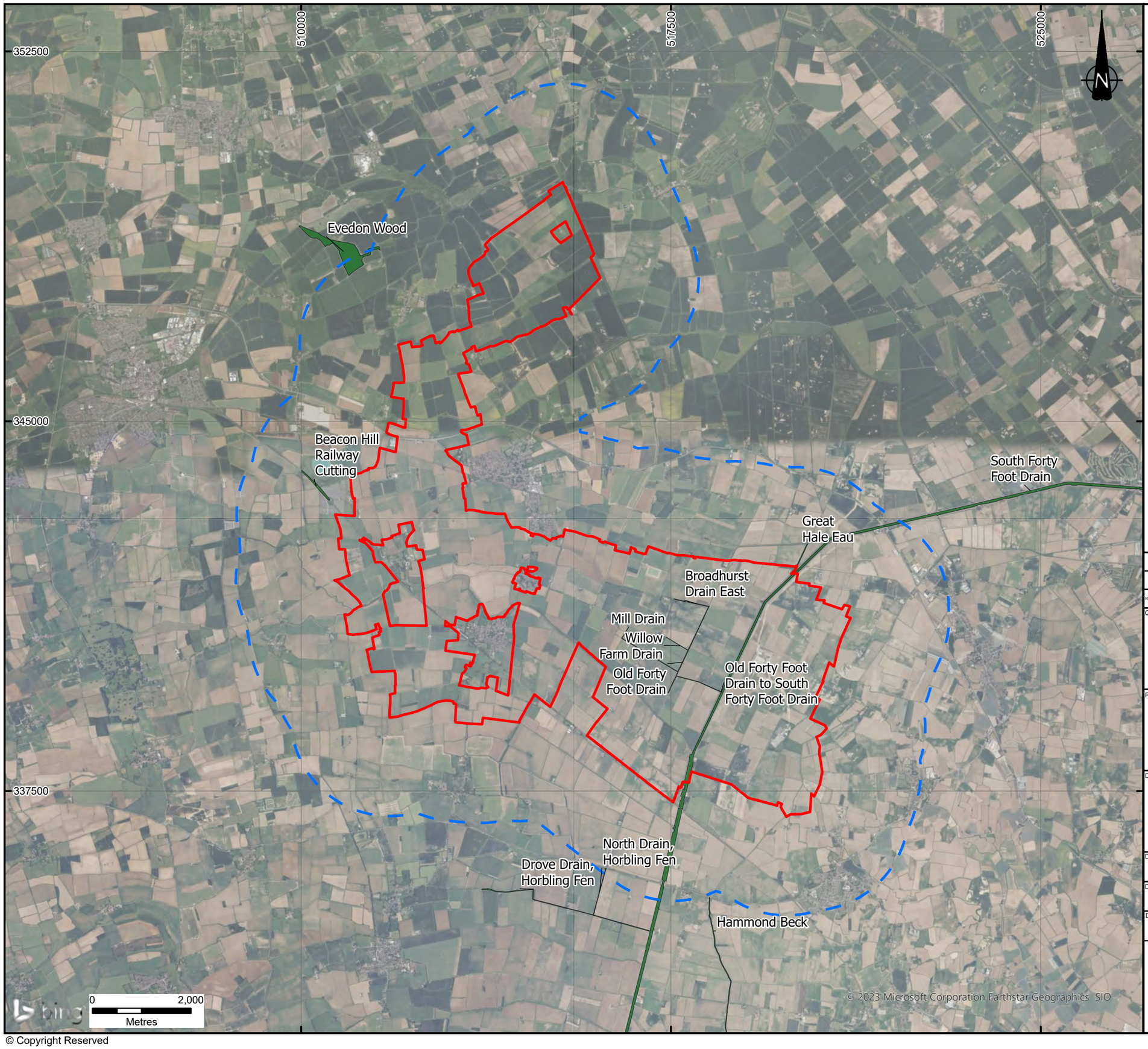

KEY

- Site Boundary
- 2km Search Area
- Local Wildlife Sites

Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023

Local Wildlife Sites provided by Greater Lincolnshire Nature Partnership on 20.3.2023

REVISION	DETAILS	DATE	DRAWN	CHKD	APPD
B	BOUNDARY OF CABLE CORRIDOR REVISED	29/3/23	EL	TB	TB
A	FIRST ISSUE	20/3/23	EL	TB	TB

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DRAWING TITLE

FIGURE 5.3
OTHER DESIGNATIONS
(STATUTORY/NON-STATUTORY)
WITHIN 2KM OF THE SITE

DRG No.		REV
ST19595-022		B
DRG SIZE	SCALE	DATE
A3	1:75,000	14/04/2023
DRAWN BY	CHECKED BY	APPROVED BY
EL	TB	TB

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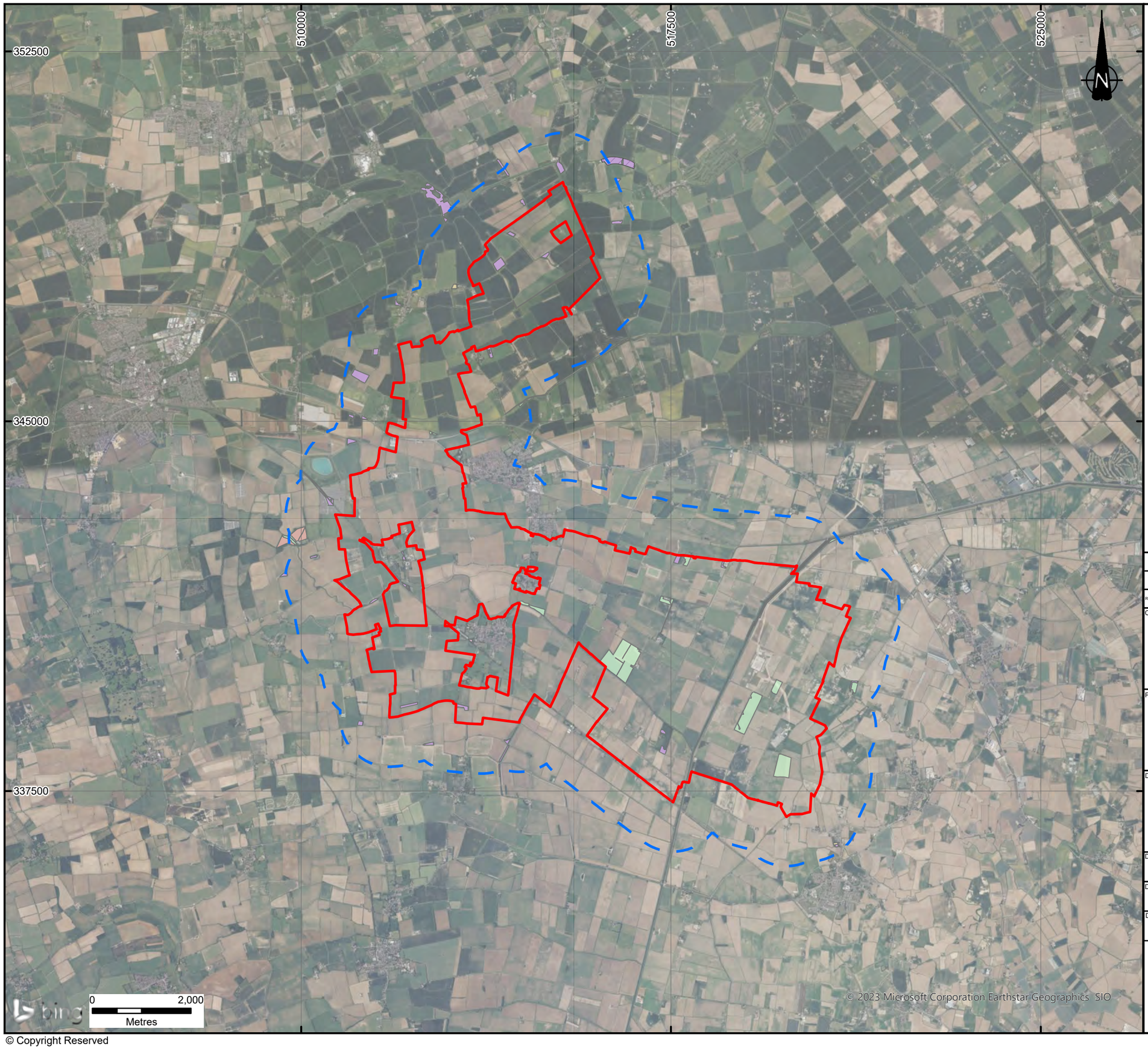

KEY

- Site Boundary
- 1km Search Area
- Ancient woodland

Priority Habitat Inventory

- Coastal and floodplain grazing marsh
- Deciduous woodland
- Good quality semi improved grassland
- Lowland calcareous grassland
- No main habitat but additional habitats present
- Traditional orchard

Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023

REVISION	DETAILS	DATE	DRAWN	CHKD	APPD
B	BOUNDARY OF CABLE CORRIDOR REVISED	29/3/23	EL	TB	TB
A	FIRST ISSUE	22/3/23	EL	TB	TB

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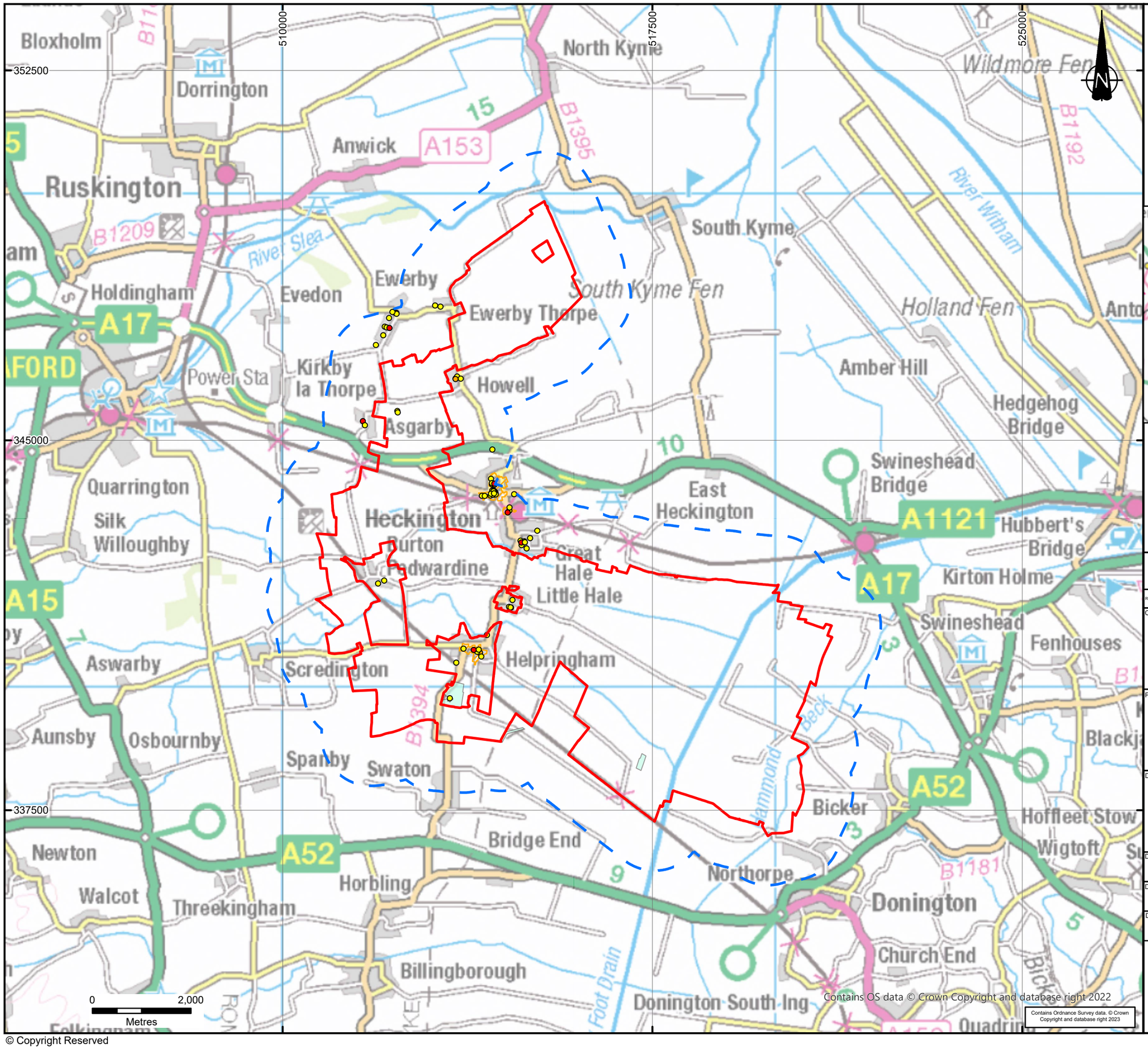
FIGURE 5.4
ANCIENT WOODLAND/PRIORITY HABITAT
WITHIN 1KM OF THE SITE

DRG No.	REV
ST19595-035	B

DRG SIZE	SCALE	DATE
A3	1:75,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	TB	TB

wardell armstrong



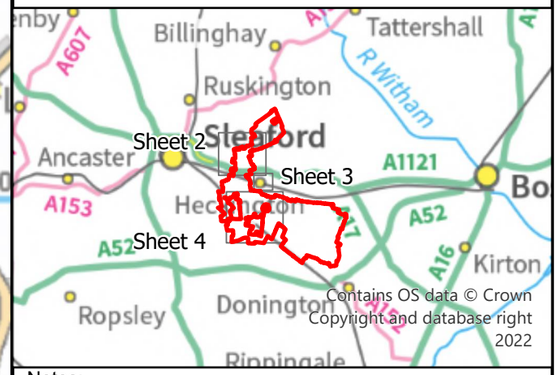
KEY

- Site Boundary
- 1km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
- Grade II*
- Grade II

- Conservation Areas



Notes:

Boundaries are indicative.

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D
A	FIRST ISSUE	13/4/23	EL	VA-J	LG

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DRAWING TITLE

FIGURE 6.1
DESIGNATED HERITAGE ASSETS
UP TO 1KM FROM THE SITE

DRG No.	REV
ST19595-029 (Sheet 1 of 4)	A

DRG SIZE	SCALE	DATE
A3	1:75,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

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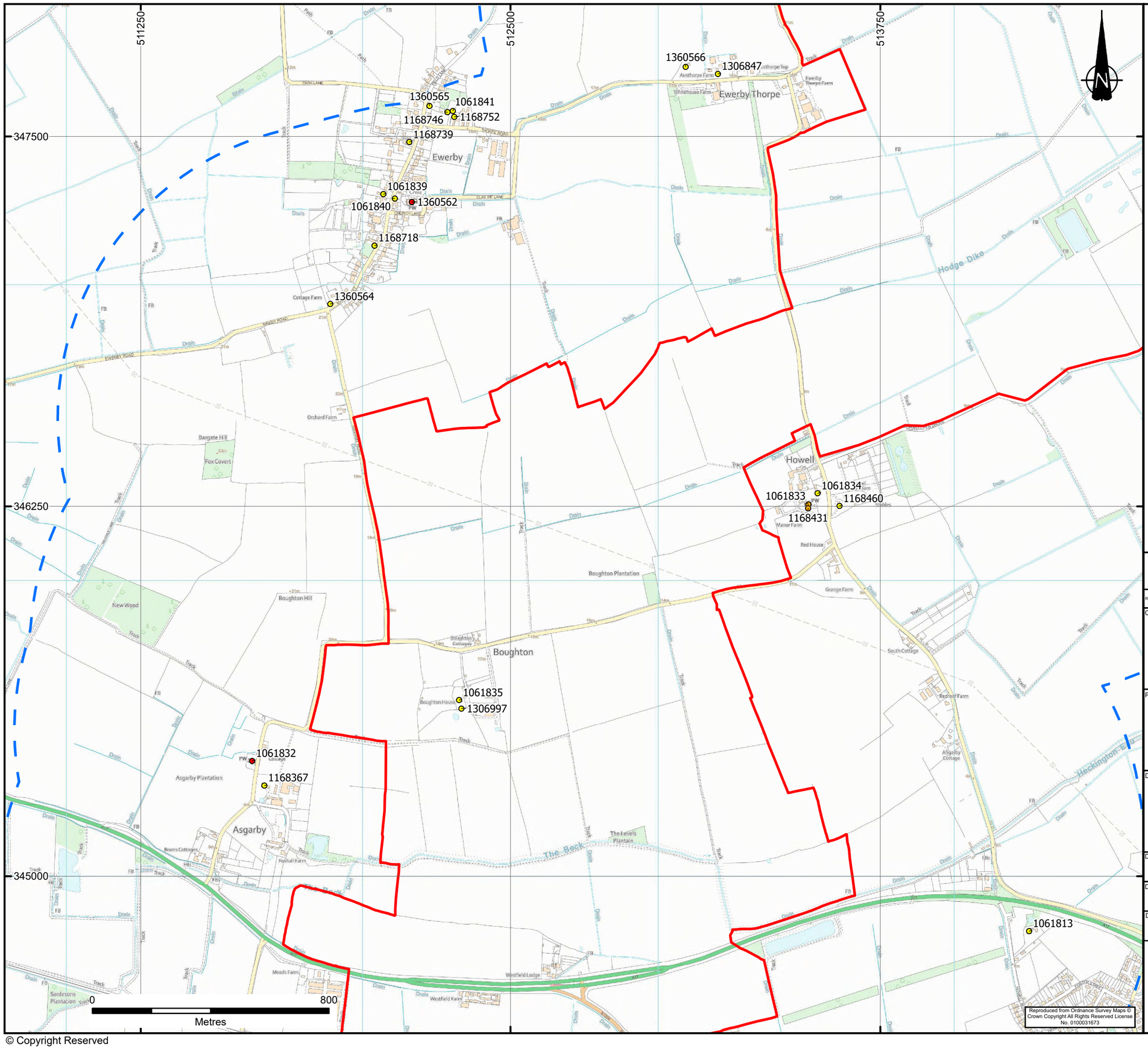

KEY

- Site Boundary
- 1km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
- Grade II*
- Grade II
- Conservation Areas

Notes:

Boundaries are indicative.

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023

REVISION	DETAILS	DATE	DRAWN	CHKD	APPD
A	FIRST ISSUE	13/4/23	EL	VA-J	LG

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DRAWING TITLE

FIGURE 6.1
DESIGNATED HERITAGE ASSETS
UP TO 1KM FROM THE SITE

DRG No.	REV
ST19595-029 (Sheet 2 of 4)	A

DRG SIZE	SCALE	DATE
A3	1:12,500	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
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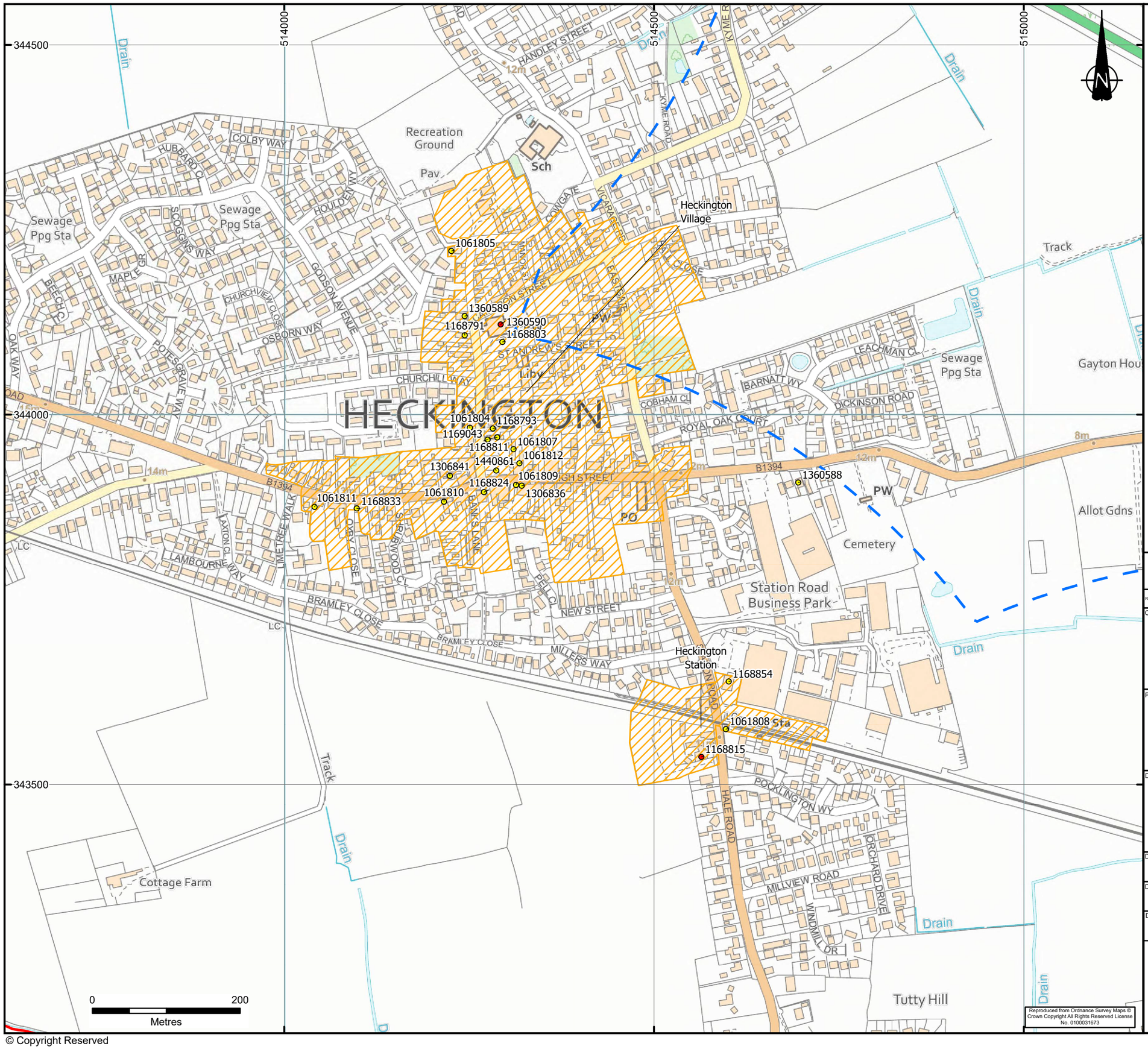

KEY

- Site Boundary
- 1km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
- Grade II*
- Grade II

- Conservation Areas

Notes:

Boundaries are indicative.

REVISION	DETAILS	DATE	DRAWN	CHKD	APP'D
A	FIRST ISSUE	13/4/23	EL	VA-J	LG

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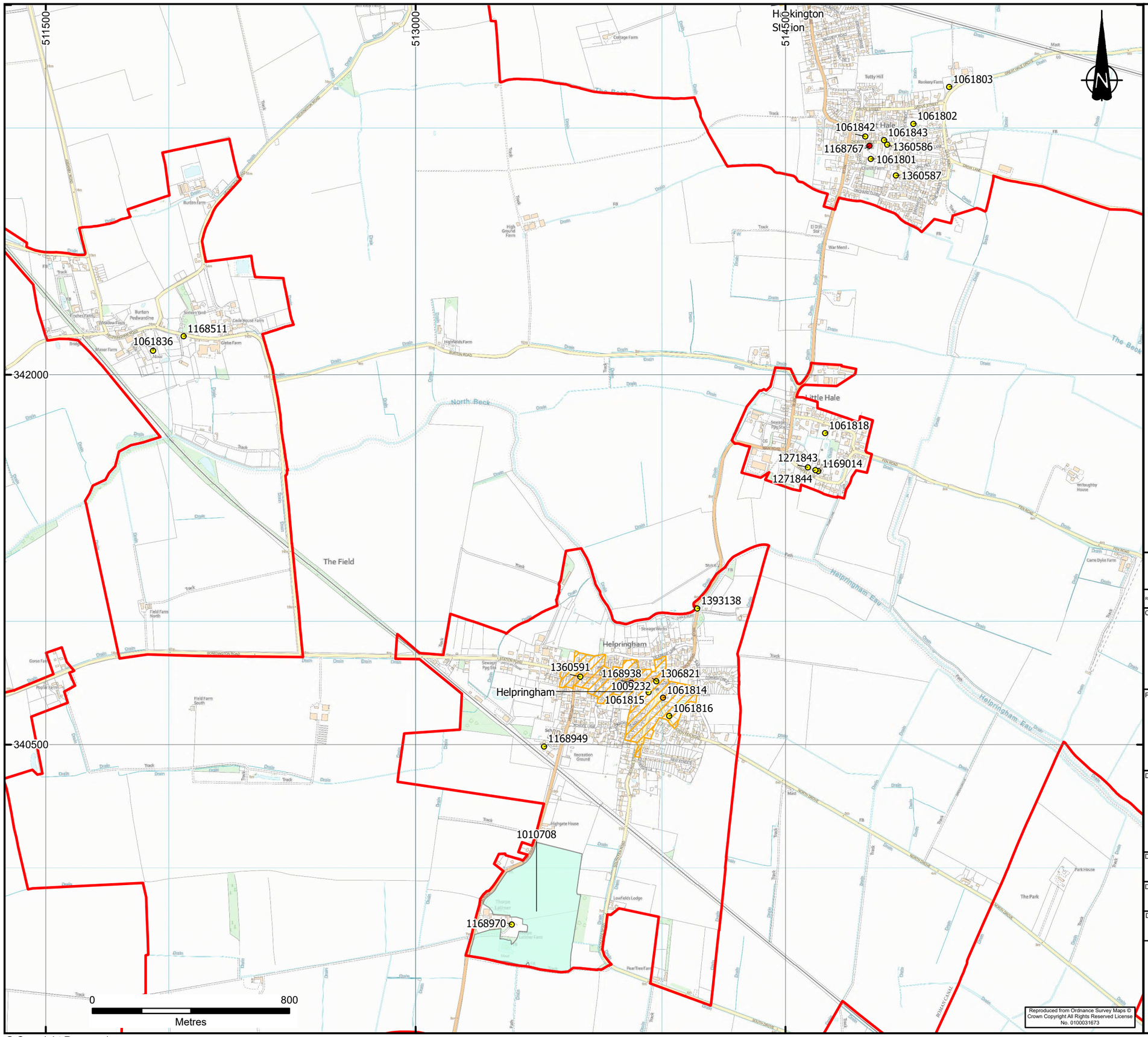
DRAWING TITLE

FIGURE 6.1
DESIGNATED HERITAGE ASSETS
UP TO 1KM FROM THE SITE

DRG No.	REV
ST19595-029 (Sheet 3 of 4)	A

DRG SIZE	SCALE	DATE
A3	1:5,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG



KEY

- Site Boundary
- 1km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
- Grade II*
- Grade II

- Conservation Areas

Notes:

Boundaries are indicative.

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023

REVISION	DETAILS	DATE	DRAWN	CHKD	APP'D
A	FIRST ISSUE	13/4/23	EL	VA-J	LG

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DRAWING TITLE

FIGURE 6.1
DESIGNATED HERITAGE ASSETS
UP TO 1KM FROM THE SITE

DRG No.	REV
ST19595-029 (Sheet 4 of 4)	A

DRG SIZE	SCALE	DATE
A3	1:15,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
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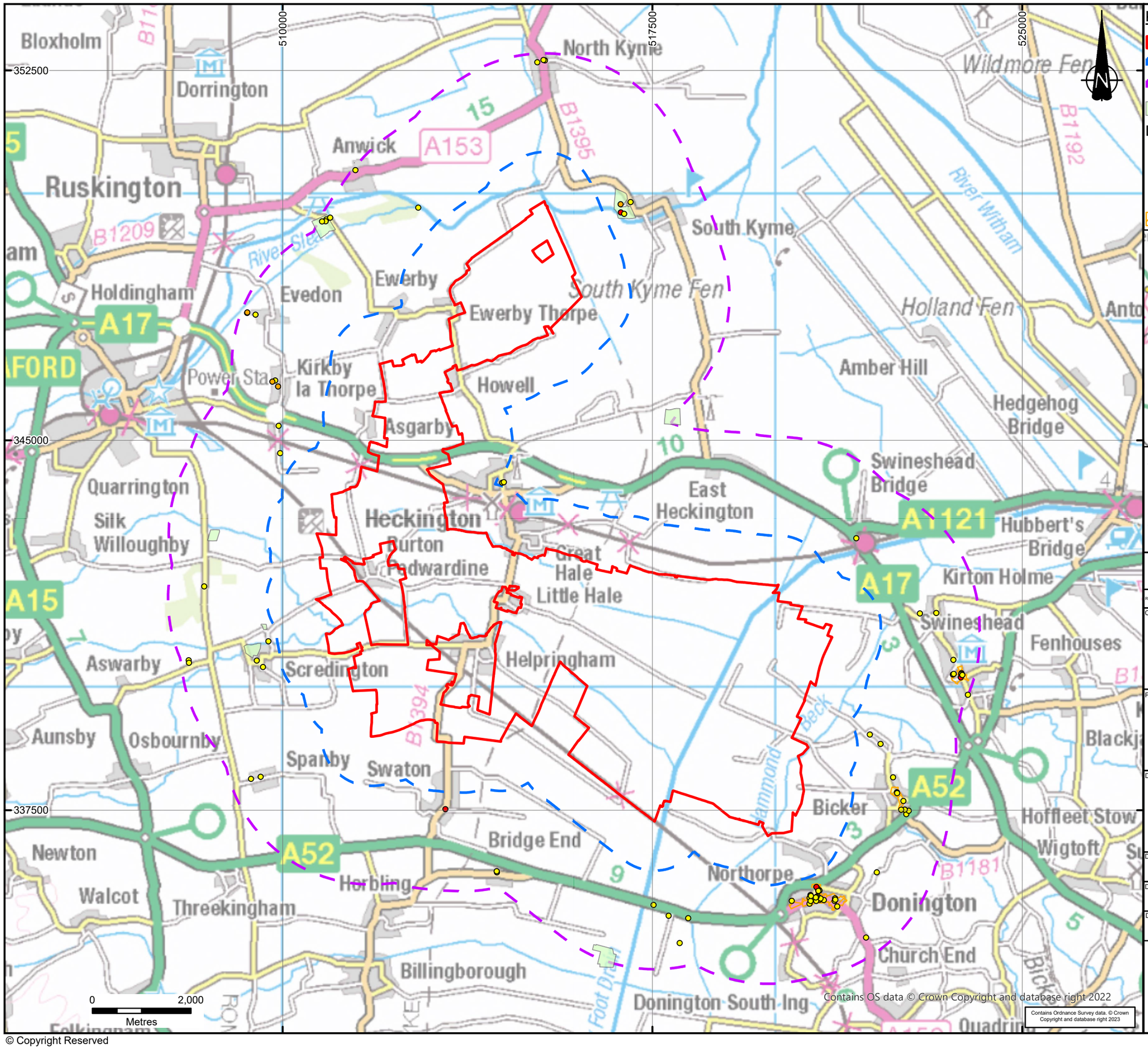
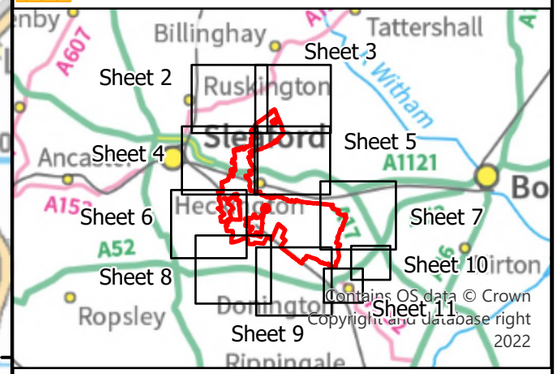


KEY

- Site Boundary
- 1km Study Area
- 3km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
- Grade II*
- Grade II
- Conservation Areas



Notes:

Boundaries are indicative.
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REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D
A	FIRST ISSUE	14/3/23	EL	VA-J	LG

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DRAWING TITLE

FIGURE 6.2
DESIGNATED HERITAGE ASSETS
BETWEEN 1KM AND 3KM FROM THE SITE

DRG No.	REV
ST19595-030 (Sheet 1 of 11)	A

DRG SIZE	SCALE	DATE
A3	1:75,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

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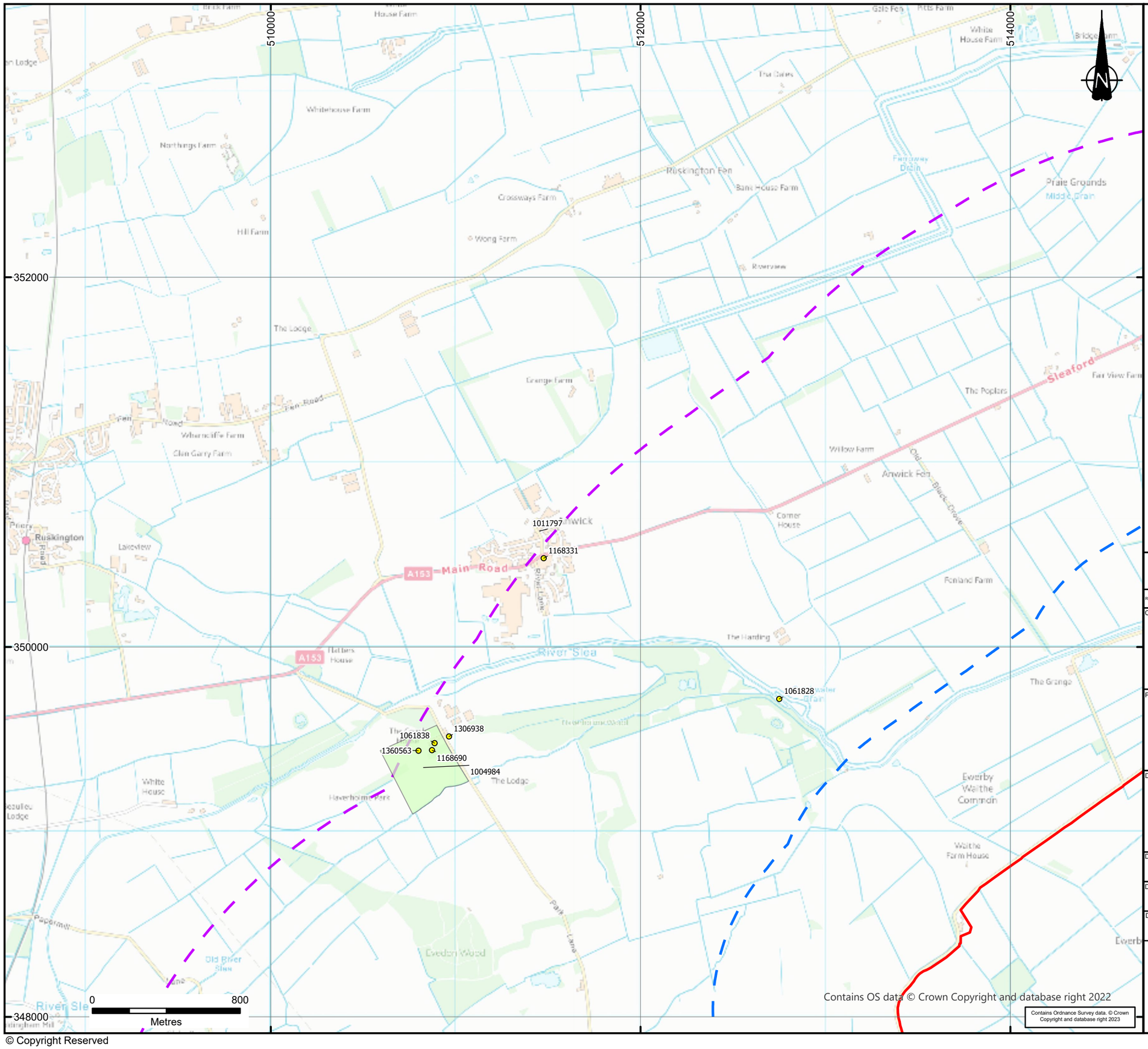

KEY

- Site Boundary
- 1km Study Area
- 3km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
- Grade II*
- Grade II

Conservation Areas

Notes:

Boundaries are indicative.

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023

REVISION	DETAILS	DATE	DRAWN	CHKD	APPD
A	FIRST ISSUE	13/4/23	EL	VA-J	LG

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BEACON FEN ENERGY PARK LTD

PROJECT

BEACON FEN ENERGY PARK

DRAWING TITLE

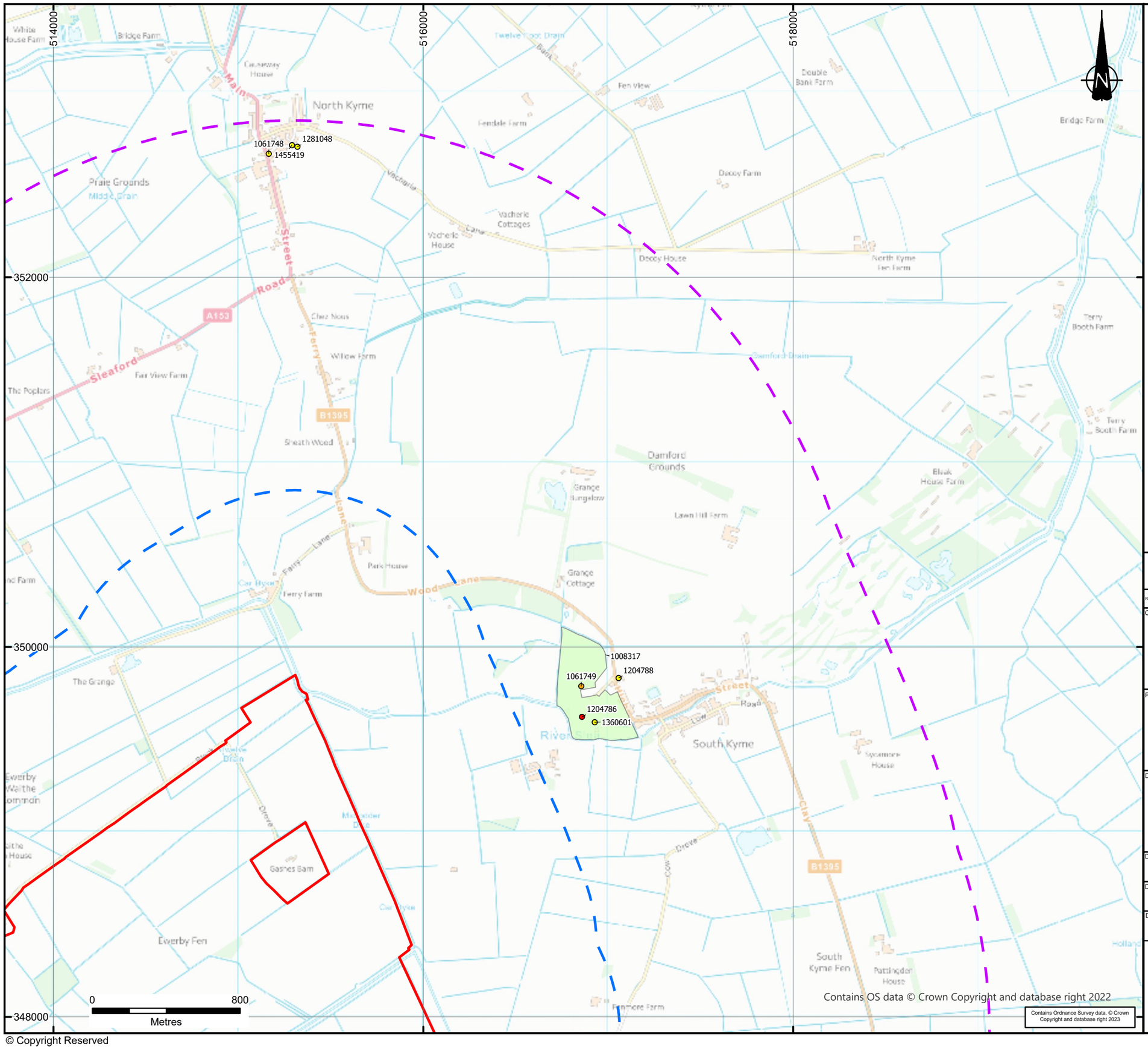
FIGURE 6.2
DESIGNATED HERITAGE ASSETS
BETWEEN 1KM AND 3KM FROM THE SITE

DRG No.	REV
ST19595-030 (Sheet 2 of 11)	A

DRG SIZE	SCALE	DATE
A3	1:20,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

wardell armstrong



KEY

- Site Boundary
- 1km Study Area
- 3km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
- Grade II*
- Grade II

- Conservation Areas

Notes:

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A	FIRST ISSUE	13/4/23	EL	VA-J	LG

CLIENT

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PROJECT

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DRAWING TITLE

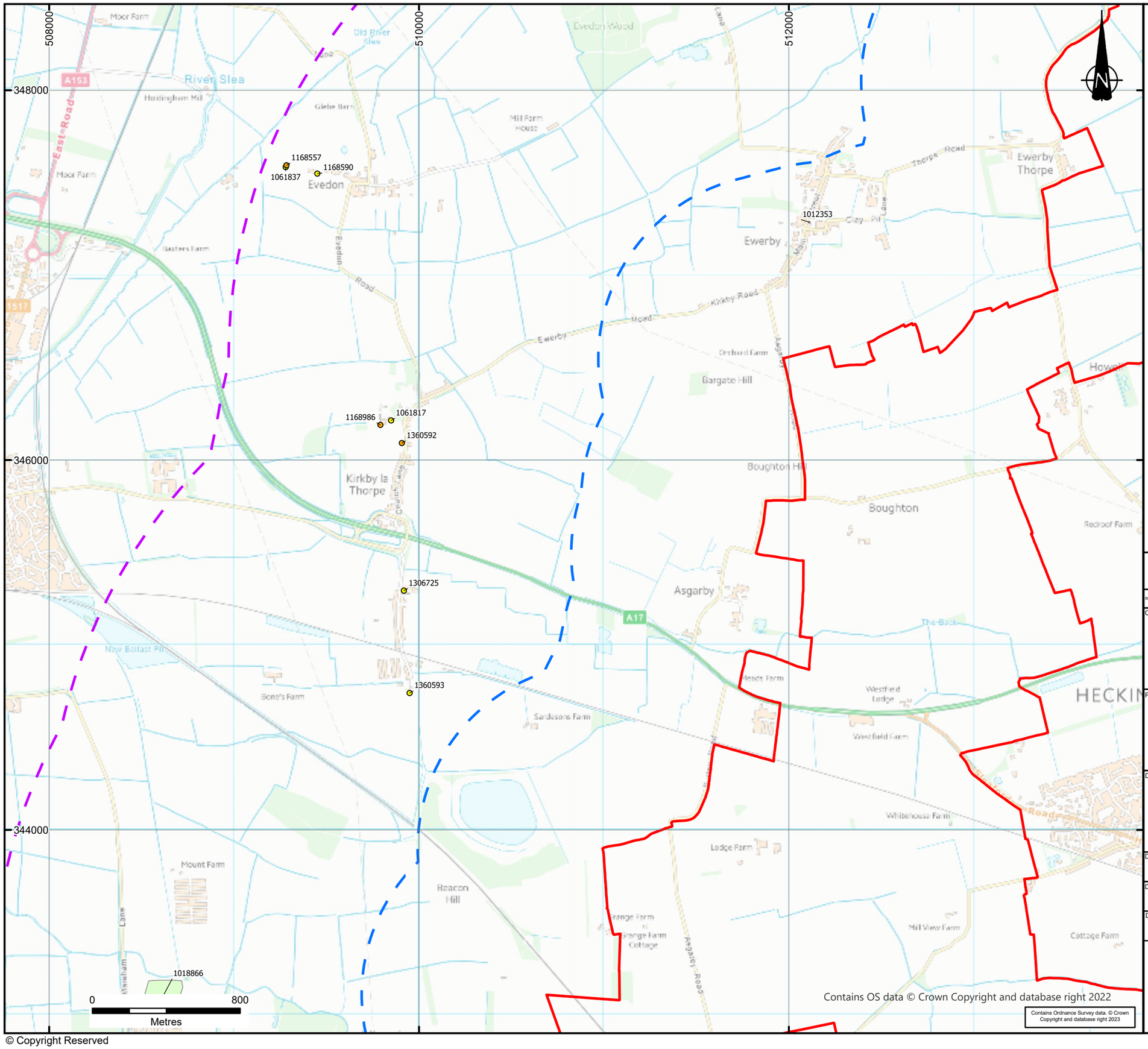
FIGURE 6.2
DESIGNATED HERITAGE ASSETS
BETWEEN 1KM AND 3KM FROM THE SITE

DRG No.	REV
ST19595-030 (Sheet 3 of 11)	A

DRG SIZE	SCALE	DATE
A3	1:20,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

wardell armstrong



KEY

- Site Boundary
- 1km Study Area
- 3km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
- Grade II*
- Grade II

- Conservation Areas

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DRAWING TITLE

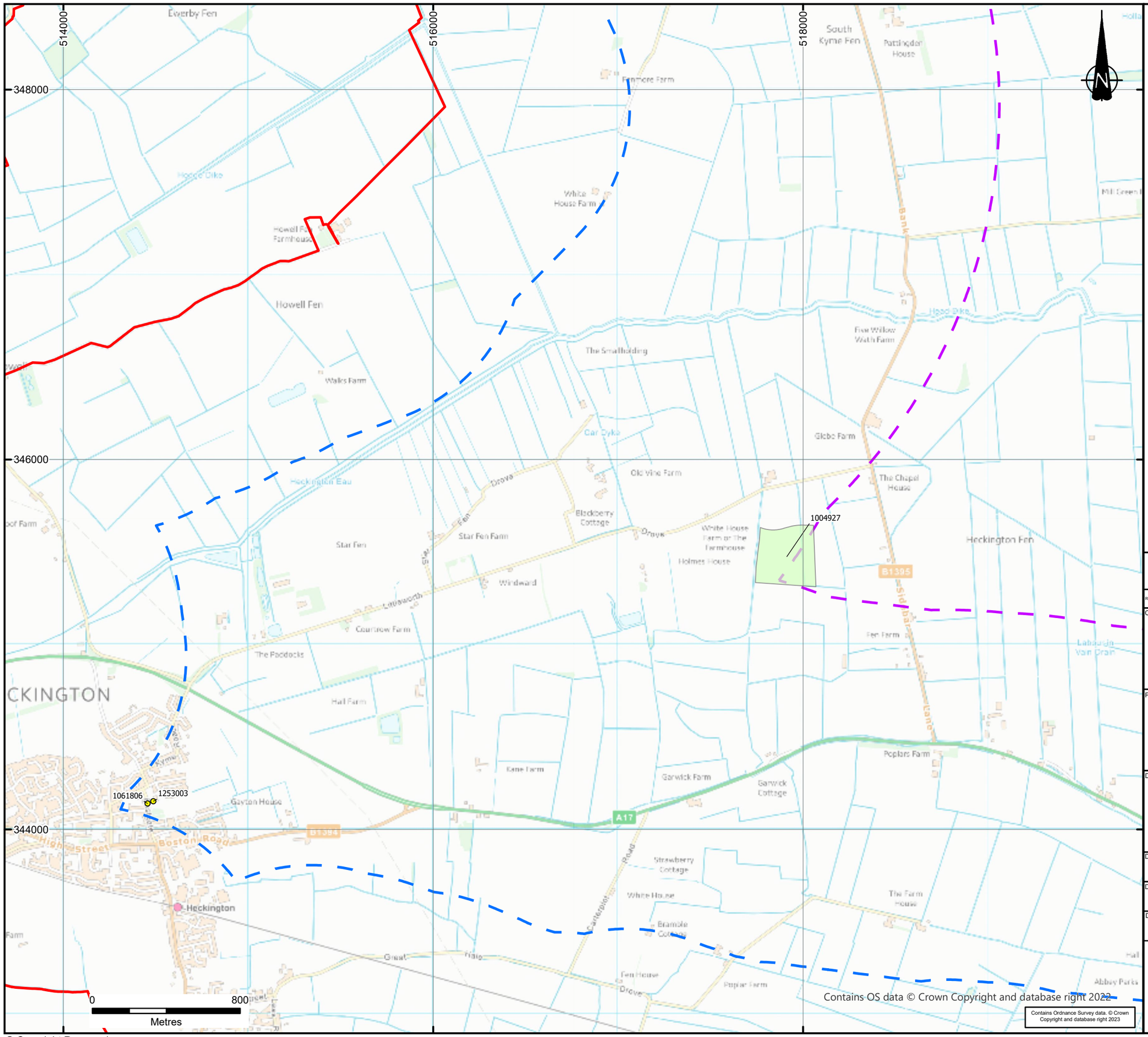
FIGURE 6.2
DESIGNATED HERITAGE ASSETS
BETWEEN 1KM AND 3KM FROM THE SITE

DRG No.	REV
ST19595-030 (Sheet 4 of 11)	A

DRG SIZE	SCALE	DATE
A3	1:20,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

wardell armstrong



KEY

- Site Boundary
- 1km Study Area
- 3km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
- Grade II*
- Grade II

Conservation Areas

Notes:

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PROJECT

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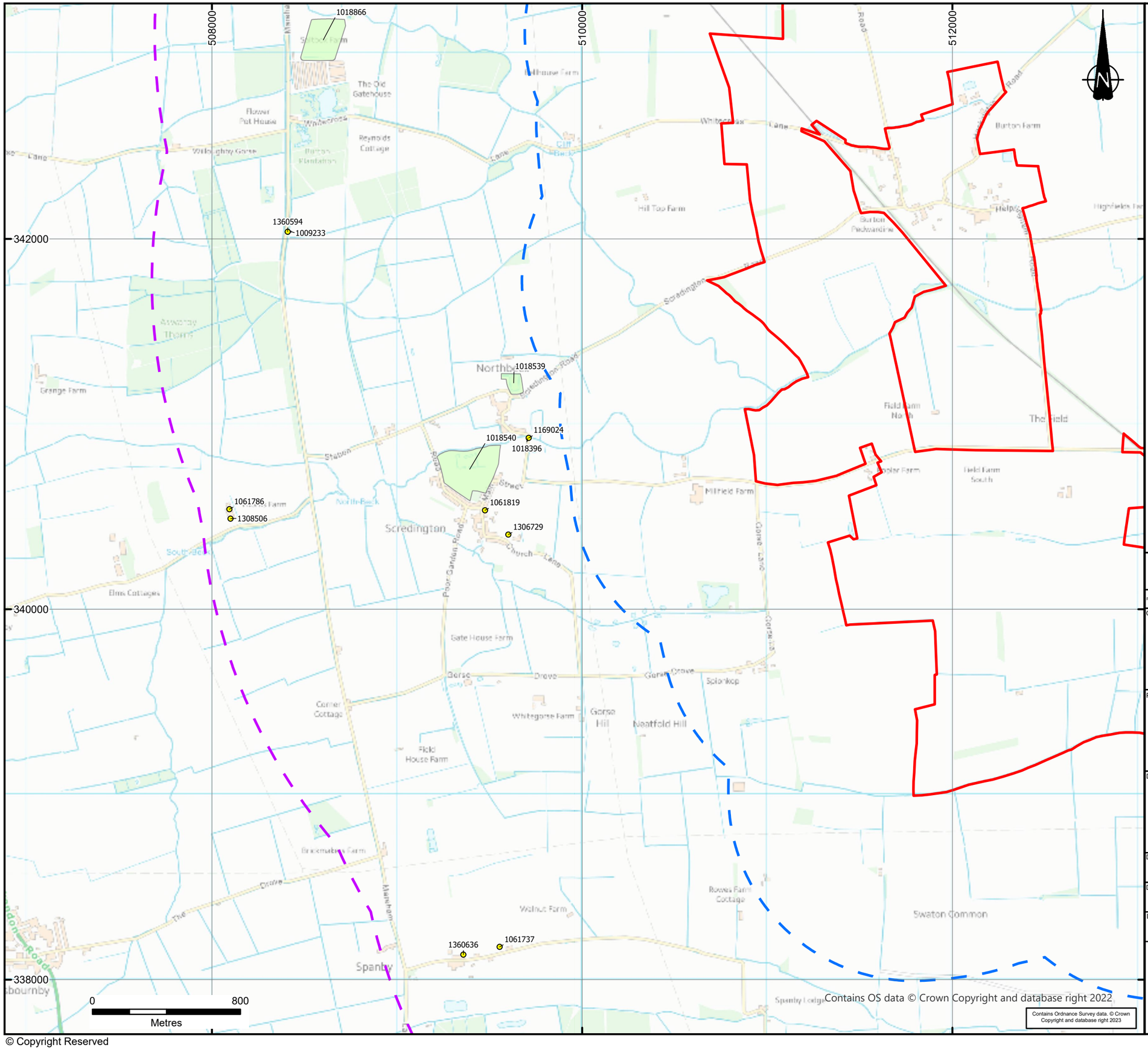
DRAWING TITLE

FIGURE 6.2
DESIGNATED HERITAGE ASSETS
BETWEEN 1KM AND 3KM FROM THE SITE

DRG No.		REV
ST19595-030 (Sheet 5 of 11)		A
DRG SIZE	SCALE	DATE
A3	1:20,000	14/04/2023
DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

wardell armstrong



KEY

- Site Boundary
- 1km Study Area
- 3km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
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- Grade II
- Conservation Areas

Notes:

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A	FIRST ISSUE	13/4/23	EL	VA-J	LG

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PROJECT

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DRAWING TITLE

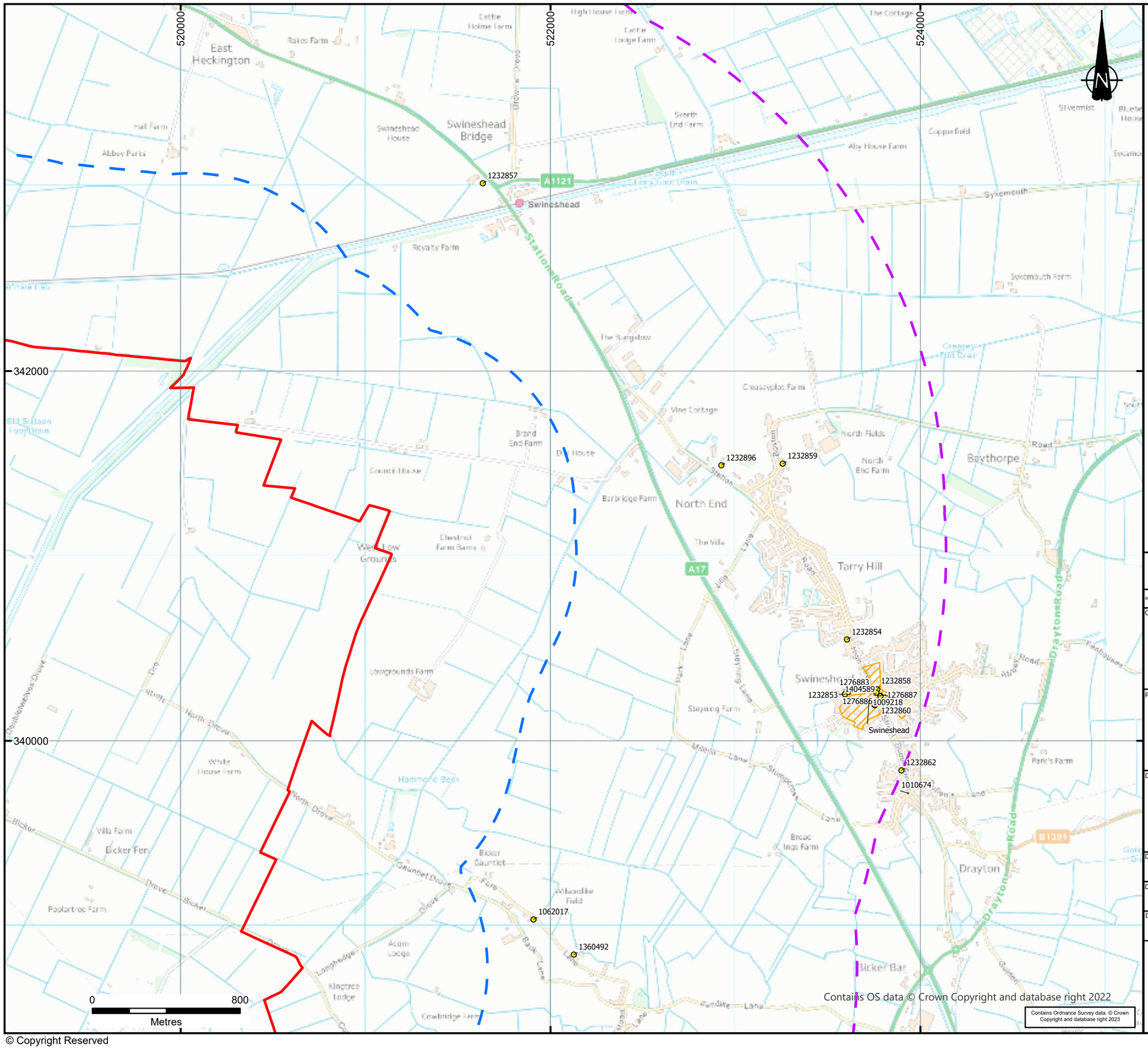
FIGURE 6.2
DESIGNATED HERITAGE ASSETS
BETWEEN 1KM AND 3KM FROM THE SITE

DRG No.	REV
ST19595-030 (Sheet 6 of 11)	A

DRG SIZE	SCALE	DATE
A3	1:20,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

wardell armstrong



KEY

- Site Boundary
- 1km Study Area
- 3km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
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- Grade II
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Notes:

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DRAWING TITLE

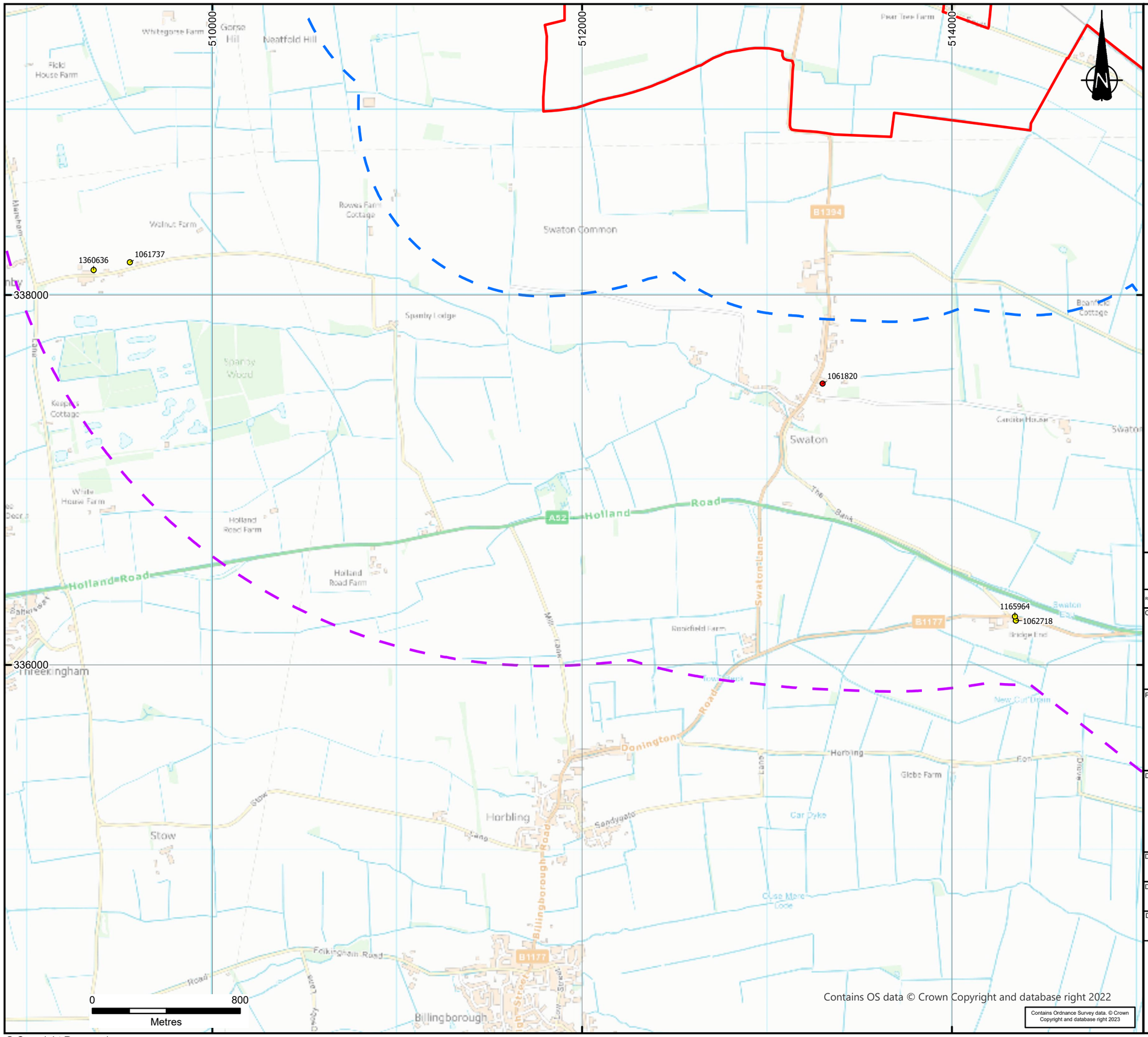
FIGURE 6.2
DESIGNATED HERITAGE ASSETS
BETWEEN 1KM AND 3KM FROM THE SITE

DRG No.	REV
ST19595-030 (Sheet 7 of 11)	A

DRG SIZE	SCALE	DATE
A3	1:20,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

wardell armstrong



KEY

- Site Boundary
- 1km Study Area
- 3km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
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- Grade II

- Conservation Areas

Notes:

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PROJECT

BEACON FEN ENERGY PARK

DRAWING TITLE

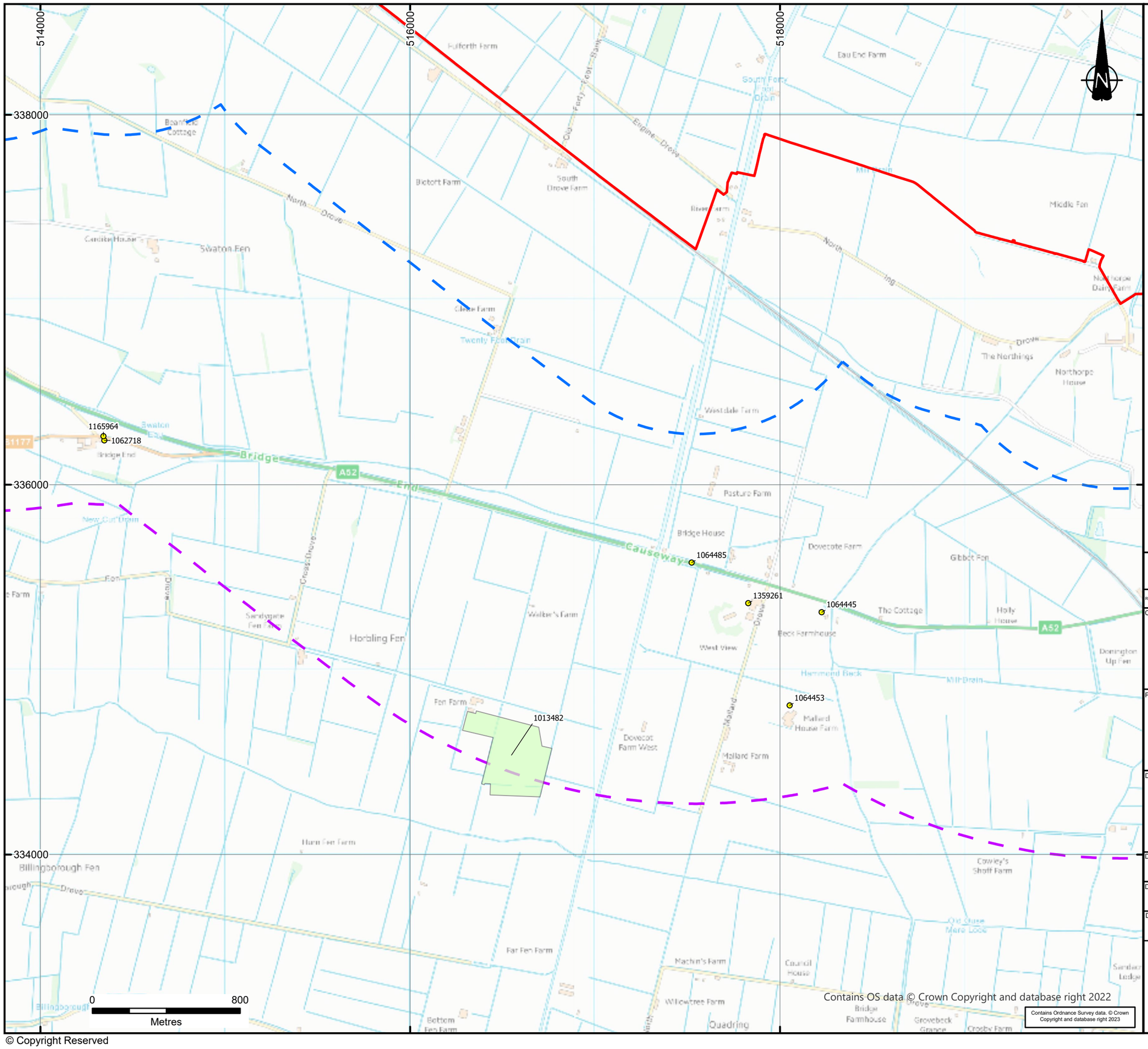
FIGURE 6.2
DESIGNATED HERITAGE ASSETS
BETWEEN 1KM AND 3KM FROM THE SITE

DRG No.	REV
ST19595-030 (Sheet 8 of 11)	A

DRG SIZE	SCALE	DATE
A3	1:20,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

wardell armstrong



KEY

- Site Boundary
- 1km Study Area
- 3km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
- Grade II*
- Grade II
- Conservation Areas

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PROJECT

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DRAWING TITLE

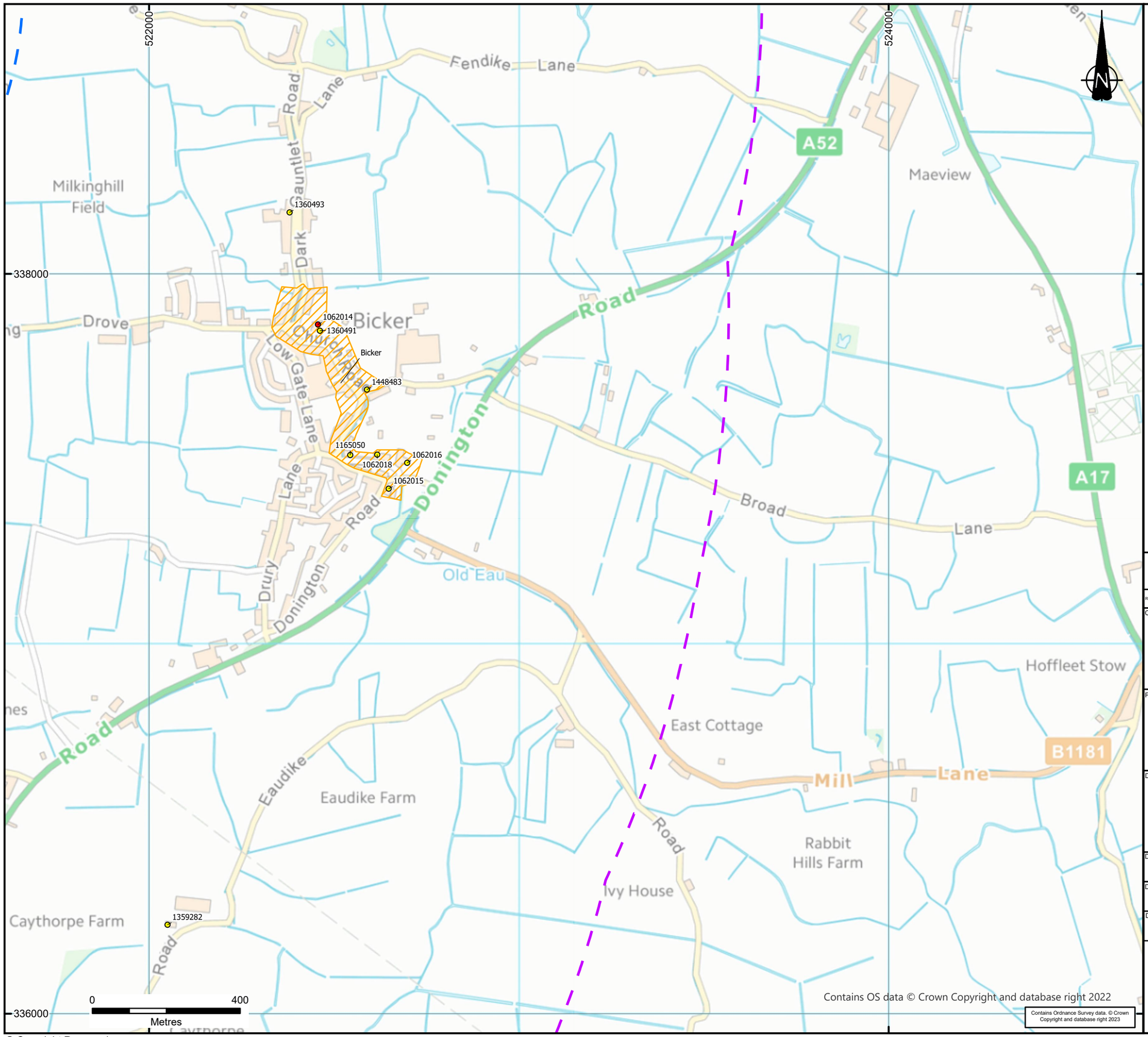
FIGURE 6.2
DESIGNATED HERITAGE ASSETS
BETWEEN 1KM AND 3KM FROM THE SITE

DRG No.	REV
ST19595-030 (Sheet 9 of 11)	A

DRG SIZE	SCALE	DATE
A3	1:20,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

wardell armstrong



KEY

- Site Boundary
- 1km Study Area
- 3km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
- Grade II*
- Grade II

- Conservation Areas

Notes:

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A	FIRST ISSUE	13/4/23	EL	VA-J	LG

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PROJECT

BEACON FEN ENERGY PARK

DRAWING TITLE

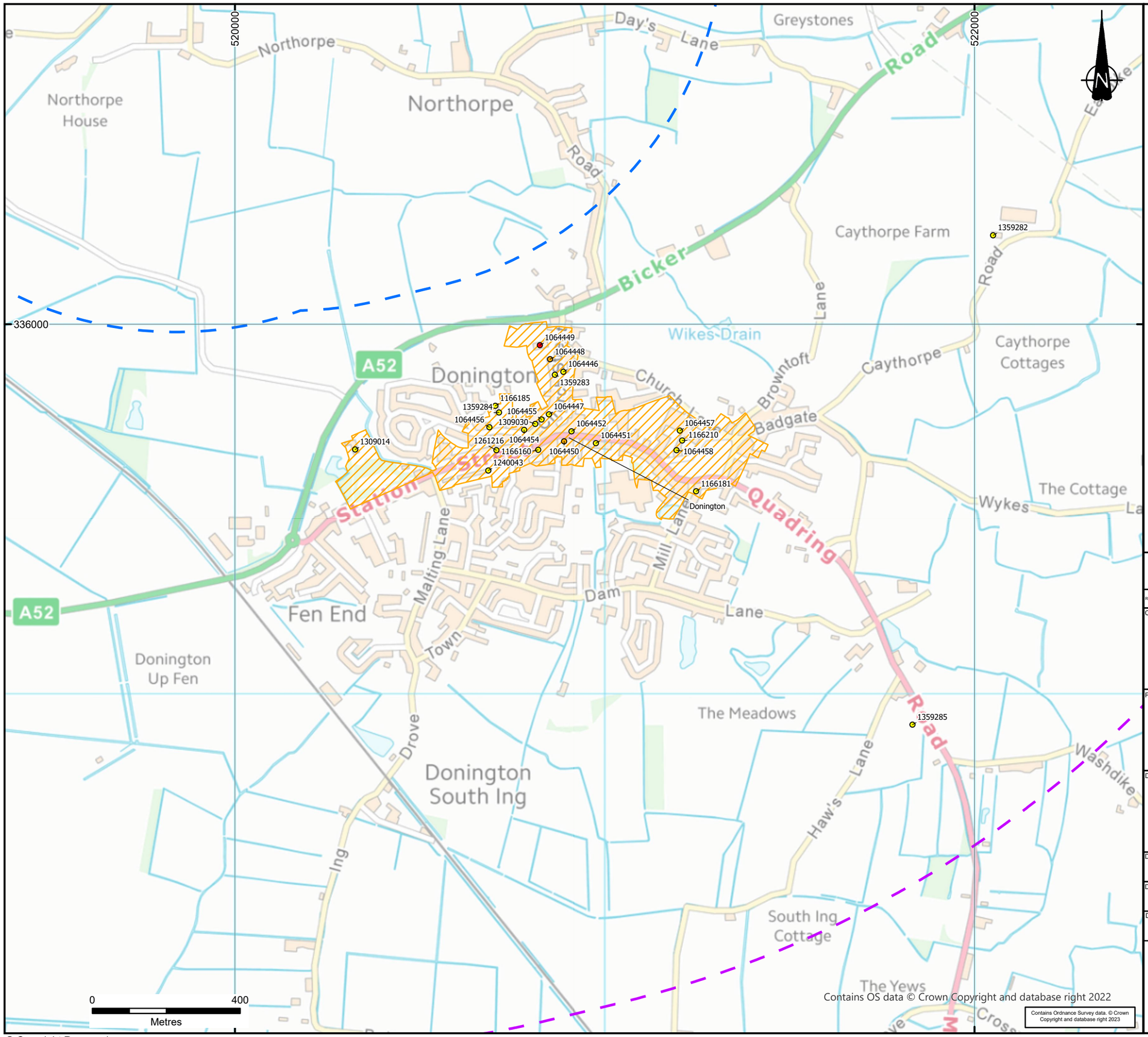
FIGURE 6.2
DESIGNATED HERITAGE ASSETS
BETWEEN 1KM AND 3KM FROM THE SITE

DRG No.	REV
ST19595-030 (Sheet 10 of 11)	A

DRG SIZE	SCALE	DATE
A3	1:10,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

wardell armstrong



KEY

- Site Boundary
- 1km Study Area
- 3km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
- Grade II*
- Grade II
- Conservation Areas

Notes:

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PROJECT

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DRAWING TITLE

FIGURE 6.2
DESIGNATED HERITAGE ASSETS
BETWEEN 1KM AND 3KM FROM THE SITE

DRG No.		REV
ST19595-030 (Sheet 11 of 11)		A
DRG SIZE	SCALE	DATE
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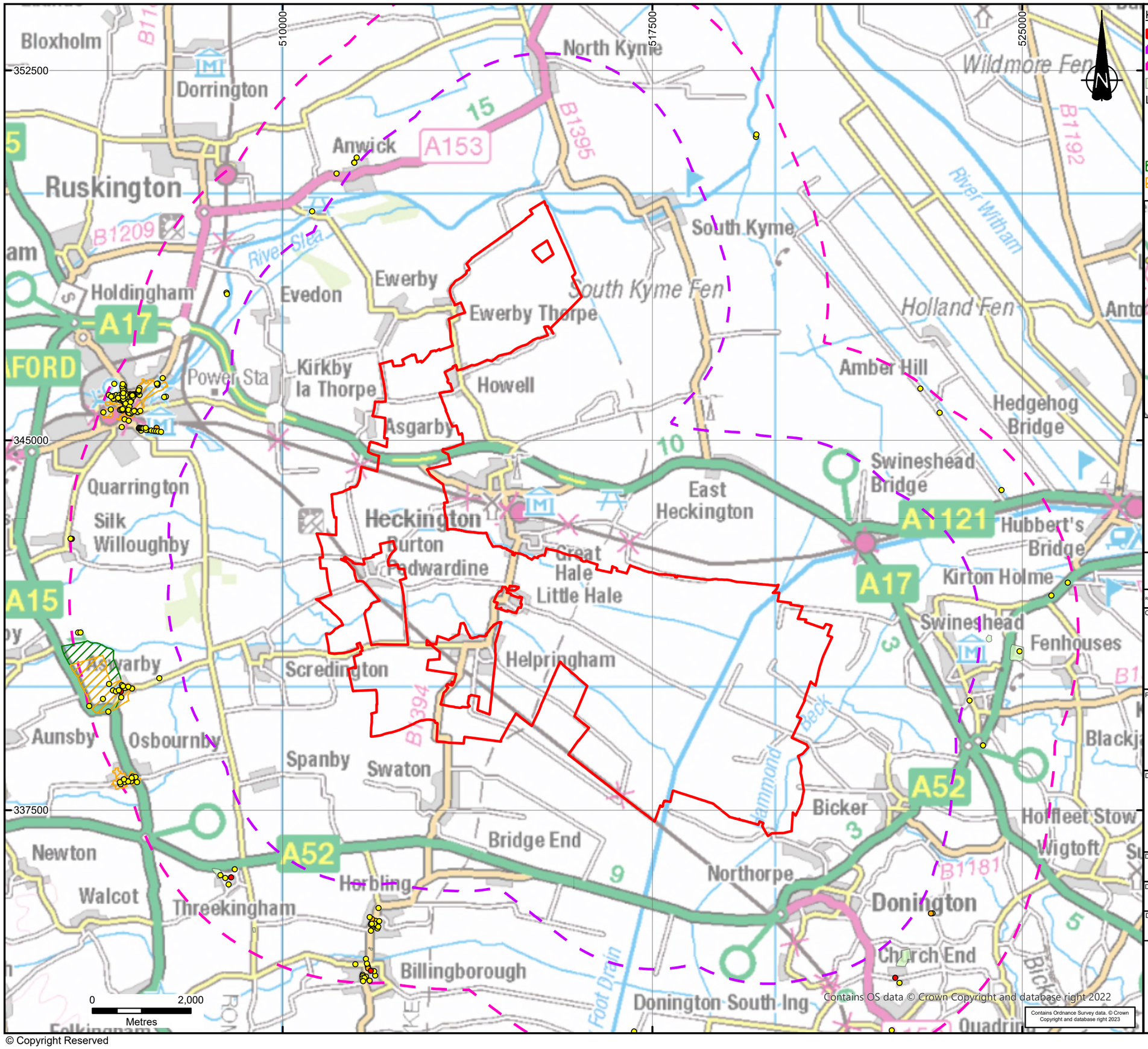
DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

wardell armstrong



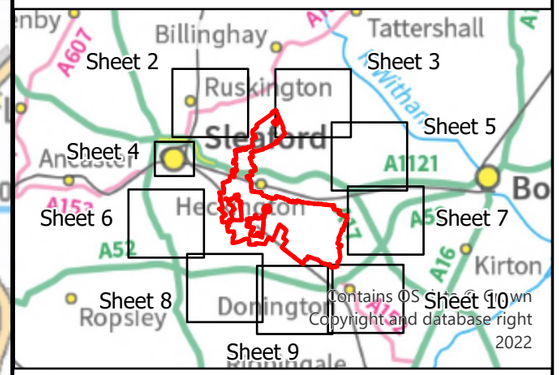
KEY

- Site Boundary
- 3km Study Area
- 5km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
- Grade II*
- Grade II

- Aswerby Registered Parks and Gardens
- Conservation Areas



Notes:

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A	FIRST ISSUE	13/4/23	EL	VA-J	LG

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BEACON FEN ENERGY PARK LTD

PROJECT

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DRAWING TITLE

FIGURE 6.3
DESIGNATED HERITAGE ASSETS
BETWEEN 3KM AND 5KM FROM THE SITE

DRG No.	REV
ST19595-031 (Sheet 1 of 10)	A

DRG SIZE	SCALE	DATE
A3	1:75,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
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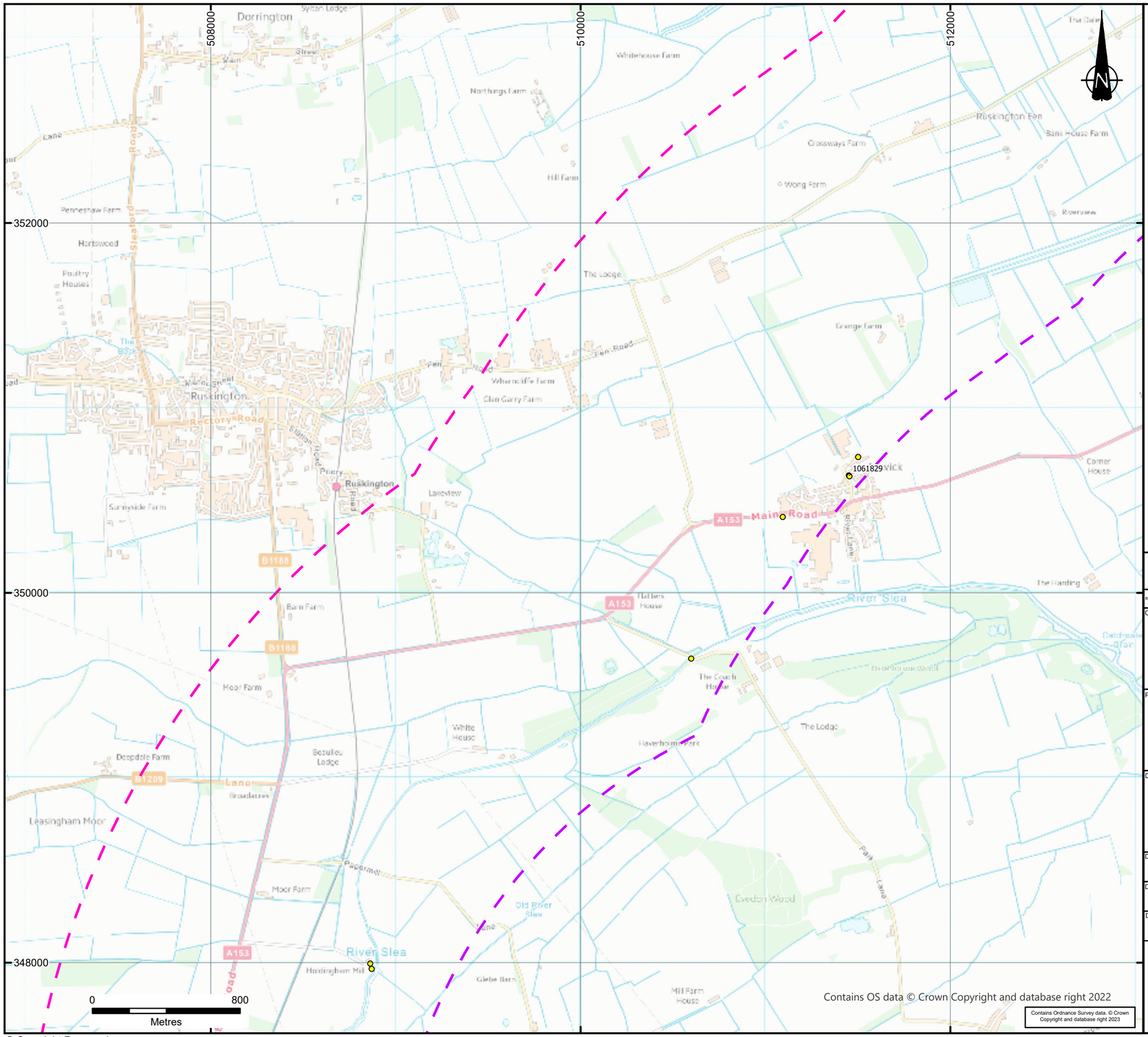

KEY

- Site Boundary
- 5km Study Area
- 3km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
- Grade II*
- Grade II

- Aswerby Registered Parks and Gardens
- Conservation Areas

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PROJECT

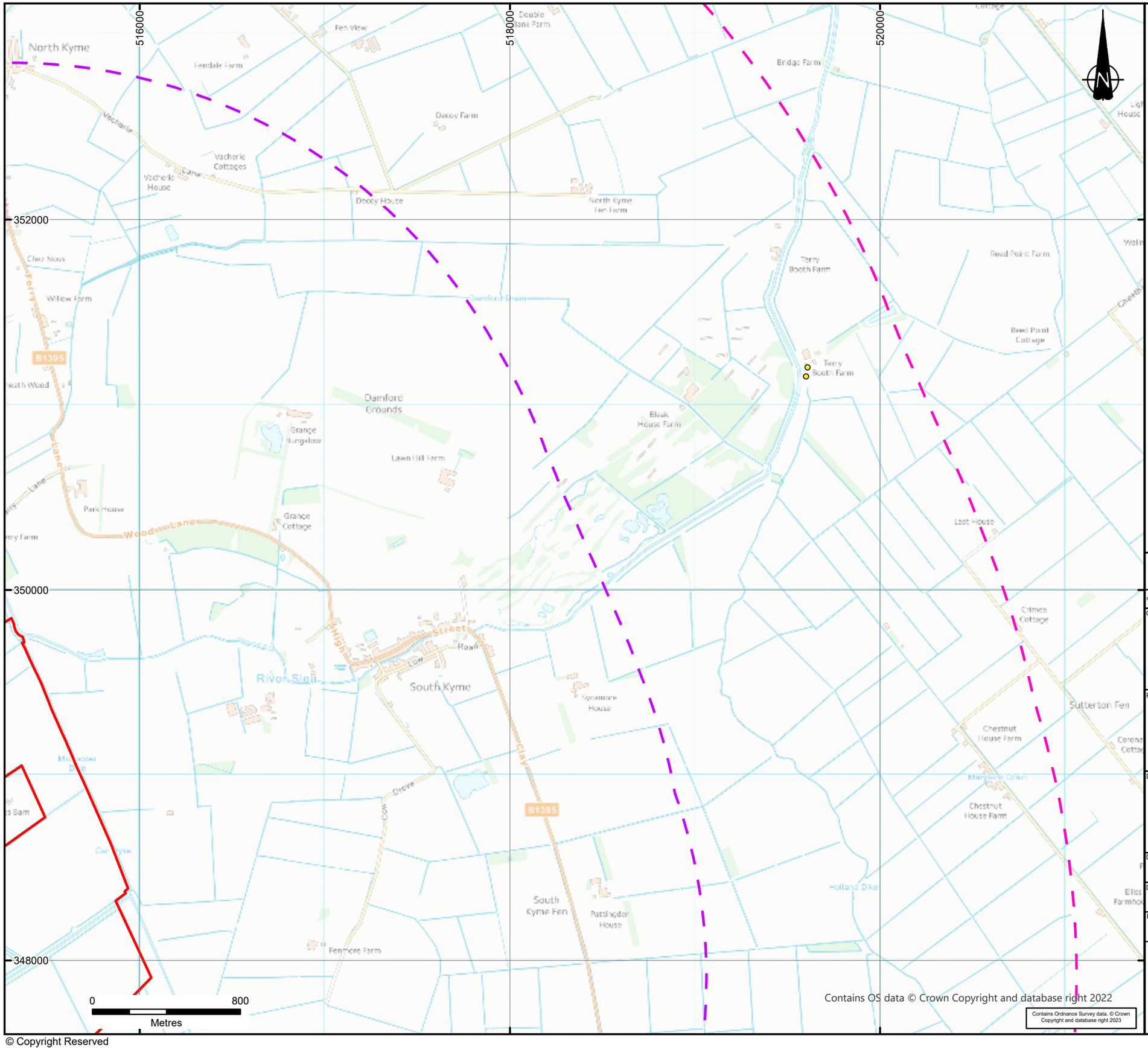
BEACON FEN ENERGY PARK

DRAWING TITLE

FIGURE 6.3
DESIGNATED HERITAGE ASSETS
BETWEEN 3KM AND 5KM FROM THE SITE

DRG No.		REV
ST19595-031 (Sheet 2 of 10)		A
DRG SIZE	SCALE	DATE
A3	1:20,000	14/04/2023
DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

wardell armstrong



KEY

- Site Boundary
- 5km Study Area
- 3km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
- Grade II*
- Grade II

- Aswerby Registered Parks and Gardens
- Conservation Areas

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FIGURE 6.3
DESIGNATED HERITAGE ASSETS
BETWEEN 3KM AND 5KM FROM THE SITE

DRG No.		REV
ST19595-031 (Sheet 3 of 10)		A
DRG SIZE	SCALE	DATE
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DRAWN BY	CHECKED BY	APPROVED BY
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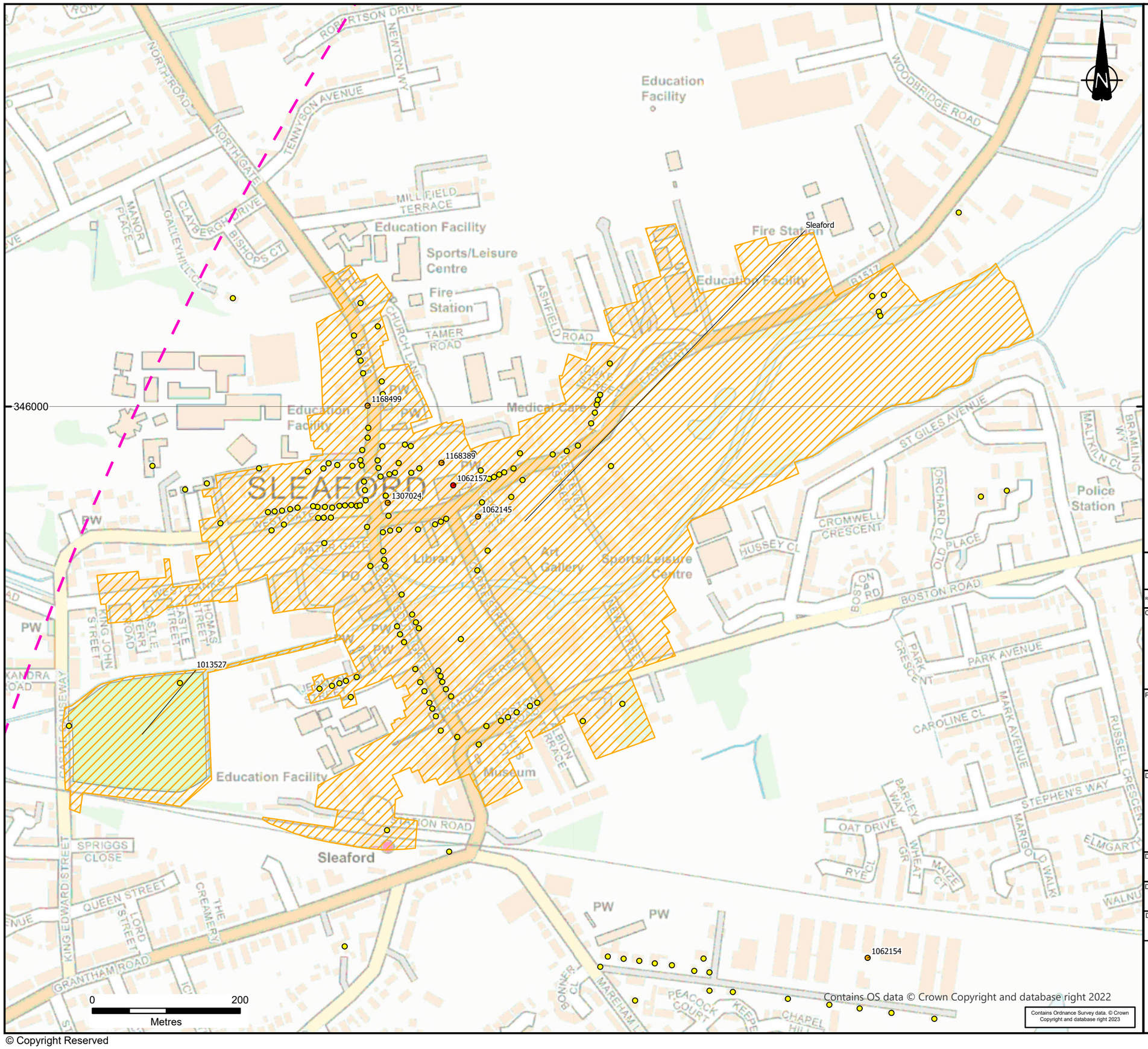

KEY

- Site Boundary
- 5km Study Area
- 3km Study Area
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Listed Buildings

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- Grade II*
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DRAWING TITLE

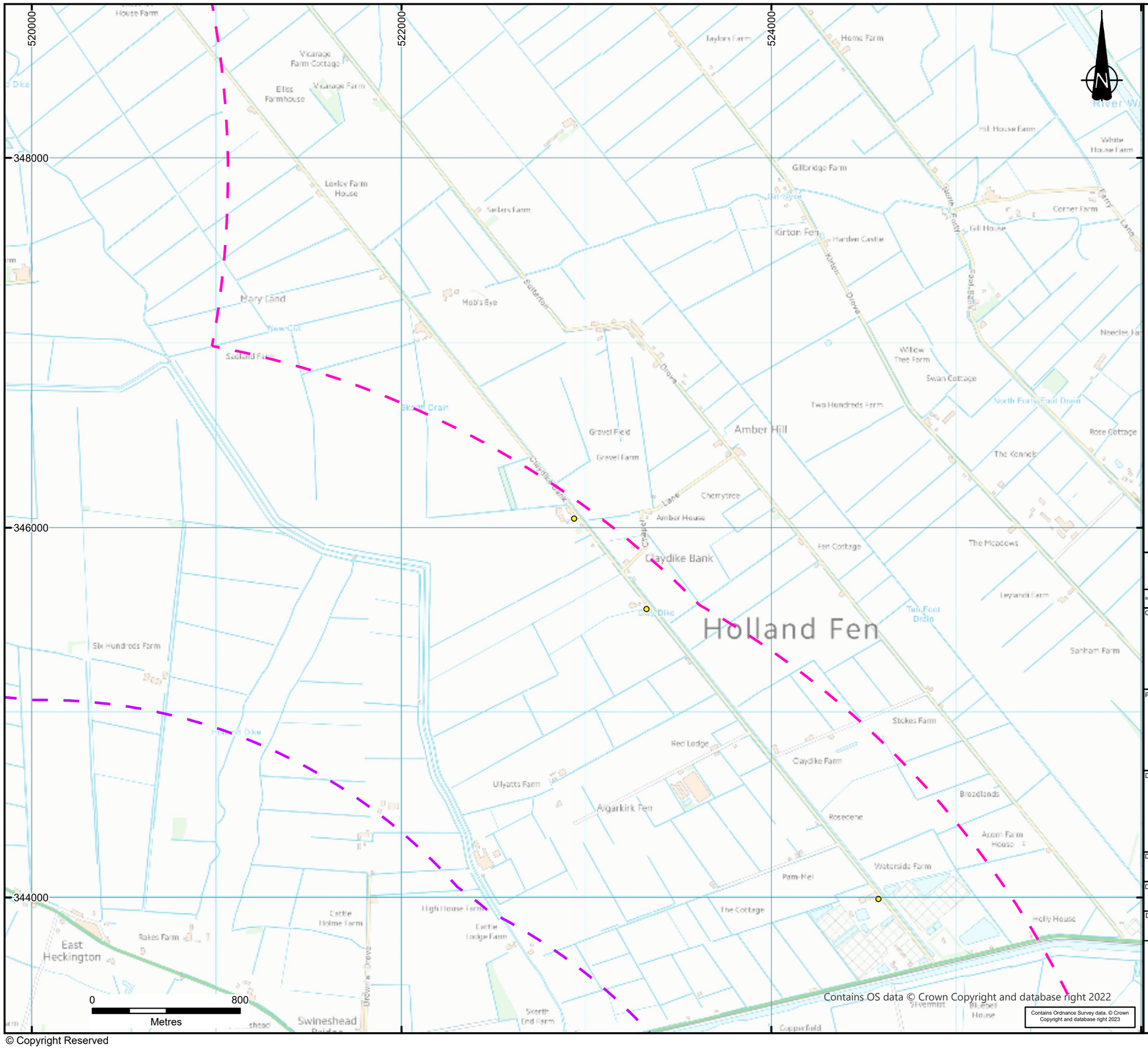
FIGURE 6.3
DESIGNATED HERITAGE ASSETS
BETWEEN 3KM AND 5KM FROM THE SITE

DRG No.	REV
ST19595-031 (Sheet 4 of 10)	A

DRG SIZE	SCALE	DATE
A3	1:5,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

wardell armstrong



KEY

- Site Boundary
- 5km Study Area
- 3km Study Area
- Scheduled Monuments

Listed Buildings

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- Grade II*
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DRAWING TITLE

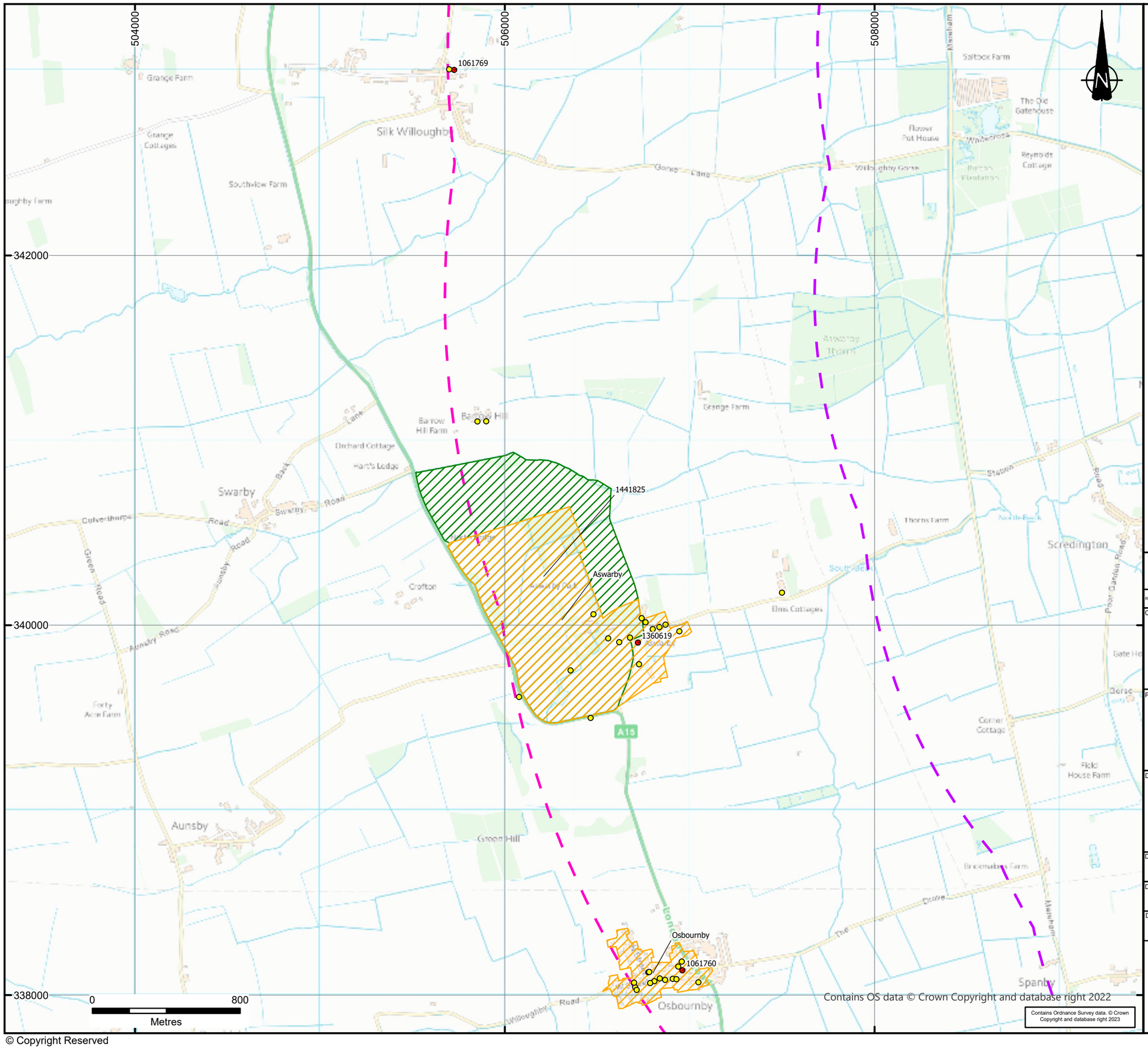
FIGURE 6.3
DESIGNATED HERITAGE ASSETS
BETWEEN 3KM AND 5KM FROM THE SITE

DRG No.	REV
ST19595-031 (Sheet 5 of 10)	A

DRG SIZE	SCALE	DATE
A3	1:20,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

wardell armstrong



KEY

- Site Boundary
- 5km Study Area
- 3km Study Area
- Scheduled Monuments

Listed Buildings

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- Grade II*
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DRAWING TITLE

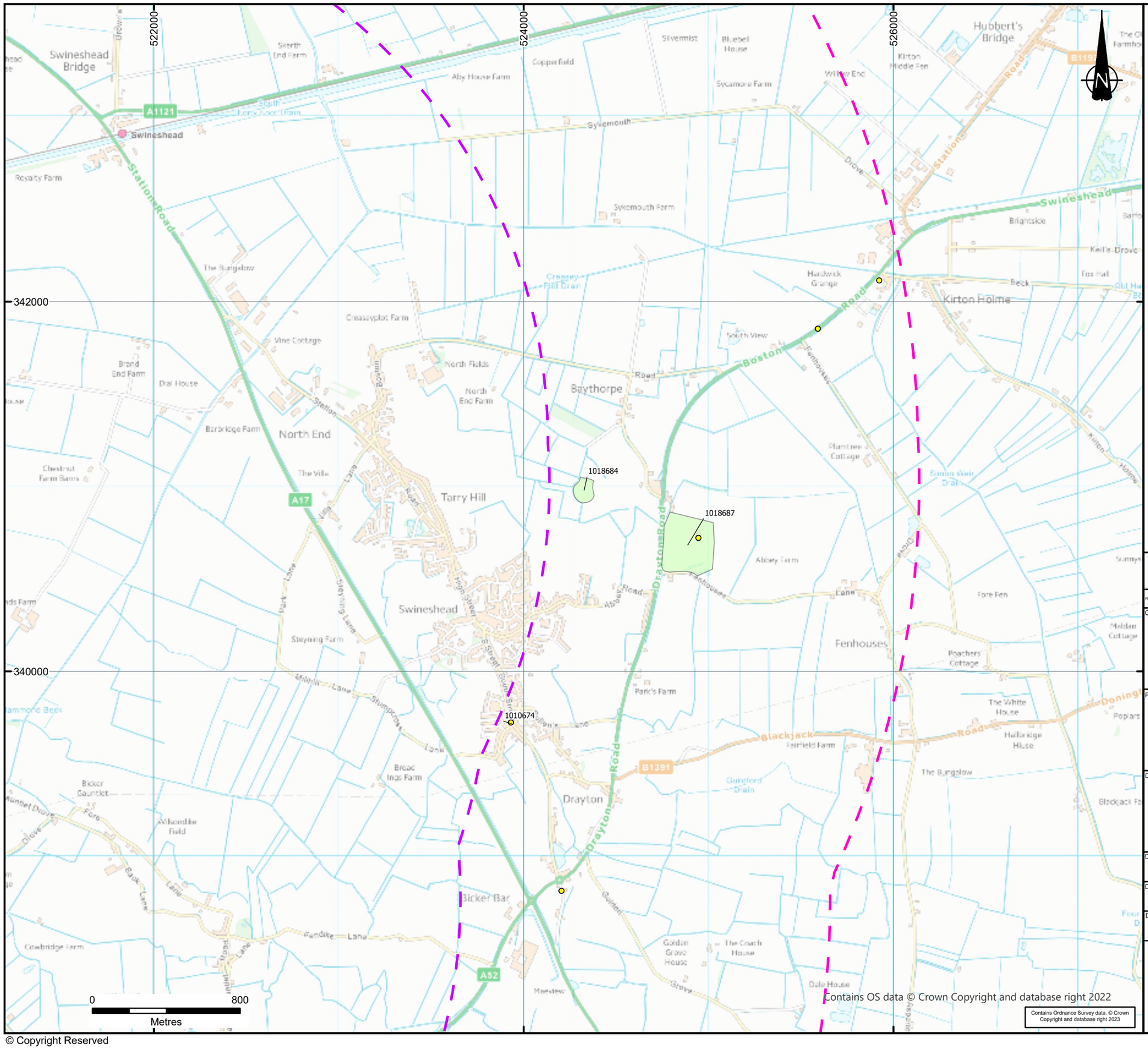
FIGURE 6.3
DESIGNATED HERITAGE ASSETS
BETWEEN 3KM AND 5KM FROM THE SITE

DRG No.	REV
ST19595-031 (Sheet 6 of 10)	A

DRG SIZE	SCALE	DATE
A3	1:20,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

wardell armstrong



KEY

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- 5km Study Area
- 3km Study Area
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Listed Buildings

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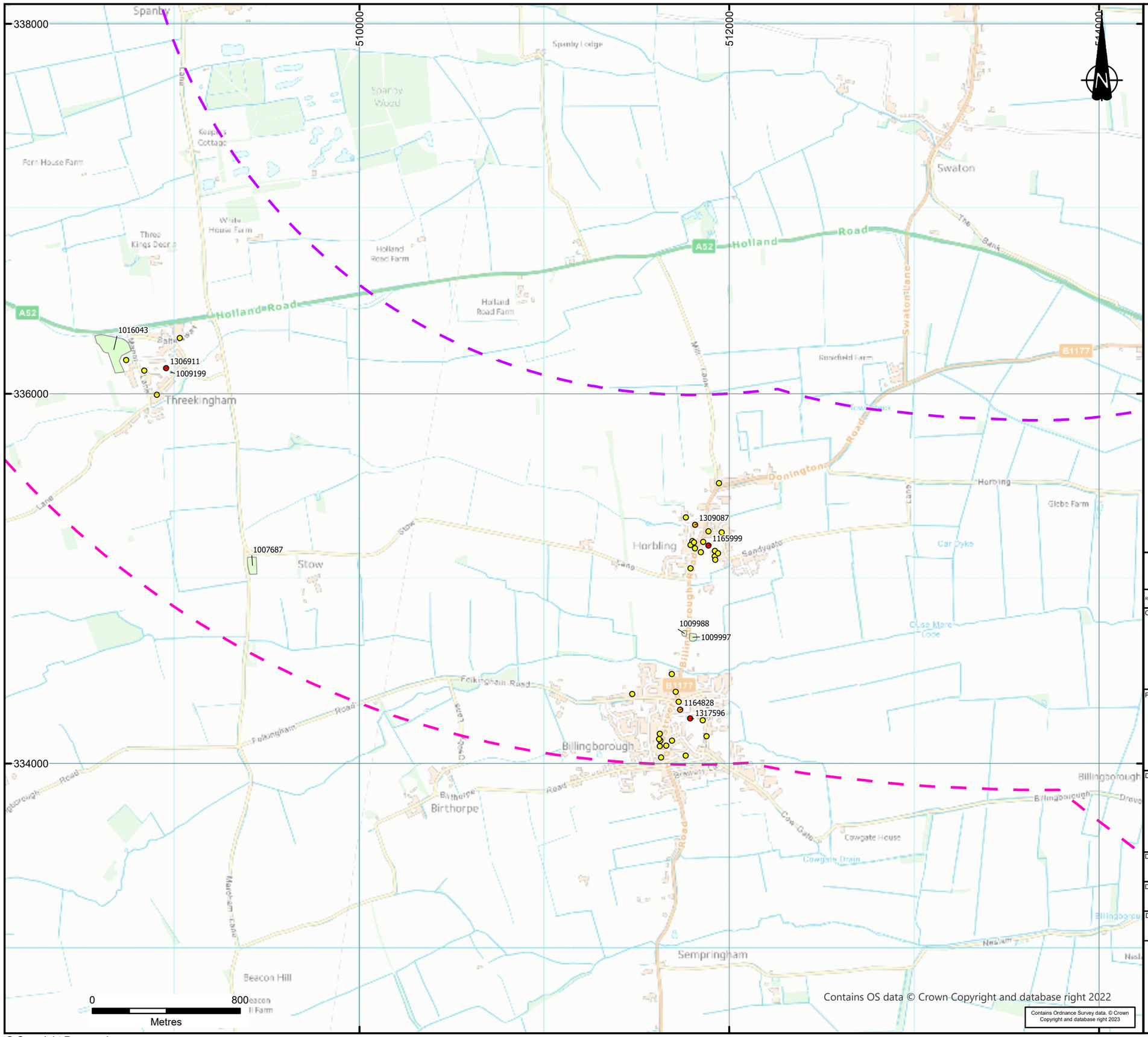
FIGURE 6.3
DESIGNATED HERITAGE ASSETS
BETWEEN 3KM AND 5KM FROM THE SITE

DRG No.	REV
ST19595-031 (Sheet 7 of 10)	A

DRG SIZE	SCALE	DATE
A3	1:20,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

wardell armstrong



KEY

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REVISION	DETAILS	DATE	DRAWN	CHKD	APP'D
A	FIRST ISSUE	13/4/23	EL	VA-J	LG

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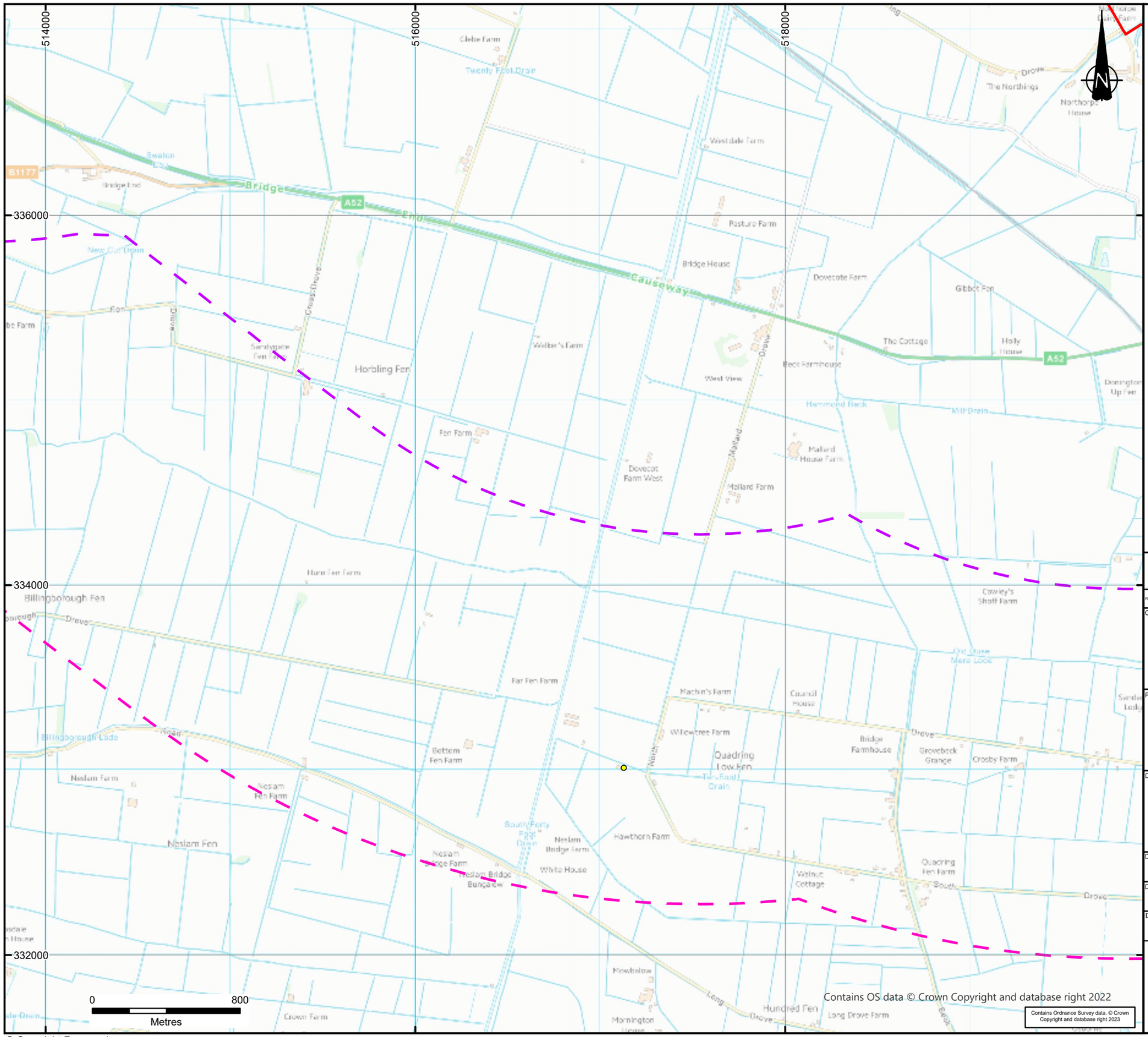
DRAWING TITLE

FIGURE 6.3
DESIGNATED HERITAGE ASSETS
BETWEEN 3KM AND 5KM FROM THE SITE

DRG No. ST19595-031 (Sheet 8 of 10)		REV A
DRG SIZE A3	SCALE 1:20,000	DATE 14/04/2023
DRAWN BY EL	CHECKED BY VA-J	APPROVED BY LG

wardell armstrong



KEY

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- 5km Study Area
- 3km Study Area
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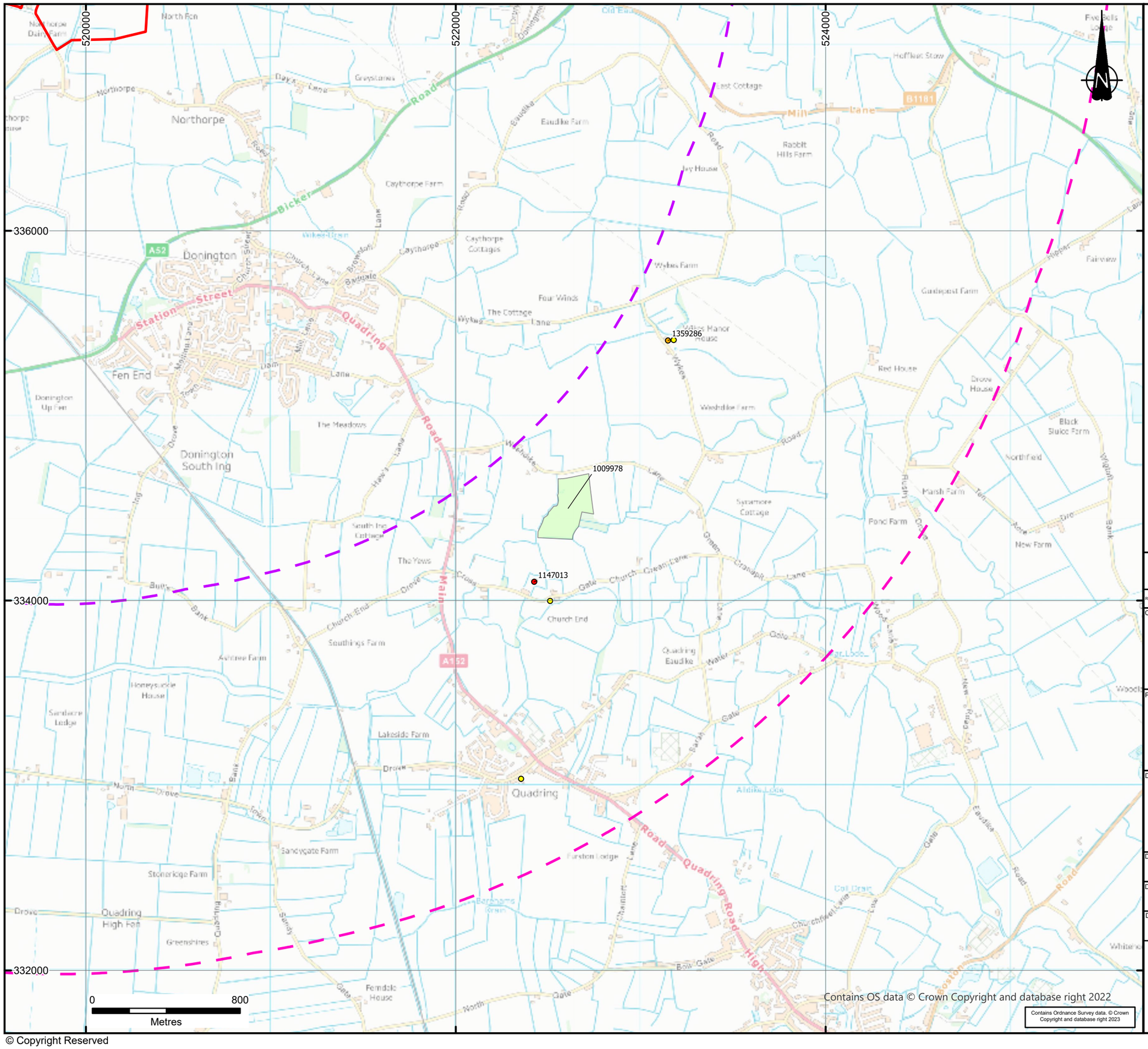
FIGURE 6.3
DESIGNATED HERITAGE ASSETS
BETWEEN 3KM AND 5KM FROM THE SITE

DRG No.	REV
ST19595-031 (Sheet 9 of 10)	A

DRG SIZE	SCALE	DATE
A3	1:20,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
EL	VA-J	LG

wardell armstrong



KEY

- Site Boundary
- 5km Study Area
- 3km Study Area
- Scheduled Monuments

Listed Buildings

- Grade I
- Grade II*
- Grade II

- Aswerby Registered Parks and Gardens
- Conservation Areas

Notes:

Boundaries are indicative.

Due to the number of Grade II Listed Buildings only Highly Graded Assets have been labelled.

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FIGURE 6.3
DESIGNATED HERITAGE ASSETS
BETWEEN 3KM AND 5KM FROM THE SITE

DRG No.	REV
ST19595-031 (Sheet 10 of 10)	A

DRG SIZE	SCALE	DATE
A3	1:20,000	14/04/2023

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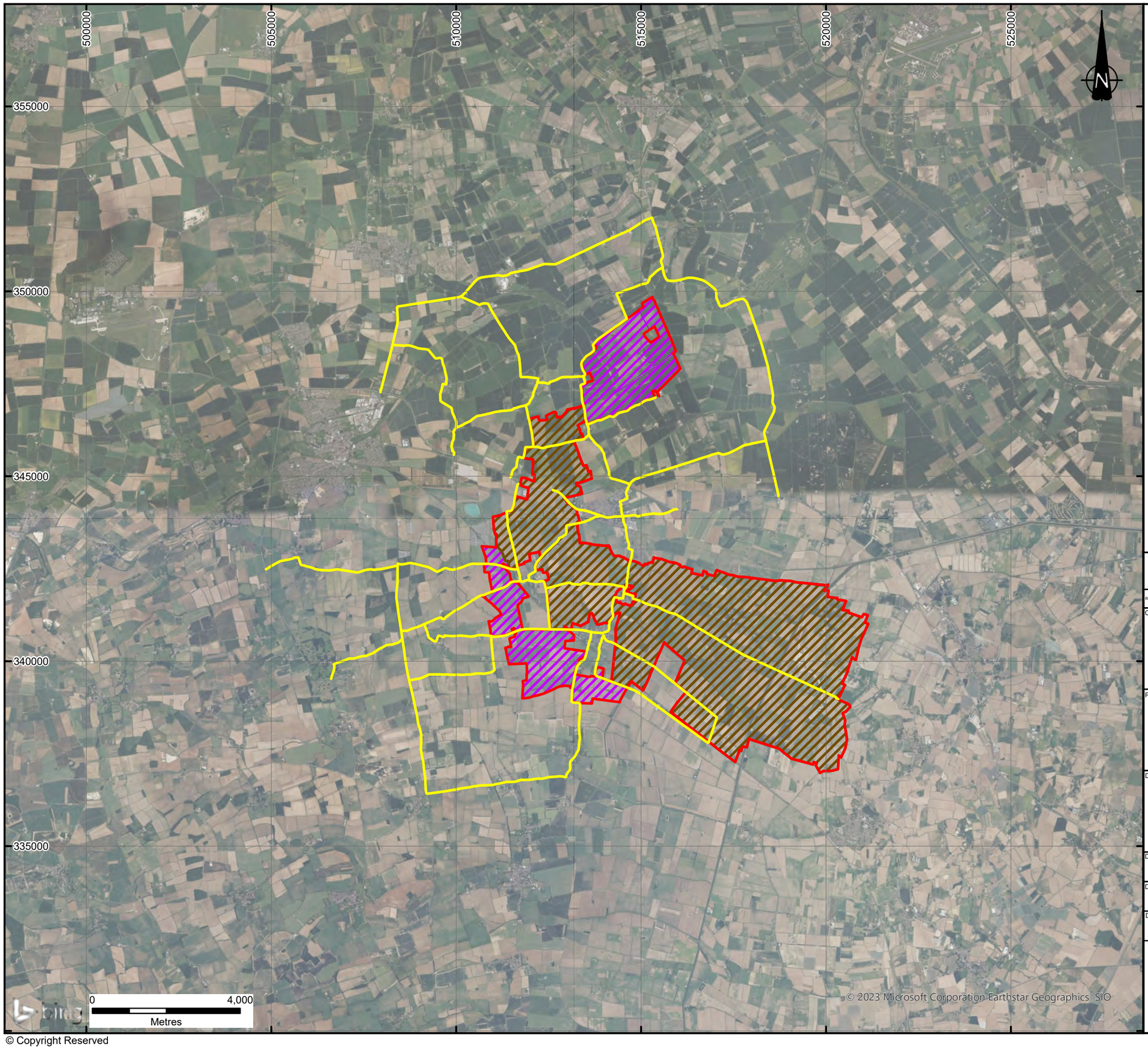

KEY

- Site Including Cable Route
- Cable Route Search Area
- Northern and Sourthern Solar Array Sites
- Study Area

Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023

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FIGURE 7.1
STUDY AREA

DRG No.		REV
ST19595-046		A
DRG SIZE	SCALE	DATE
A3	1:100,000	14/04/2023
DRAWN BY	CHECKED BY	APPROVED BY
RCB	IC	IC

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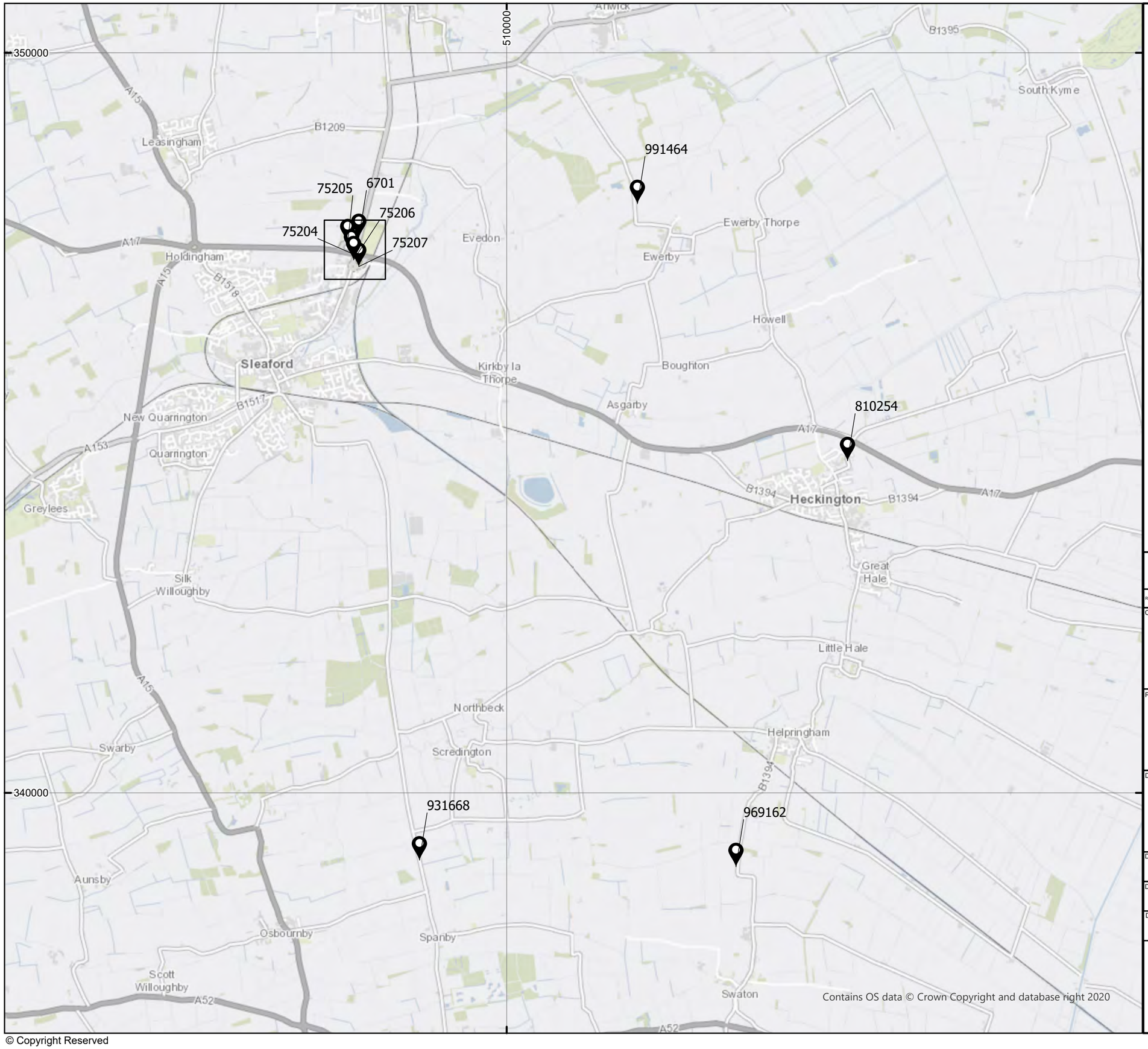
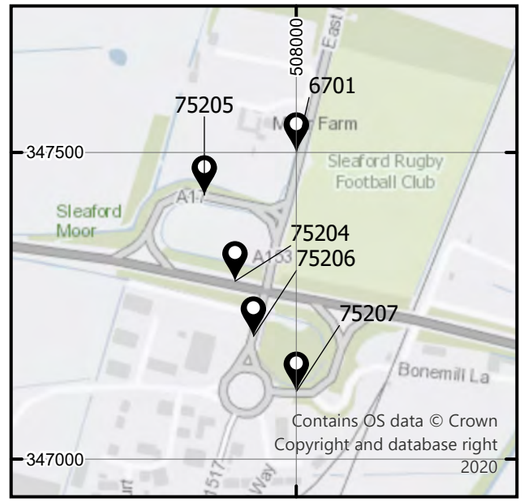


KEY

Count Locations



Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

Count Locations taken from Department of Transport Contains public sector information licensed under the Open Government Licence v3.0

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FIGURE 7.2
COUNT LOCATIONS

DRG No.		REV
ST19595-047		A
DRG SIZE	SCALE	DATE
A3	Inset 1:10,000 1:50,000	14/04/2023
DRAWN BY	CHECKED BY	APPROVED BY
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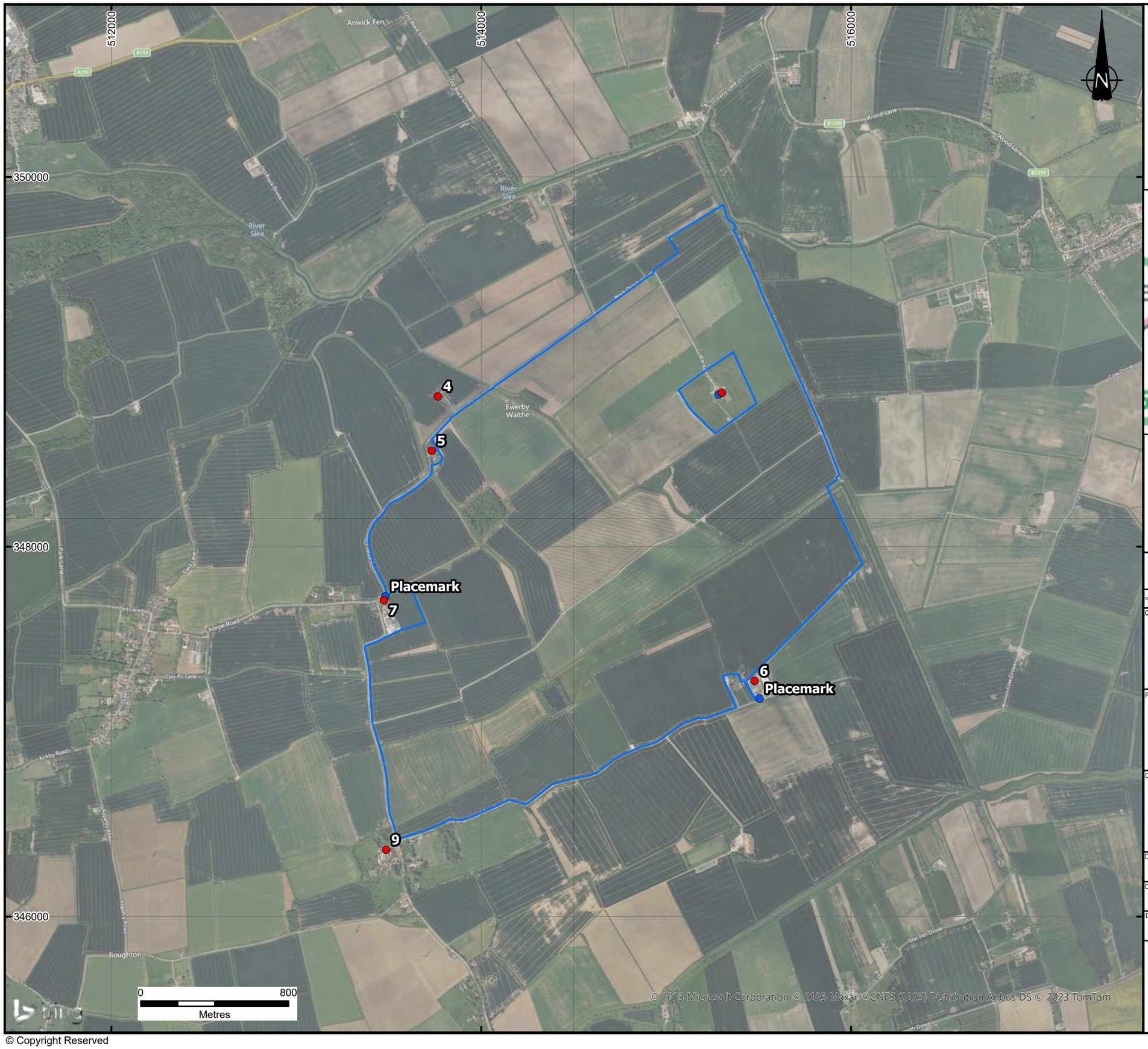
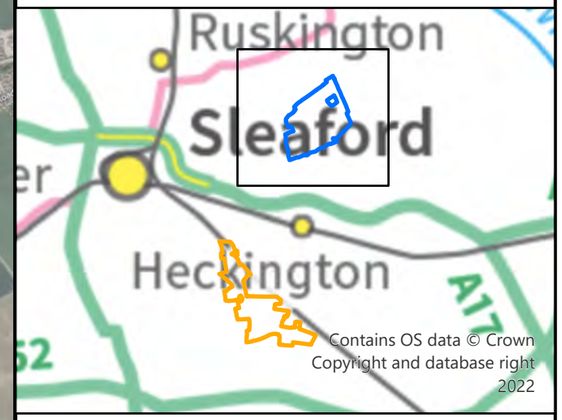


KEY

- Northern Panel Array
- Southern Panel Array
- Suggested Noise Monitoring Locations
- Identified Receptors



Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

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FIGURE 8.1
EXISTING NOISE SENSITIVE RECEPTOR LOCATIONS

DRG No.		REV
ST19595-017 (Sheet 1 of 2)		A
DRG SIZE	SCALE	DATE
A3	1:20,000	14/04/2023
DRAWN BY	CHECKED BY	APPROVED BY
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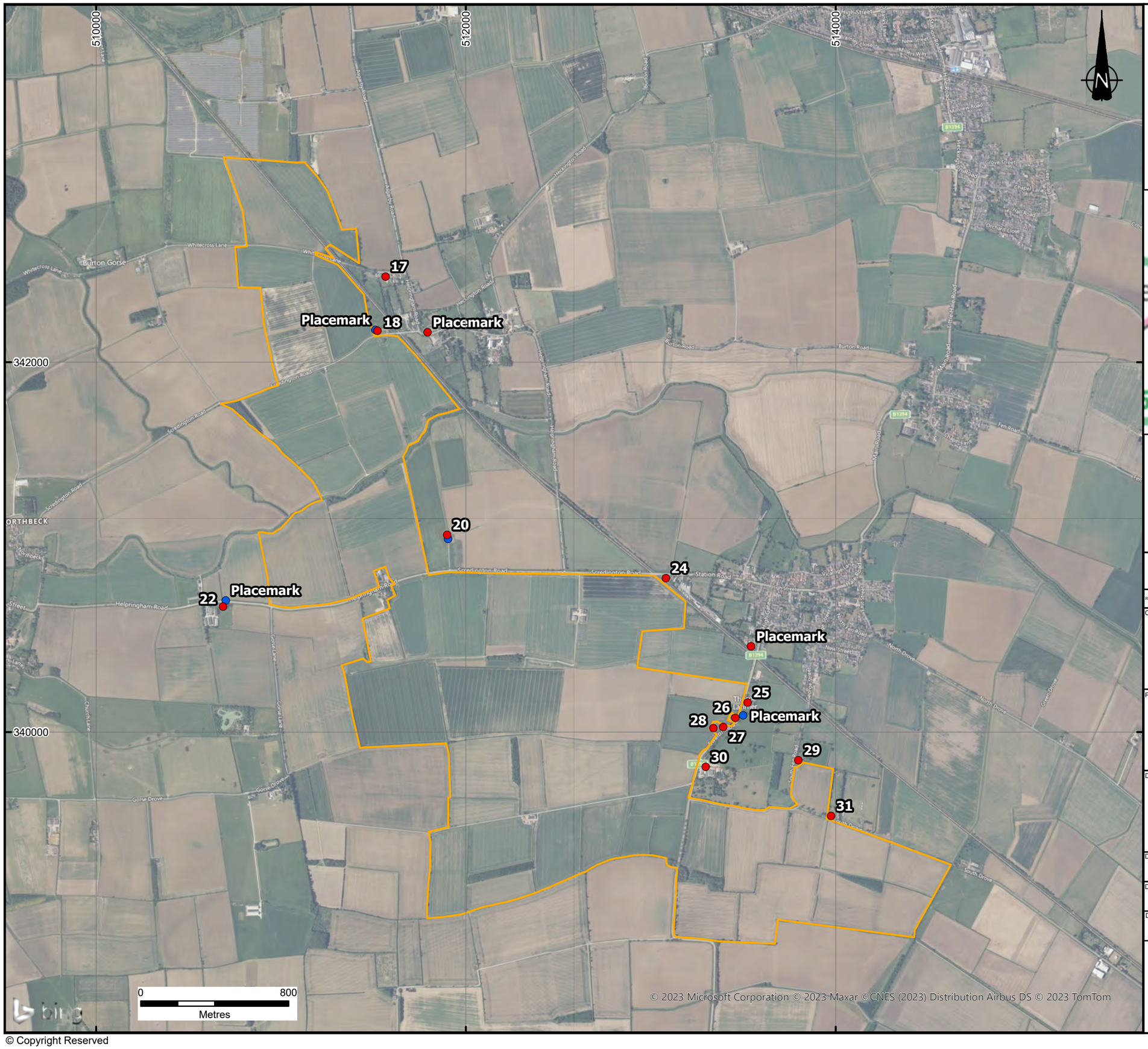
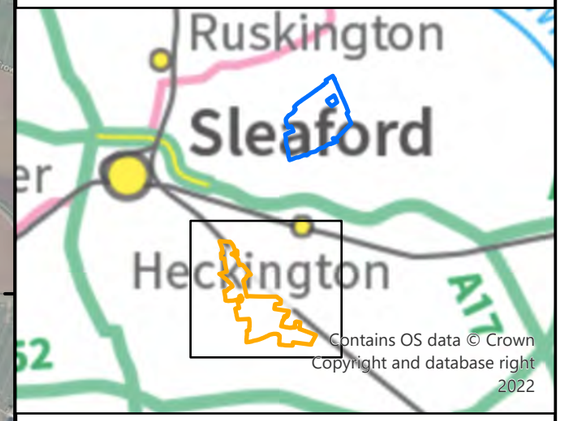


KEY

- Northern Panel Array
- Southern Panel Array
- Suggested Noise Monitoring Locations
- Identified Receptors



Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

REVISION	DETAILS	DATE	DRAWN	CHKD	APPD
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FIGURE 8.2
EXISTING NOISE SENSITIVE RECEPTOR LOCATIONS

DRG No.		REV
ST19595-017 (Sheet 2 of 2)		A
DRG SIZE	SCALE	DATE
A3	1:20,000	14/04/2023
DRAWN BY	CHECKED BY	APPROVED BY
EL	MC	SU

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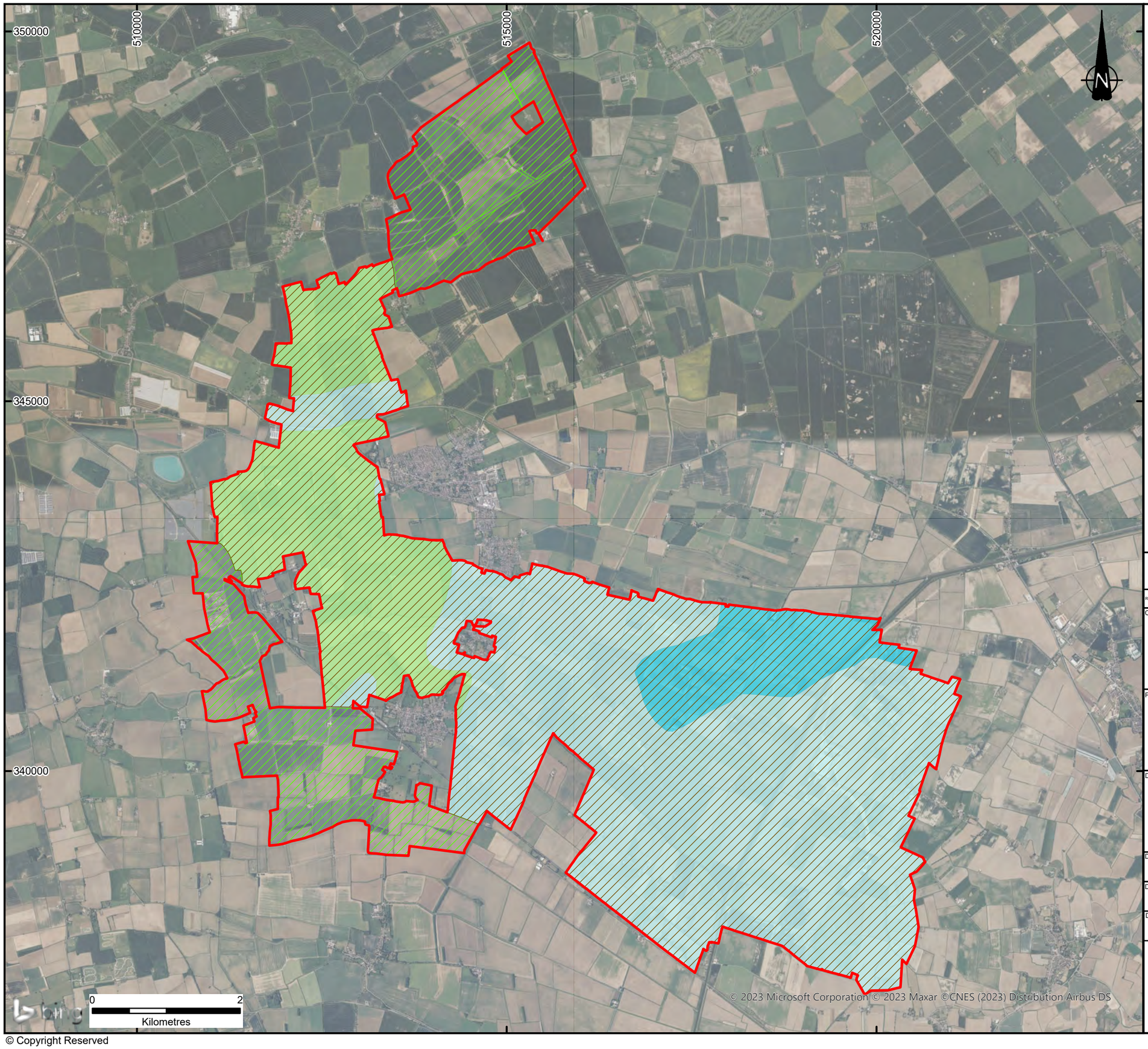

KEY

- Site Boundary
- Cable Route Search Area
- Northern and Southern Solar Array Sites

Provisional Agricultural Land Classification

- Grade 1
- Grade 2
- Grade 3

Agricultural Land Classification	Area (ha)
Grade 1	337.51 ha
Grade 2	2411.9 ha
Grade 3	908.81 ha

Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D
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FIGURE 12.1
PROVISIONAL AGRICULTURAL LAND CLASSIFICATION - CABLE ROUTE SEARCH AREA

DRG No.	REV
ST19595-039	A

DRG SIZE	SCALE	DATE
A3	1:50,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
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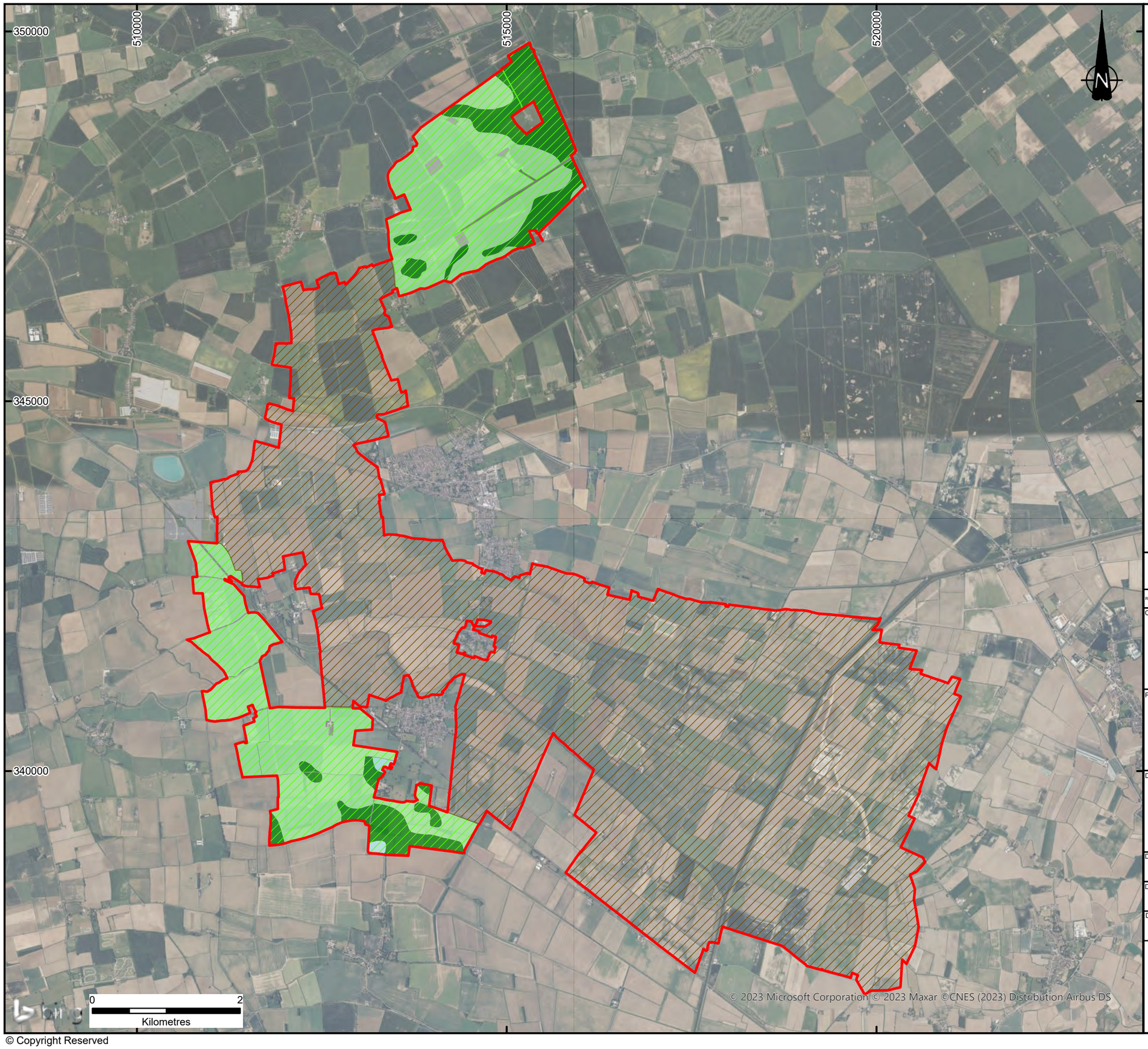

KEY

- Site Boundary
- Cable Route Search Area
- Northern and Southern Solar Array Sites

Post 1988 Agricultural Land Classification

- Grade 2
- Subgrade 3a
- Subgrade 3b
- Non-agricultural

Agricultural Land Classification	Array Area	Area (ha)
Grade 2	Southern	7.39
Subgrade 3a	Southern	75.87
Subgrade 3b	Southern	422.25
Subgrade 3a	Northern	149.88
Subgrade 3b	Northern	362.28
Non-agricultural	Northern	7.33

Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

Site Boundary Provided by client called Corrected_RLB_20230328 dated 28-03-2023

Land at Bicker Fen Post 1988 ALC provided by Land Research Associates 2023.

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FIGURE 12.2
POST 1988 AGRICULTURAL LAND CLASSIFICATION - SOLAR ARRAY SITES

DRG No.	REV
ST19595-040	A

DRG SIZE	SCALE	DATE
A3	1:50,000	14/04/2023

DRAWN BY	CHECKED BY	APPROVED BY
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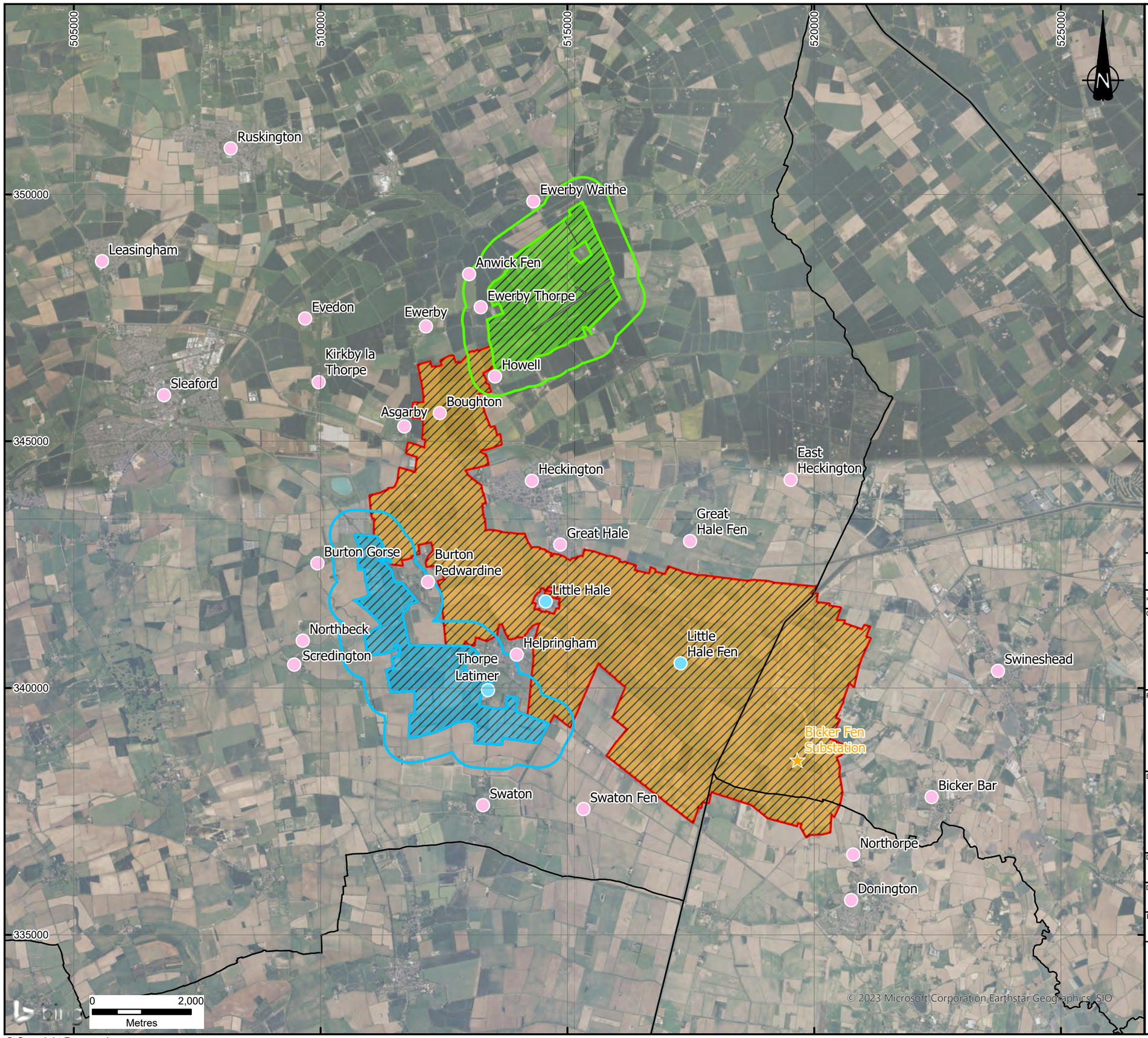

KEY

- Site Boundary
- Cable Route Search Area
- Nothern Solar Array Site
- Southern Solar Array Site
- Northern Site 500m Buffer
- Southern Site 500m Buffer
- District Border
- Communities
- Farm
- Bicker Fen GSP

Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

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FIGURE 13.1
COMMUNITIES LOCATIONS

DRG No.		REV
ST19595-041		A
DRG SIZE	SCALE	DATE
A3	1:75,000	14/04/2023
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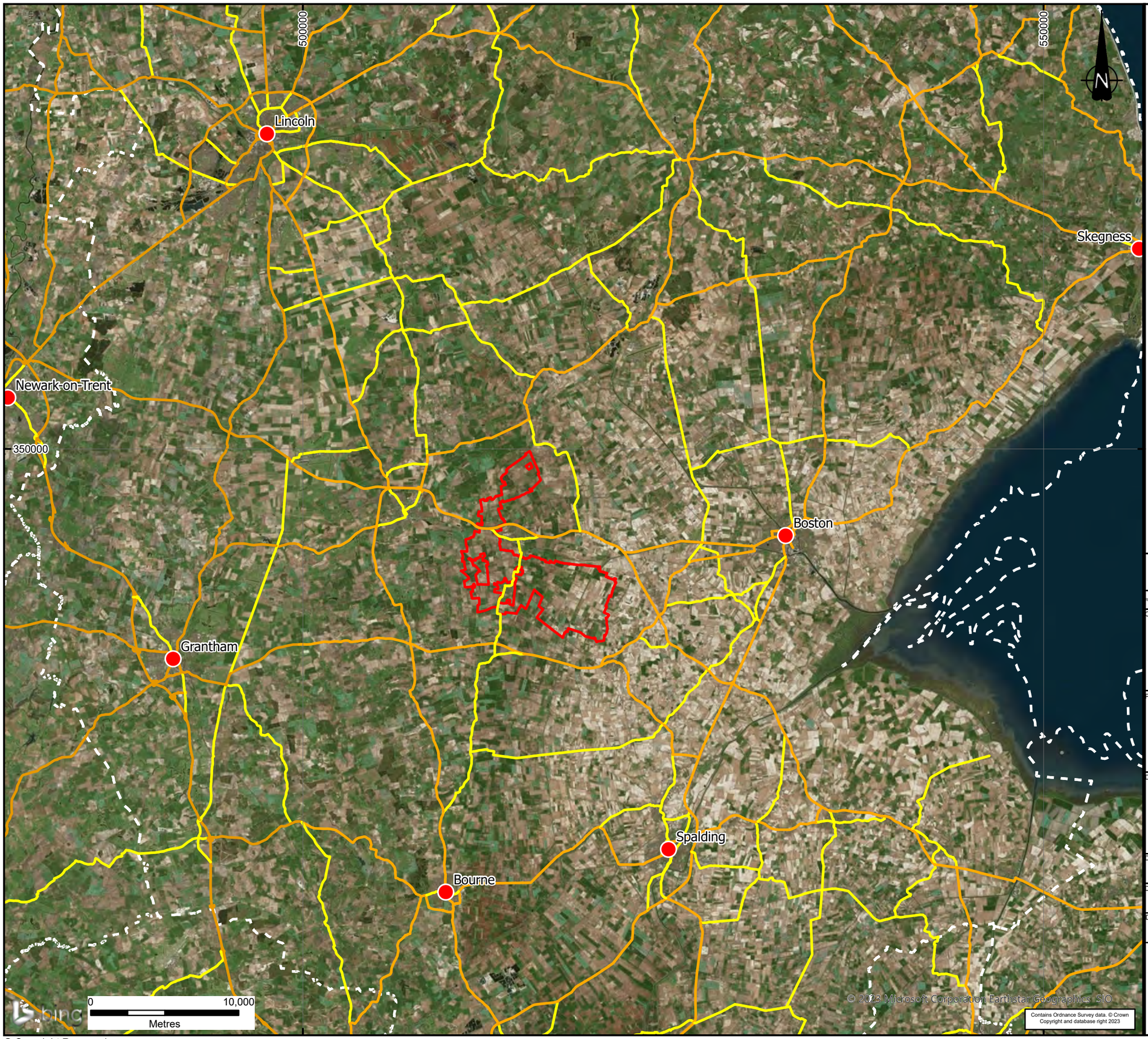

KEY

- Site Boundary
- Indirect Area of Influence
- A Road
- B Road
- County Boundary

Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

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A	FIRST ISSUE	13/4/23	RCB	AC	AC

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FIGURE 13.2
INDIRECT AREA OF INFLUENCE CITIES AND ROAD ACCESS TO PROJECT AREA

DRG No.		REV
ST19595-041		A
DRG SIZE	SCALE	DATE
A3	1:250,000	14/04/2023
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