

Gate Burton Energy Park Environmental Statement

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8. Ecology and Nature Conservation

8.1 Introduction

8.1.1 This chapter of the Environmental Statement (ES) presents the findings of an assessment of the likely significant effects on ecology and nature conservation (collectively referred to as biodiversity within this chapter) as a result of the Scheme. For more details and a description of the Scheme, refer to **Chapter 2: The Scheme** of this ES [EN010131/APP/3.1].

8.1.2 This chapter identifies and proposes measures to address the potential impacts and likely significant effects of the Scheme on biodiversity during the construction, operation and decommissioning phases. This chapter:

- provides an evaluation of relevant important ecological receptors (including biodiversity (nature conservation) designations, priority habitats, protected species and invasive non-native species (INNS) associated with the Scheme, with each being assigned a biodiversity value (sensitivity value);
- identifies the Scheme's potential direct and indirect impacts and effects on ecological receptors and their conservation status, inter-relationships, and their contribution to local (and if appropriate county, regional and national) biodiversity;
- takes into account impact avoidance measures regarding design and management activities when determining the significance of potential effects; and
- identifies and describes the requirement for any further mitigation measures and consideration of mitigation and monitoring measures in the assessment of potential residual effects.

8.1.3 This chapter is supported by the following figures in **ES Volume 2** [EN010131/APP/3.2]:

- **Figure 8-1:** Sites statutorily designated for biodiversity value;
- **Figure 8-2:** Non-statutory sites designated for biodiversity; and
- **Figure 8-3:** Phase 1 Habitat survey.

8.1.4 This chapter is supported by the following technical appendices (which include full details of the study areas, survey methods, survey dates and guidance used for each survey), as presented in **ES Volume 3** [EN010131/APP/3.3]:

- **Appendix 8-A:** Legislation and policy relevant to ecology and biodiversity;
- **Appendix 8-B:** Preliminary Ecological Appraisal report;
- **Appendix 8-C:** Flora report (including hedgerows);
- **Appendix 8-D:** Terrestrial invertebrate report;
- **Appendix 8-E:** Aquatic ecology report;
- **Appendix 8-F:** Great Crested Newt survey report;
- **Appendix 8-G:** Report on surveys for reptiles and other amphibians;
- **Appendix 8-H:** Report on surveys for breeding birds;

- **Appendix 8-I:** Wintering bird survey report;
 - **Appendix 8-J:** Report on surveys for bats;
 - **Appendix 8-K:** Report on surveys for riparian mammals; and
 - **Appendix 8-L:** Badger survey methods.
- 8.1.5 The survey report for Badger is not included in full within this ES chapter, owing to the sensitivities of detailing information on the location of Badger setts. Therefore, the results, evaluation and conclusions section of **Volume 3: Appendix 8-L** of this ES [EN010131/APP/3.3] will be provided confidentially to key stakeholders. Similarly, where specially protected breeding bird species (owing to inclusion on Schedule 1 of the Wildlife and Countryside Act, 1981 (Ref 8-1)) were recorded, then the locations of these have been plotted onto a separate figure which will also be provided confidentially to key stakeholders.
- 8.1.6 A **Framework Construction Environmental Management Plan (Framework CEMP)** [EN010131/APP/7.3], **Framework Operational Environmental Management Plan (Framework OEMP)** [EN010131/APP/7.4] and a **Framework Decommissioning Environmental Management Plan Strategy (Framework DEMP)** [EN010131/APP/7.5] have been prepared for the Scheme to manage environmental effects of the Scheme and to demonstrate compliance with environmental legislation.
- 8.1.7 This chapter is also supported by an **Outline Landscape and Ecology Management Plan (OLEMP)** [EN010131/APP/7.10], the purpose of which is to set out the key measures required to avoid, mitigate and compensate for impacts and effects to biodiversity (and landscape) from the construction and operation of the Scheme. The OLEMP will also provide management prescriptions aimed at ensuring the Scheme delivers a net gain for biodiversity over the long term.
- 8.1.8 Effects on ecological resources from solar energy projects can arise from direct and indirect impacts upon designated sites, habitats or species, and be of a temporary or permanent nature. Indirect effects can occur through pollution of air and water and via changes in lighting, noise or hydrology. This biodiversity chapter is therefore supported by information contained within the following chapters of the ES [EN010131/APP/3.1]:
- **Chapter 6:** Climate Change;
 - **Chapter 9:** Water Environment (which includes hydrology and water pollution);
 - **Chapter 10:** Landscape and Visual Amenity (which includes lighting);
 - **Chapter 11:** Noise and Vibration; and
 - **Chapter 15:** Other Environmental Topics (which includes changes in air quality).
- 8.1.9 This chapter should also be read in conjunction with **Chapters 1 to 5** of this ES [EN010131/APP/3.1] as these chapters provide an introduction to the Scheme, its evolution, consultation and the EIA methods.

8.2 Consultation

- 8.2.1 A request for an EIA Scoping Opinion was sought from the Secretary of State through the Planning Inspectorate in 2021 as part of the EIA Scoping Process. Further consultation in response to formal pre-application engagement was undertaken through the PEI report, in June 2022. Scoping consultation responses in relation to biodiversity, are presented in **Volume 3: Appendix 1-C** of this ES [EN010131/APP/3.3].
- 8.2.2 Consultation has been undertaken with key stakeholders including Lincolnshire County Council (LCC), Nottinghamshire County Council (NCC), West Lindsey District Council (WLDC), Bassetlaw District Council (BDC), Natural England (NE), Lincolnshire Wildlife Trust (LWT) and Nottinghamshire Wildlife Trust (NWT), including an online workshop with NE, LWT and NWT on 9th August 2022, in which the following matters were discussed:
- Approach to ecological survey work and baseline conditions;
 - The evolution of the Scheme design to avoid and/ or minimise impacts to important ecological features (IEFs); and
 - Habitat creation and enhancements.
- 8.2.3 As part of the PEI Report statutory feedback (received in August 2022) and the online workshop with NE, LWT and NWT, the following comments were made:
- BDC and NWT confirm that the methodology for biodiversity related assessments are sound and that they are generally satisfied with the approach taken.
 - WLDC confirm that they do not currently have in-house expertise to cover ecology matters, but that information should be sought from LWT.
 - NE, LWT and NWT confirmed they had no further comments of the scope of ecological surveys undertaken.
- 8.2.4 As above, further details of the consultation feedback received from key stakeholders and Applicant responses are held in **ES Volume 3: Appendix 1-C** [EN010131/APP/3.3] and the **Consultation Report** [EN010131/APP/4.1] submitted as part of the Application.

8.3 Legislation and Planning Policy

- 8.3.1 A summary of applicable legislation, planning policy and other guidance documents relating to sites protected for their biodiversity value, significant habitats and protected and/or notable species and invasive non-native species pertinent to the Scheme is provided below.
- 8.3.2 Full details of the legislation, policy, and guidance of relevance to the assessment of significant biodiversity effects of the Scheme are provided in full in **Volume 3: Appendix 8-A** of this ES [EN010131/APP/3.3].

Legislation

- 8.3.3 Applicable legislation to inform the biodiversity assessment includes:

- Directive 2009/147/EC on the conservation of wild birds (Birds Directive) (Ref 8-2);
- Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) (Ref 8-3);
- Regulation (EU) 1143/2014 on the prevention and management of the introduction and spread of invasive alien species (IAS) (Ref 8-4);
- Wildlife and Countryside Act (WCA) 1981(Ref 8-1);
- Countryside and Rights of Way Act 2000 (Ref 8-5);
- Conservation of Habitats and Species Regulations 2017 (Ref 8-6);
- Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ref 8-7);
- The Environment Act 2021 (Ref 8-8);
- Natural Environment and Rural Communities (NERC) Act 2006 (Ref 8-9);
- Protection of Badgers Act 1992 (Ref 8-10);
- Hedgerows Regulations 1997 (Ref 8-11);
- Animal Welfare Act 2006 (Ref 8-12);
- Salmon and Freshwater Fisheries Act 1975 (Ref 8-13);
- Eels (England and Wales) Regulations 2009 (Ref 8-14);
- Invasive Alien Species (Enforcement and Permitting) Order 2019 (Ref 8-15); and
- Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 8-16).

8.3.4 European Union (EU) legislation as it applied to the UK on 31st December 2020 is now a part of UK domestic legislation as ‘retained EU legislation’. Changes have been made to parts of the Conservation of Habitats and Species Regulations 2017 (Ref 8-6) so that they effectively continue the legislation which implemented the EU Habitats and Species Directive (Ref 8-3) and parts of the Wild Birds Directive (Ref 8-2) through the provisions of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ref 8-7). Most of these changes involve transferring functions from the European Commission to the appropriate authorities in England. All other processes or terms of the 2017 Regulations (Ref 8-6) remain substantively unchanged and the network of protected European sites in the UK is now referred to as the “national site network” (previously the “Natura 2000 network”).

8.3.5 As part of the assessment of a development, it is necessary to determine whether the Scheme is likely to have a significant effect on areas that have been internationally designated for biodiversity conservation purposes (*i.e.* European sites). European sites are protected under the Conservation of Habitats and Species Regulations 2017 (Ref 8-6). The UK left the EU on 31 January 2020 under the terms set out in the European Union (Withdrawal Agreement) Act 2020 (“the Withdrawal Act”). However, the most recent amendments to the Habitats Regulations – the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ref 8-7) make it clear that the need for Habitats Regulations Assessment (HRA) continues to apply. Likely significant effects have been considered further, with relation to international sites **[EN010131/APP/7.2]** Whilst the HRA decisions must be taken by the competent authority (the Secretary of State, informed by the recommendations of the appointed Examining Authority), the information

needed to undertake the necessary assessments must be provided by the Applicant. The information needed for the competent authority to establish whether there are any Likely Significant Effects (LSEs) from the Scheme and to assist in carrying out its Appropriate Assessment is provided in the **HRA Report [EN010131/APP/7.2]**.

National Planning Policy

- 8.3.6 This chapter takes into account the requirements within relevant National Policy Statements (NPS) for solar, including relevant sections of the draft updated versions of these NPSs. In combination, these NPSs set out national policy for energy infrastructure and provide guidance and the legal framework for planning decisions. The following NPSs are considered important and relevant to the Scheme and biodiversity:
- Overarching National Policy Statement for Energy (EN-1) (2011) (Ref 8-17);
 - Draft Overarching National Policy Statement for Energy (EN-1) (2021) (Ref 8-18);
 - Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) (2021) (Ref 8-19);
 - National Policy Statement for Electricity Networks Infrastructure (EN-5) (2011) (Ref 8-20); and
 - Draft National Policy Statement for Electricity Networks Infrastructure (EN-5) (2021) (Ref 8-21).
- 8.3.7 The National Planning Policy Framework (NPPF) (Ref 8-22), with particular reference to Section 15 and paragraphs 174, 180 and 181, which state that the planning system should contribute to and enhance the natural and local environment by minimising impacts on biodiversity and providing net gains in biodiversity. The NPPF (Ref 8-22) is clear that pursuing sustainable development includes moving from a net loss of biodiversity to achieving net gains for nature, and that a core principle for planning is that it should contribute to conserving and enhancing the natural environment and reducing pollution. The NPPF also specifies the obligations that the Local Authorities and the UK Government have regarding statutory designated sites and protected species under UK and international legislation and how this is to be delivered in the planning system. Protected or notable habitats and species can be a material consideration in planning decisions and may therefore make some sites unsuitable for particular types of development, or if development is permitted, mitigation measures may be required to avoid or minimise impacts on certain habitats and species, or where impact is unavoidable, compensation may be required.
- 8.3.8 Planning Practice Guidance (Ref 8-23) was also reviewed for further guidance and interpretation of the NPPF.

Local Planning Policy

- 8.3.9 Local planning policies that are relevant to the Scheme and biodiversity are:

- Central Lincolnshire Local Plan 2012-2036, adopted 24 April 2017, specifically Policies LP20: Green Infrastructure Network and Policy LP21: Biodiversity and Geodiversity (Ref 8-24);
- Bassetlaw District Council Core Strategy and Development Management Policies DPD, adopted 22 December 2011, specifically Policy DM9: Green Infrastructure, Biodiversity & Geodiversity, Landscape; Open Space & Sports Facilities (Ref 8-25);
- Rampton & Woodbeck Neighbourhood Plan Policy 10 (The protection of the Parish landscape) (Ref 8-26); and
- Sturton Ward Neighbourhood Plan (Review) Policies 2a (Protecting the landscape character, significant green gaps and key views) and 2b (Enhancing biodiversity) (Ref 8-27).

Other Guidance

8.3.10 Other guidance documents relevant to the assessment of the impacts of the Scheme on biodiversity include:

- Biodiversity 2020: A strategy for England's Wildlife and Ecosystem Services with regards to marine habitats, ecosystems, and fisheries (Ref 8-28);
- 25-year Environment Plan (Ref 8-29);
- UK Post 2010 Biodiversity Framework (Ref 8-30);
- Biodiversity Guidance for Solar Developments (Ref 8-31);
- Mitigating biodiversity impacts associated with solar and wind energy development: Guidelines for project developers (Ref 8-32); and
- Natural England and Department for Environment, Food and Rural Affairs (DEFRA) Standing Advice (protected species) (Ref 8-33).

8.4 Assessment Assumptions and Limitations

8.4.1 The assessment of all phases (construction, operation and decommissioning) of the Scheme is based upon the design for the Scheme (refer to **Chapter 2: The Scheme** of this ES [EN010131/APP/3.1]).

8.4.2 As noted in **Chapter 2: The Scheme**, the construction period is expected to be 24 to 36 months. This assessment considers the aspects predicted to represent the worst-case scenario within this construction period. This will differ depending on the construction activity and ecological receptor involved. For example, a 36 month construction period will encompass three breeding seasons for birds, instead of two for a 24 month construction period. A longer duration may, therefore, create disturbance over a longer period for the general breeding bird assemblage, but not necessarily individuals. Conversely, a shorter, but more intense, construction period may result in greater levels of disturbance to individual breeding birds but reduce exposure to the wider assemblage. In general, the impact on flora is not affected by the duration of activity but rather the change or loss of any habitats.

8.4.3 Habitat and species information referenced in the assessment and presented in this chapter has been obtained from site surveys undertaken on land within and around the Order limits between August 2021 and October 2022. The

assessment has referenced published data, records and web-based information obtained at the time of writing.

- 8.4.4 Specific assumptions and limitations relevant to each survey, including how any limitations have been overcome, are included within the relevant technical reports presented in **Volume 3, Appendices 8-B to 8-L** of this ES [EN010131/APP/3.3]. There are no survey specific constraints that represent a significant limitation or data gap and the baseline that has been established is suitably robust.

8.5 Study Area

- 8.5.1 The Order limits, referred to within this chapter, includes the Solar and Energy Storage Park, the Grid Connection Corridor and minor junction works (as defined in **Chapter 2: The Scheme** of this ES [EN010131/APP/3.1]) and presented in **ES Volume 2: Figure 1-1** and **Figure 1-2** [EN010131/APP/3.2].
- 8.5.2 The study area was defined to include biodiversity features likely to be at risk from possible direct and indirect impacts that might arise from the Scheme. This is termed the Zone of Influence (Zoi). The Chartered Institute of Ecology and Environmental Management (CIEEM) (Ref 8-34) define the Zoi as: “...*the area over which biodiversity features may be affected by biophysical changes as a result of the proposed project and associated activities*”.
- 8.5.3 The study area captured all sites designated for their biodiversity value, sensitive habitats and species of importance that occur within the relevant ecological Zoi. This then enabled the identification of specific areas which required ecological survey (termed Survey Areas hereafter where referring to areas within which ecological surveys were undertaken). The boundaries and zones for the ecology study area reflect standard industry good practice and were informed by published guidance and professional judgement. The study areas defined are the maximum distances that statutory consultees would typically expect to be considered and these study areas were presented within the Scoping Report (Ref 8-35) and acknowledged by consultees to be appropriate.
- 8.5.4 The extent of the Zoi varies according to the ecological receptor in question and with regards to the precautionary principle. Accordingly, the study areas used in this assessment ensure sufficient data were gathered to meet any design iterations which may change the likely Zoi used to undertake the impact assessment.
- 8.5.5 Accordingly, the desk study areas included:
- Sites of international biodiversity value (Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites) within 10km of the Order limits as well as any SACs within 30km of the Order limits where bats are noted as the, or one of the qualifying features;
 - Statutorily designated sites of national biodiversity value, e.g. Sites of Special Scientific Interest (SSSIs) and Local Nature Reserves (LNRs) within 2km of the Order limits;

- Non-statutorily designated sites of biodiversity value, e.g. Local Wildlife Sites (LWSs), within 2km of the Order limits;
- Ancient Woodland, veteran trees and other notable habitats within 2km of the Order limits; and
- Records of protected or notable species and scheduled invasive non-native species within 2km of the Order limits.

8.5.6 The desk study enabled determination of an appropriate study area within which all ecological receptors requiring assessment were subject to field survey (see Table 8-1). Habitat and species surveys were undertaken within the Order limits and its immediate vicinity and were extended to outside of the Order limits as appropriate (such as identifying ponds up to 500m from the Order limits for Great Crested Newt *Triturus cristatus*) (see Table 8-1).

8.5.7 In defining individual study areas, consideration was given to the geographic location, nature and scale of the Scheme (refer to **Chapter 2: The Scheme** of this ES [EN010131/APP/3.1]).

8.6 Assessment Methodology

Establishment of the Baseline Conditions

8.6.1 Establishment of the ecological baseline, within the Zol, involved reference to existing data sources, consultation with statutory bodies and other organisations, and field surveys.

Sources of Information – Desk Study

8.6.2 A desk study was undertaken to identify sites designated for their biodiversity value and records of protected and/or notable habitats and species (biodiversity features) and invasive non-native species that are relevant to the Scheme.

8.6.3 The desk study also identified Water Framework Directive (WFD) water body status in order to identify water bodies that are likely to be impacted. However, as water pollution may spread downstream or there could be downstream flood risk effects, it was also necessary to consider a wider study area along watercourses to identify all the relevant attributes that may be impacted and that contribute to the water bodies overall importance. Consideration thus was also given to any surface water or groundwater bodies or water dependent ecological sites outside of the study area and beyond 2km from the Order limits boundary, if it is considered that they might be hydrologically linked.

8.6.4 The study area used for the desk study is defined in Section 8.5.5 of this chapter.

8.6.5 Lincolnshire Environmental Records Centre (LERC) and Nottinghamshire Biological and Geological Records Centre (NBGRC) were contacted in October 2021 to gain information on pre-existing ecological information (*i.e.*: location and citations of Local Wildlife Sites (LWSs), records of protected, notable and invasive non-native species within 2km of the Order limits).

- 8.6.6 A review of ecology reports for surveys undertaken within the Order limits prior to the Scheme's evolution (surveys of bat activity (Ref 8-36) and surveys of breeding birds (Ref 8-37)) was also undertaken to identify previous baseline conditions within the Order limits and identify which surveys either require updating or completing to inform the current baseline. These are referenced and evaluated within the appropriate technical appendices.
- 8.6.7 Online data resources that were reviewed included:
- Multi-Agency Geographic Information Centre (MAGIC) (Ref 8-38) to identify the location (and details) of statutorily designated sites, ancient woodland, notable habitats, granted European Protected Species Licence applications (within 2km of the Order limits) and the location of implemented agri-environment schemes within the Order limits;
 - Joint Nature Conservation Committee (JNCC) website (Ref 8-39) for site information and designation details of SACs, SPAs and Ramsar Sites identified within the relevant study areas (refer to Section 8.5.5 of this chapter);
 - National Biodiversity Network (NBN) Gateway (Ref 8-40) for details on any protected and/or notable species recorded within 2km of the Order limits; and
 - Environment Agency (EA) Ecology and Fish Data for species records of fish, macroinvertebrate and macrophytes (Ref 8-41).
- 8.6.8 Protected and notable habitats and species include those listed under Schedules 1, 5 and 8 of the WCA (Ref 8-1); Schedules 2, 4 and 5 of the Habitat Regulations (Ref 8-6); and species and habitats of principal importance (SPI and HaPI) for biodiversity conservation in England listed pursuant to Section 41 of the NERC Act (Ref 8-9). Other habitats and species are also considered and have been assessed on a case-by-case basis, e.g. those included in national, regional or local Red Data Books and Lists but not protected by legislation.
- 8.6.9 Records of invasive non-native species, as listed under Schedule 9 of the WCA (Ref 8-1) and Schedule 2 of the Invasive Alien Species (Enforcement and Permitting) Order 2019 (Ref 8-15) were also collated and have been taken into account when assessing the potential ecological effects of the Scheme.

Field Surveys

- 8.6.10 The requirement for ecological field surveys was determined following the Preliminary Ecological Appraisal (PEA) included as **Volume 3: Appendix 8-B** of this ES [EN010131/APP/3.3] and analysis of the evolving Scheme design.
- 8.6.11 The PEA consisted of three components: the desktop study data review (see Sections 8.6.2 to 8.6.9); a Phase 1 Habitat survey; and a scoping survey for protected species and other species of conservation concern.
- 8.6.12 The Phase 1 Habitat survey followed the standard JNCC method '*Handbook for Phase 1 habitat survey: A technique for environmental audit*' (Ref 8-42). In summary, this comprised walking over the habitat within the Order limits and recording the habitat types and boundary features present.

- 8.6.13 A protected species scoping survey was carried out in conjunction with the Phase 1 Habitat survey. This survey, in combination with the desk study, led to the recommendation of detailed field surveys for certain protected or notable habitats and species, as presented in **Volume 3: Appendix 8-B** of this ES [EN010131/APP/3.3].
- 8.6.14 An aquatic scoping survey was completed to assess the quality of targeted aquatic habitats (watercourses and ditches) within the Order limits where potential impacts were considered likely and to assess the potential for water bodies to support protected or notable species and inform further survey work (included within **Volume 3: Appendix 8-E** of this ES [EN010131/APP/3.3]).
- 8.6.15 Following the PEA, field surveys were then undertaken to characterise the ecological baseline within the relevant Survey Areas as presented in Table 8-1. Further details regarding the definition of these Survey Areas and any limitations are presented in the associated survey reports within **Volume 3: Appendices 8-B to 8-L** of this ES [EN010131/APP/3.3].
- 8.6.16 Detailed field surveys for terrestrial invertebrates were scoped out during the PEA (see **Volume 3: Appendix 8-B** of this ES [EN010131/APP/3.3]). The Order limits contain a variety of habitats, but the majority of habitat that may support notable terrestrial invertebrates or invertebrate communities (e.g. woodland, scrub and arable margins) will be retained and, or avoided during construction of the Scheme. However, a walkover survey (see **Volume 3: Appendix 8-D** of this ES [EN010131/APP/3.3]) was undertaken by a specialist entomologist to determine the most suitable habitats that could potentially support terrestrial invertebrates and this walkover survey was also used to inform the design of the Scheme.
- 8.6.17 Field surveys for Hedgehog *Erinaceus europaeus* and Brown Hare *Lepus europaeus* were not undertaken as part of the assessment as observations of both species were recorded through the desk study and other ecological surveys of the Order limits. Both species are assumed to be present within the Order limits.
- 8.6.18 Harvest Mouse *Micromys minutus* was scoped out of further assessment as there were no recent desk study records of this species occurring within 2km of the Order limits. Furthermore, Polecat *Mustela putorius* was also scoped out of further assessment as there were no desk study records of this species occurring within 2km of the Order limits. Both species are Priority Species (Ref 8-9) and whilst no recent (Harvest Mouse), or any (Polecat), records exist within 2km of the Order limits, the Order limits comprises a variety of habitats, of which the majority of habitat that could support these species (e.g. woodland, scrub and arable margins) will be retained and avoided during construction of the Scheme and therefore no impacts are predicted on these species, if present.
- 8.6.19 A detailed appraisal of the Scheme design in the context of desk study information was undertaken in relation to potential impacts to aquatic habitats. Consultation with Natural England was also undertaken (as documented in **ES Volume 3: Appendix 1-C** [EN010131/APP/3.3] and the **Consultation Report** [EN010131/APP/4.1]) to inform the approach to the assessment of aquatic habitats. A stand-off from aquatic habitats (ponds, watercourses, and ditches)

was agreed in terms of the placement of solar arrays and access roads (see also **Chapter 9: Water Environment** of this **ES [EN010131/APP/3.1]**).

8.6.20 Table 8-1 presents details of the coverage, methods and survey periods of field surveys undertaken within the relevant Survey Areas.

Table 8-1 Ecological surveys undertaken to characterise baseline conditions

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Justification for the Survey Area
Phase 1 Habitat (ES Volume 3: Appendix 8-B)	Walkover survey recording the habitat types and boundary features present following the standard method as detailed in ' <i>Handbook for Phase 1 habitat survey: A technique for environmental audit</i> ' (Ref 8-42).	August to September 2021 with subsequent surveys as a result of changes to the Order limits undertaken between April and August 2022, which informed the requirement for further detailed botanical surveys, where necessary.	The Order limits and to a maximum of 50m from the Order limits, where viewable or access is permitted.	50m is an appropriate radius for the Survey Area with respect to such factors as air quality, dust and noise, acknowledging that habitats that are likely to be impacted by the Scheme are mainly within the Order limits.
Terrestrial Habitats and Flora (including invasive non-native species) (ES Volume 3: Appendix 8-C)	Surveys for arable flora involved walking selected arable field boundaries (as identified during the Phase 1 Habitat survey) to record notable species as listed in Great Britain (Ref 8-43)) and England (Ref 8-44)) Red Data Lists or rated as locally, regionally or nationally scarce (Ref 8-45). Selected grassland areas (including set-aside and verges) where likely to be impacted by the Scheme, were surveyed in more detail (<i>i.e.</i> species lists with abundance ratings) for notable species and species composition to help inform mitigation, habitat compensation and enhancement proposals, with the rarity of higher plants given	June to September 2022	The areas of terrestrial habitat surveyed within the Order limits were those with the potential to be affected by the Scheme and were identified from the initial Phase 1 Habitat survey and desk study information.	Habitat within the Order limits is an appropriate Survey Area, acknowledging that habitats that are likely to be impacted by the Scheme are mainly within the Order limits.

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Justification for the Survey Area
	based on 'New Flora of the British Isles' (Ref 8-46).			
Hedgerows (ES Volume 3: Appendix 8-C)	Selected hedgerows within the Order limits, where likely to be impacted by the Scheme, were surveyed and assessed for their 'importance' against the Wildlife and Landscape Criteria, detailed in the Hedgerows Regulations (Ref 8-11).	August to September 2022	The Order limits.	The Order limits is an appropriate Survey Area, acknowledging that the hedgerows that are likely to be impacted by the Scheme are within the Order limits.
Terrestrial Invertebrate scoping survey (ES Volume 3: Appendix 8-D)	Desk-based study using satellite imagery and the Phase 1 Habitat map, followed by a walkover survey by a specialist entomologist to identify any habitats potentially suitable to support notable terrestrial invertebrates.	May 2022	Selected areas of the most suitable habitats to support terrestrial invertebrates within the Solar and Energy Storage Park.	Habitat within the Solar and Energy Storage Park is an appropriate Survey Area, acknowledging that habitats that may be permanently impacted (<i>i.e.</i> lost) by the Scheme and potentially supporting notable terrestrial invertebrates or assemblages are within this area.
Aquatic scoping survey (ES Volume 3: Appendix 8-E)	Walking accessible and safe stretches of water body banks (seven crossing points of watercourses and ditches), noting physical habitat features such as riparian cover, channel substrate, habitat type, modifications, and in-stream vegetation to assess the potential for waterbodies to support protected or notable	July 2022	A walkover of the Order limits, focussed on crossing points of watercourses and ditches.	Targeted locations of crossing points where the potential for impacts was considered likely (<i>i.e.</i> , culverts or temporary crossing points) to determine any potential impacts arising from the Scheme both upstream and downstream (the desk study assesses a wider 2km area or further pending the availability of data in connected water bodies).

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Justification for the Survey Area
	species and inform further survey work.			
Aquatic macrophyte and macro-invertebrate surveys, including the presence of any invasive non-native plant and animal species (INNS) (ES Volume 3: Appendix 8-E)	Survey method for watercourses and ditches will follow aquatic macroinvertebrate and macrophyte sampling procedures standardised by the Environment Agency (Ref 8-47).	September 2022	Aquatic macrophytes and aquatic macroinvertebrates surveyed in seven watercourses and ditches	Targeted locations of crossing points where the potential for impacts was considered likely (<i>i.e.</i> , culverts or temporary crossing points) to determine any potential impacts arising from the Scheme both upstream and downstream (the desk study assesses a wider 2km area or further pending the availability of data in connected water bodies).
Great Crested Newt (ES Volume 3: Appendix 8-F)	Habitat Suitability Index (HSI) evaluated suitability of ponds for Great Crested Newt following the standard method developed by Oldham <i>et al.</i> (2000) (Ref 8-48). Water sampling and eDNA analysis method for Great Crested Newt adhered to the standard survey technique (Ref 8-49).	HSI survey: April to June 2022 Water sampling for eDNA survey: mid-April to June 2022	Ponds within 500m of the Order limits were identified during the desk study. A HSI survey was undertaken on all water bodies within the Scheme and within 250m of the Order limits and, where further survey effort was identified as being required, water sampling and eDNA analysis was undertaken on those water bodies that were most likely (<i>i.e</i> where the HSI score was 'below average' or greater) to support Great Crested Newt and potentially impacted upon by the Scheme.	Habitats within the Order limits could constitute significant foraging areas, hibernation or resting sites for Great Crested Newts, which typically utilise terrestrial habitat up to 500m from their breeding ponds (Ref 8-50). However, 250m is an appropriate Survey Area from the Order limits acknowledging that there is a notable decrease in abundance of Great Crested Newt beyond a distance of 250m from a breeding pond (Ref 8-51).
Reptiles and other amphibians (ES Volume 3:	Reptile and amphibian surveys involved recording reptile and amphibian species presence,	April to June 2022 (waterbody checks) and September to	Selected areas of the most suitable habitat for reptiles and	The Survey Area provides sufficient information on reptile and amphibian presence or

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Justification for the Survey Area
Appendix 8-G and ES Volume 3: Appendix 8-F)	or absence, using artificial refugia in accordance with <i>Froglife's Advice Sheet 10</i> (Ref 8-52) and <i>Natural England's Standing Advice Sheet for Reptiles</i> (Ref 8-53). Searches were also undertaken for the presence of amphibian egg clusters (Common Toad and Common Frog) in water bodies.	early October 2022 (refugia surveys)	amphibians (such as grassland / scrub) within the Order limits.	absence within the Solar and Energy Storage Park, acknowledging that habitats that may be permanently impacted (<i>i.e.</i> lost) by the Scheme and potentially supporting reptiles and amphibians are within this area.
Breeding birds (including farmland birds) (ES Volume 3: Appendix 8-H)	Surveys for breeding birds were based on a standard territory mapping method for surveying breeding birds as detailed in ' <i>Bird Monitoring Methods</i> ' (Ref 8-54) and ' <i>Bird Census Techniques</i> ' (Ref 8-55); and were adapted where necessary to include species-specific methods for other species, as required. Species-specific methods for Barn Owl utilised ' <i>Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment</i> ' (Ref 8-56), as appropriate.	April to September 2022	The Order limits and to a maximum of 50 m from the Order limits for the breeding bird assemblage. The Survey Area was extended up to 200 m from the Order limits to record specially protected species, <i>e.g.</i> Hobby <i>Falco subbuteo</i> and Barn Owl <i>Tyto alba</i> .	Standardised Survey Areas for assessing the impacts of development on bird populations do not exist, however, the Survey Area will provide information on the breeding birds within the area immediately surrounding the Order limits and includes areas contiguous with the Order limits boundary, where birds may potentially be adversely affected. Depending on the sensitivity of the species, birds occurring outside of the Survey Area may also be adversely affected (such as those listed on Schedule 1 of the WCA (Ref 8-1)) and therefore where any such species are recorded beyond the 50 m radius Survey Area (up to 200 m from the Order limits), these were also recorded. However, the 50 m radius Survey Area is sufficient to determine the

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Justification for the Survey Area
Wintering (non-breeding) birds (including farmland birds) (ES Volume 3: Appendix 8-I)	Wintering bird surveys utilised transect-based walkovers following methods detailed in ' <i>Bird Monitoring Methods</i> ' (Ref 8-54) and ' <i>Bird Census Techniques</i> ' (Ref 8-55).	October 2021 to March 2022	The Order limits and to a maximum of 50m from the Order limits.	likely impacts of the Scheme on breeding bird species occurring in the Survey Area. Standardised Survey Areas for assessing the impacts of development on bird populations do not exist, however, the Survey Area used provides information on the wintering (non-breeding) birds within the area immediately surrounding the Order limits and includes areas contiguous with the Order limits boundary, where birds may potentially be adversely affected and is sufficient to determine the likely impacts of the Scheme on wintering bird species occurring in the area.
Bats (ES Volume 3: Appendix 8-J)	A Preliminary Roost Appraisal (PRA) was undertaken of buildings and structures and mature trees, following guidance as described in the BCT Guidelines (Ref 8-57). Surveys for bat activity were undertaken within the Solar and Energy Storage Park and were based on standard methods for bat activity transect surveys as described in the Bat Conservation Trust (BCT) ' <i>Bat Surveys for Professional Ecologists: Good</i>	PRA survey; March and September 2022 Activity survey: May, July and September 2022	Bat activity - Solar and Energy Storage Park only. PRA – Order limits and to a maximum of 50 m.	The Survey Area provides sufficient information on bat usage of the Order limits and, where impacts are predicted, enables assessment of commuting and foraging habitat and nearby roosts to determine impacts on bat populations occurring within, and, or adjacent to the Order limits.

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Justification for the Survey Area
<p>Riparian mammals (including invasive non-native mammal species, such as Mink <i>Mustela vison</i>)) (ES Volume 3: Appendix 8-K)</p>	<p><i>Practice Guidelines 3rd Edition</i>' (Ref 8-57).</p> <hr/> <p>Water Vole <i>Arvicola amphibius</i> surveys involved searching watercourses for signs of Water Vole activity as described in the '<i>Water Vole Conservation Handbook</i>' (Ref 8-58) and '<i>The Water Vole Mitigation Handbook</i>' (Ref 8-59). Otter <i>Lutra lutra</i> surveys involved searching watercourses for signs of Otter activity, following guidance in the '<i>New Rivers and Wildlife Handbook</i>' (Ref 8-60); the '<i>Fifth Otter Survey of England 2009-2010</i>' (Ref 8-61) and the '<i>Ecology of European Otter</i>' (Ref 8-62).</p>	<p>Water Vole survey: May and September 2022 Otter survey: May and September 2022</p>	<p>Aerial photographs and information gathered during the PEA survey was used to identify riparian and wetland habitats within an appropriate buffer (up to 10m) either side of the Solar and Energy Storage Park and this information was used to refine the survey area for riparian mammals. Therefore, the survey area included any water bodies within the Site and watercourses within and, or, connected to the Solar and Energy Storage Park (up to 10m). Within the Grid Connection Corridor, all water bodies and watercourses (including upstream and downstream of watercourses), to a maximum of 10m where access was permitted. However, for Otter the survey area was extended to 100m upstream and downstream (where access permitted) from the River Trent and included terrestrial habitats (such as woodland) where Otter holts may be present.</p>	<p>Surveying riparian habitats within the Order limits (including upstream and downstream) is sufficient to determine presence or absence of riparian mammals within, or adjacent to, the Order limits and to assess potential impacts on both species.</p>

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Justification for the Survey Area
Badger <i>Meles meles</i> (ES Volume 3: Appendix 8-L)	Surveys for Badger involved a walkover survey searching for signs of Badger activity as described in the Mammal Society publication ' <i>Surveying Badgers</i> ' (Ref 8-63) and in the National Badger Survey method (Ref 8-64) with additional reference to ' <i>Surveying for Badgers: Good Practice Guidelines</i> ' (Ref 8-65).	December 2021, with any evidence of Badger also recorded during other ecological surveys between August 2021 and September 2022.	The Order limits and to a maximum of 50 m radius from the Order limits.	50 m is an appropriate Survey Area acknowledging setts present beyond this distance are unlikely to be impacted by the Scheme, e.g., through construction disturbance.

Impact Assessment Method

8.6.21 The impact assessment, detailed in this chapter, has been undertaken in accordance with best practice guidance for Ecological Impact Assessment (EclA), issued by the CIEEM (the CIEEM guidelines) entitled '*Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine*' (Ref 8-34) as summarised below. The aims of the ecological assessment are to:

- identify IEFs (*i.e.* designated sites, habitats, species or ecosystems) which may be impacted by the Scheme;
- provide a scientifically rigorous and transparent assessment of the likely ecological impacts and resultant effects of the Scheme. Impacts and effects may be positive or negative;
- facilitate scientifically rigorous and transparent determination of the consequences of the Scheme in terms of national, regional and local policies relevant to biodiversity and biodiversity conservation, where the level of detail provided is proportionate to the scale of the development and the complexity of its potential impacts; and
- set out what steps will be taken to adhere to legal requirements relating to the relevant ecological features concerned.

8.6.22 The principal steps involved in the CIEEM approach (Ref 8-34) can be summarised as:

- Ecological features that are both present and might be affected by the Scheme are identified (both those likely to be present at the time works begin and those predicted to be present at a set time in the future) through a combination of targeted desk-based study and field survey work to determine the relevant baseline conditions;
- The importance of the identified ecological features is evaluated, placing their relative biodiversity conservation importance into geographic context, which is then used to define the relevant biodiversity features that need to be considered further;
- The changes or perturbations predicted to result as a consequence of the Scheme (*i.e.* the potential impacts) and which could potentially affect relevant ecological features are identified and their nature described. Established best-practice, legislative requirements or other incorporated design measures to minimise or avoid impacts are also described and are taken into account;
- The likely effects (positive or negative) on relevant ecological features are then assessed, and where possible quantified;
- Measures to avoid or reduce any predicted significant effects, if possible, are then developed in conjunction with other elements of the design (including mitigation for other environmental disciplines) and if necessary, measures to compensate for effects on features of biodiversity conservation importance are also included;
- Any residual effects of the Scheme are reported; and
- Scope for ecological enhancement is considered.

8.6.23 It is not necessary in the assessment to address all habitats and species with potential to occur in the relevant study area and instead the focus is on those

that are “relevant” *i.e.* ecological features that are considered to be important and potentially affected by the Scheme. The CIEEM guidelines (Ref 8-34) makes clear that there is no need to “*carry out detailed assessment of ecological features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable*”. This does not mean that efforts should not be made to safeguard wider biodiversity and requirements for this have been considered. National and local planning policy documents emphasise the need to achieve net gains for nature and that a core principle for planning is that it should contribute to conserving and enhancing the natural environment and reducing pollution. These considerations have been applied to the assessment method in this chapter.

Determining Importance

- 8.6.24 To support a focussed assessment, there is a need to determine the scale at which the relevant ecological features identified through the desk studies and field surveys undertaken for the Scheme are of value or importance. The value of each relevant ecological feature has been defined with reference to the geographical level at which it matters.
- 8.6.25 Relevant planning policy and legislation (see **Volume 3: Appendix 8-A** of this ES [EN010131/APP/3.3]) were used to inform on designated sites, habitats and species of biodiversity conservation importance within each geographical level. Such features provide the starting point for identification of IEFs to consider within the EclA. This is important in demonstrating how the Scheme will comply with statutory requirements and policy objectives for biodiversity, in accordance with Section 4.3 of the CIEEM guidelines (Ref 8-34).
- 8.6.26 Species populations are valued on the basis of their size, recognised status (such as through published lists of species of conservation concern and designation of Biodiversity Action Plan (BAP) status) and legal protection. For example, bird populations exceeding 1% of published information on biogeographic populations are considered to be of international importance, those exceeding 1% of published data for national populations are considered to be of national importance, and so on.
- 8.6.27 In assigning values to species populations, it is important to take into account the status of the species in terms of any legal protection. However, it is also important to consider other factors such as its distribution, rarity, population trends and the size of the population which would be affected. For example, whilst the Great Crested Newt is protected as a European protected species under the relevant legislation and therefore conservation of the species is of significance at an international level, this does not mean that every population of Great Crested Newt is internationally important. It is important to consider the particular population in its context. Therefore, in assigning values to species, the geographic scale at which they are important has been considered. The assessments of value rely on the professional opinion and judgment of experienced ecologists.
- 8.6.28 Plant communities are assessed both in terms of their intrinsic value and as habitat for protected species whose habitat is also specifically protected and for species of biodiversity conservation concern which are particularly associated with them.

- 8.6.29 Due regard is also paid to the legal protection afforded to species during the development of mitigation and compensation measures to be implemented for the Scheme. For European protected species there is a requirement that the Scheme should not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.
- 8.6.30 For the purposes of the assessment within this chapter, only ecological features of at least Local importance are considered as IEFs that require assessment for potential significant effects.
- 8.6.31 Assessing the value of features requires consideration of both existing and future predicted baseline conditions. Therefore, the description and valuation of ecological features takes account of any likely changes, such as trends in the population size or distribution of species, likely changes to the extent of habitats and the effects of other proposed developments or land use changes; as explained in the 'Future Baseline' section of this chapter.
- 8.6.32 A summary of the value (importance) of ecological receptors and the geographical frames of reference used for this assessment, based on section 4.7 in the CIEEM guidelines (Ref 8-34) is presented in Table 8-2.

Table 8-2 Summary of value of ecological receptors, according to geographic context

Value / importance of ecological receptor	Geographic Frame of Reference	Examples
Very High	International	Statutorily designated sites, such as Ramsar Sites, SACs (including candidate SACs), SPAs, normally within the geographic area of Europe Species occurring in numbers approaching that of international importance (<i>i.e.</i> , >1% of a biogeographic population) Qualifying species connected to an SAC (such as bats)
High	UK or National (Great Britain), but considering the potential for certain ecological features to be more notable (of higher value) in England, with context relative to Great Britain as a whole); or Regional (East Midlands)	Statutorily designated site, such as a SSSI or NNR Species occurring in numbers approaching that of national importance (<i>i.e.</i> , >1% of the UK population) Priority habitats included on Annex I of the Habitats Directive (Ref 8-3) or S41 of the NERC Act 2006 (Ref 8-9) A feature is of Regional importance when it is of greater geographical importance than within the county of Lincolnshire or Nottinghamshire but does not reach the threshold to be of National importance
Medium	County (Lincolnshire and Nottinghamshire) and, or, District (Bassetlaw and West Lindsey)	Non-statutorily designated sites, such as LWSs Species occurring in numbers approaching that of county or district importance (<i>i.e.</i> , >1% of the county or district (if known) population)
Low	Local	Species of conservation interest, <i>e.g.</i> : UK Biodiversity Action Plan (UKBAP) / Local Biodiversity Action Plan (LBAP) species that contribute to the local community. Areas of habitat that do not meet criteria for selection as LWS in Lincolnshire and Nottinghamshire

Value / importance of ecological receptor	Geographic Frame of Reference	Examples
Negligible	Site	Areas of habitat or species that are considered to enrich local area <hr/> Species that are common and widespread and are not legally protected or included within local planning policy Areas of habitats that are widespread and of no local value (such as a fence-line or hard-standing)

Characterising Ecological Effects

8.6.33 In accordance with section 1.21 in the CIEEM guidelines (Ref 8-34), the terminology used within the assessment draws a clear distinction between the terms ‘impact’ and ‘effect’. For the purposes of this chapter these terms are defined as follows:

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

8.6.34 When describing potential impacts (and where relevant the resultant effects) consideration is given to the following characteristics likely to influence this:

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

reasonable timescale, *i.e.* the 60-year lifespan of the Scheme (in the context of the feature being assessed).

8.6.35 Combined, these characteristics form the magnitude criteria for effects of the Scheme on IEFs as summarised in Table 8-3.

Table 8-3 Magnitude Criteria for Effects

Magnitude	Magnitude criteria
High	Changes to an ecological feature that almost always have an adverse effect on its integrity or conservation status. Such changes are usually long-term and often permanent and, or, irreversible
Medium	Adverse changes on an ecological feature that, in some circumstances, may affect its integrity or conservation status. Although such changes may be long-term, they are potentially reversible
Low	Adverse changes on an ecological feature that do not usually change its integrity or conservation status. Such changes are often short-term and, or, reversible
Very low	There is no noticeable change on the ecological feature

Significance Criteria

8.6.36 For each ecological feature, only those characteristics relevant to understanding the ecological effect of the Scheme and determining the significance are described. The determination of the significance of effects has been made based on the predicted effect on the structure and function, or conservation status, of relevant ecological features, as follows:

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

8.6.37 Sections 5.24 to 5.28 in the CIEEM guidelines (Ref 8-34) state that effects should be determined as being significant (a 'significant effect') when *"an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national / local nature [biodiversity] conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local. A significant effect is an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. In broad terms, significant effects encompass impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution)"*.

8.6.38 Using this information and judgement, it is determined whether the effects will be 'significant' or 'not significant' on the structure and integrity of site or ecosystems or conservation status of habitats and, or species of each ecological feature and the impact significance is determined at the appropriate geographical scale, as presented in Table 8-2.

8.6.39 There are a number of approaches for determining the significance of effects on ecological features. Whilst the CIEEM guidelines (Ref 8-34) recommend the avoidance of the use of the matrix approach for categorisation (major, moderate and minor), in order to provide consistency of terminology within this chapter, the terminology used in the CIEEM guidelines for impact assessment have been translated into the classification of effects scale, as presented in Table 8-4.

Table 8-4 Significance Criteria for Effects

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

Biodiversity Net Gain

8.6.40 When the relevant provisions come into force, the Environment Act 2021 (Ref 8-8) will include a mandate for at least 10% biodiversity net gain (BNG) for projects, including for Nationally Significant Infrastructure Projects (NSIPs).

8.6.41 BNG is a quantitative process applied to development and can be defined as *"development that leaves biodiversity in a better state than before and involves an approach where developers work with local governments, wildlife groups,*

land owners and other stakeholders in order to support their priorities for nature [biodiversity] conservation” (Ref 8-66).

- 8.6.42 The principle behind BNG is to ensure that any impacts on biodiversity, arising from any development, are taken into consideration and compensated with equivalent or additional gains.
- 8.6.43 For a development to achieve BNG, it is important that the principles of the mitigation hierarchy are followed.
- 8.6.44 There are four sequential steps that must be taken throughout the lifecycle of a project:
- Avoidance – actions taken to avoid causing impacts to the environment prior to beginning development (e.g. moving part of the development to a different location);
 - Minimisation – measures taken to reduce the duration, intensity, extent and/ or likelihood of the unavoidable environmental impacts caused by development (e.g. adapting the development design to minimise impacts);
 - Restoration or rehabilitation – actions taken to repair environmental degradation or damage following unavoidable impacts caused by development; and
 - Offsets – measures taken to compensate for any adverse environmental impacts caused by development which cannot be avoided, minimised and/ or restored (e.g. including habitat creation to offset losses).
- 8.6.45 Biodiversity metrics provide a measure of overall biodiversity value based on habitat type, area, condition and distinctiveness. The current approved metric is Defra’s Metric 3.1 and this metric is a tool that allows a value to be measured, in this case biodiversity, which is calculated pre- and post-development for three habitat components: Habitat, Rivers and streams and Hedgerows. The change in biodiversity units is calculated for each component and indicates either a net loss, a net gain or no change in biodiversity.
- 8.6.46 The BNG assessment accompanies the DCO application [EN010131/APP/7.9].

8.7 Baseline Conditions

- 8.7.1 This section describes the baseline ecological characteristics for the Order limits and surrounding areas.

Existing Baseline

Sites statutorily designated for biodiversity importance

- 8.7.2 There are two sites statutorily designated for their biodiversity value within the Zol set out in Section 8.5.5 of this chapter. These sites, of national importance, are designated for biodiversity reasons and are presented in Table 8-5. The locations of these statutory sites, relevant to the Scheme, are presented in **Volume 2: Figure 8-1** of this ES [EN010131/APP/3.2]. There are no statutory sites of international importance within the Zol set out in Section 8.5.5 of this chapter.

8.7.3 Site designation details are summarised in Table 8-5 and are taken from citation documents published online by Joint Nature Conservation Committee (JNCC) for the individual sites. Statutory sites detailed in Table 8-5 are listed in ascending order, with those closest to the Order limits listed first.

Table 8-5 Sites statutorily designated for biodiversity importance

Statutory site name and designation	Area - hectares (ha)	Description	Distance (m / km) and direction from the Order limits	Importance
Ashton's Meadow SSSI	3.60	An ancient meadow supporting a variety of flowers and grasses, including Cowslips <i>Primula veris</i> , Green-winged Orchid <i>Anacamptis morio</i> , Oxeye Daisy <i>Leucanthemum vulgare</i> and Yellow Rattle <i>Rhinanthus minor</i> . The grassland also offers a home for moths and ground-based species of butterfly like the Meadow Brown <i>Maniola jurtina</i> , Ringlet <i>Aphantopus hyperantus</i> and Gatekeeper <i>Pyronia tithonus</i> . The hedgerows are another important habitat, supporting bird species such as Yellowhammer <i>Emberiza citrinella</i> .	Approximately 540 m to the west of the Order limits	National
Lea Marsh SSSI	27.24	An important area of unimproved floodplain meadow and wet pasture adjacent to the River Trent in north-west Lincolnshire. The site lies on seasonally inundated alluvial soils and includes an unusually large area of a nationally rare grassland type.	1.9km to the north-west of the Order limits	National

Sites non-statutorily designated for biodiversity importance

8.7.4 There are 15 sites non-statutorily designated for their biodiversity value within the Zol set out in Section 8.5.5 of this chapter and these are presented in Table 8-6. These sites have been designated as Local Wildlife Sites (LWS) for their biodiversity value at a county level and are known to have supporting value to a wide variety of protected and ecologically important species and/ or habitats. The locations of these non-statutory sites are presented in **Volume 2: Figure 8-2** of this ES [EN010131/APP/3.2].

8.7.5 Non-statutory sites detailed in Table 8-6 are listed in ascending order, with those closest to the Order limits listed first.

Table 8-6 Sites non-statutorily designated for biodiversity importance within 2km of the Order limits

Non-statutory site name and designation	Area (ha)	Description	Distance (km / m), direction and closest Scheme area (see section 8.5.1) from the Order limits	Importance
Cow Pasture Lane Drains LWS	0.45	<p>This LWS comprises a drain which runs alongside Broad Lane and southwards beside a track, Cow Pasture Lane. Noted as 'drains with notable aquatic and bank-side vegetation'; Meadowsweet <i>Filipendula ulmaria</i> grows abundantly in the drain while a defunct but floristically rich hedgerow behind supports mature Ash <i>Fraxinus excelsior</i> trees and species including Dogwood <i>Cornus sanguinea</i> and Field Maple <i>Acer campestre</i>.</p> <p>The drain is deeper and wider along Cow Pasture Lane containing a variety of plants. These include Branched Bur-reed <i>Sparganium erectum</i>, Amphibious Bistort <i>Persicaria amphibia</i>, Blunt-fruited Water-starwort <i>Callitriche obtusangula</i> and stands of Reed Sweet-grass. The lower reaches of the bank support Wild Angelica, False Fox-sedge <i>Carex otrubae</i> and Meadowsweet.</p>	Within the Order limits (Grid Connection Corridor)	County
Knaith Park Wood LWS	6.40	<p>Located on the north side of Knaith Park, this LWS comprises Moor Plantation and Stag Wood. The latter is ancient woodland, although it is only Moor Plantation that has a canopy of old deciduous trees. In contrast, the western half of Stag Wood is mature Corsican pine plantation, while the eastern half was felled a few decades ago, but is not yet mature.</p>	Approximately 15 m west of the Order limits (Solar and Energy Storage Park)	County
Coates Wetland LWS	18.95	<p>The River Trent meanders around this LWS, comprising a mosaic of habitats including wetland, developing woodland and grassland enclosed within a flood bank.</p> <p>The eastern half of the LWS is dominated by grassland and tall ruderal vegetation with abundant False Oat-grass <i>Arrhenatherum elatius</i> and stands of Creeping Thistle <i>Cirsium arvense</i> interspersed with patches of Wild Angelica <i>Angelica sylvestris</i> and Purple Loosestrife <i>Lythrum salicaria</i> on damper soils. To the north a developing woodland is dominated by a variety of Willow <i>Salix</i> species.</p> <p>Damper areas on the western side of the LWS include a seasonally wet area but supporting a number of plant species typical of a Trentside inundation community. These include Marsh Yellow-cress <i>Rorippa palustris</i>, Pink Water-speedwell <i>Veronica catenata</i> and Marsh Dock <i>Rumex palustris</i>. To the south a small, deeper</p>	Approximately 35 m north of the Order limits (Grid Connection Corridor)	County

Non-statutory site name and designation	Area (ha)	Description	Distance (km / m), direction and closest Scheme area (see section 8.5.1) from the Order limits	Importance
Cottam Wetlands LWS	88.56	<p>pond is edged by species such as Greater Pond-sedge <i>Carex riparia</i>, Reed Sweet-grass <i>Glyceria maxima</i> and Yellow Iris <i>Iris pseudacorus</i>.</p> <p>The LWS is bounded to the west by a flood bank with an area of marshy grassland/tall ruderal vegetation and a drainage channel containing locally dominant Branched Bur-reed <i>Sparganium erectum</i>, Gypsywort <i>Lycopus europaeus</i> and Water-plantain <i>Alisma plantago-aquatica</i>.</p> <p>This large wetland mosaic, adjacent to and including a stretch of the River Trent, comprises a number of lakes and lagoons, ditches, damp cattle-grazed grassland, swamp and marshland. It is botanically very rich supporting a diverse flora. The Local Wildlife Site boundary encompasses part of the Cottam Power Station site and a connected disused mineral railway, which is now wooded.</p> <p>The wetlands support an interesting and varied selection of plants including Purple Loosestrife, Fine-leaved Water-dropwort <i>Oenanthe aquatica</i>, Water Horsetail <i>Equisetum fluviatile</i>, Yellow Iris, Pink Water-speedwell, Slender Tufted-sedge <i>Carex acuta</i>, Water Mint <i>Mentha aquatica</i> and Skullcap <i>Scutellaria galericulata</i>. They provide breeding habitat for amphibians, <i>Odonata</i> and many other insect species and are an important site for birds providing nesting sites and habitat for both breeding birds and wintering wildfowl and feeding opportunities for passage migrants in spring and autumn.</p>	Approximately 205 m south / east of the Order limits (Grid Connection Corridor)	County
Littleborough Lagoons LWS	5.82	<p>This lagoon, surrounded by sheep-grazed pasture, is situated beside the River Trent near the historic hamlet of Littleborough. The relatively shallow water supports an interesting aquatic flora although water levels are sometimes low in hot weather and eutrophic with many algae and expanses of exposed mud. Despite this, Bulbous Rush <i>Juncus bulbosus</i> grows in the lagoon, while muddy areas support typical Trentside annual plants including Creeping Yellow-cress <i>Rorippa sylvestris</i>, Celery-leaved Buttercup <i>Ranunculus sceleratus</i> and Red Goosefoot <i>Chenopodium rubrum</i>.</p>	Approximately 360 m west of the Order limits (Solar and Energy Storage Park)	County

Non-statutory site name and designation	Area (ha)	Description	Distance (km / m), direction and closest Scheme area (see section 8.5.1) from the Order limits	Importance
Thurlby Wood LWS	38.0	This LWS, to the south-east of Gainsborough, is contiguous with Caistor's Wood to the north. Most is semi-natural ancient woodland, and all parts are of significant botanical interest.	Approximately 420 m north of the Order limits (Solar and Energy Storage Park)	County
Out Ings LWS	12.48	Adjacent to the River Trent, this LWS is a floristically rich site comprising a diverse mosaic of grassland, willow carr, open water and wetland. Stands of Common Reed <i>Phragmites australis</i> and Reed Sweet-grass grow around the wetland margins with willow carr dominating the central area.	Approximately 535 m west of the Order limits (Solar and Energy Storage Park)	County
Ashton's Meadow LWS	3.57	See also Ashton's Meadow SSSI in Table 8-5. This meadow, bordered by hedgerows and trees, is a SSSI, owned and managed by the Nottinghamshire Wildlife Trust. The sward is unimproved and species-rich with a range of characteristic grasses and forbs. Among the grasses Upright Brome <i>Bromopsis erecta</i> and Quaking-grass <i>Briza media</i> grow abundantly with other species including Meadow Barley <i>Hordeum secalinum</i> and Yellow Oat-grass <i>Trisetum flavescens</i> . Forbs include abundant Meadow Vetchling <i>Lathyrus pratensis</i> , Common Knapweed <i>Centaurea nigra</i> , Rough Hawkbit <i>Leontodon hispidus</i> and Yellow-rattle <i>Rhinanthus minor</i> . Fairy Flax <i>Linum catharticum</i> , Pyramidal Orchid <i>Anacamptis pyramidalis</i> , Bee Orchid <i>Ophrys apifera</i> and Ox-eye Daisy <i>Leucanthemum vulgare</i> are among the many other species found.	Approximately 550 m west of the Order limits (Grid Connection Corridor)	County
5/2324 (Cottam Ponds) LWS	5.04	Lagoons to the east of the Cottam Power Station, supporting Great Crested Newt.	Approximately 800 m south of the Order limits (Grid Connection Corridor)	County
Broad Lane Grassland, North Leverton LWS	0.83	This small neutral grassland is bordered by Hawthorn <i>Crataegus monogyna</i> and Blackthorn <i>Prunus spinosa</i> hedgerows and a linear broadleaved woodland, separating it from a railway line. The sward contains a good selection of grasses with Yellow Oat-grass <i>Trisetum flavescens</i> , Yorkshire-fog <i>Holcus lanatus</i> , Sweet Vernal Grass <i>Anthoxanthum odoratum</i> , Meadow Barley <i>Hordeum secalinum</i> and Meadow Fescue <i>Schedonorus</i>	Approximately 865 m north-west of the Order limits (Grid Connection Corridor)	County

Non-statutory site name and designation	Area (ha)	Description	Distance (km / m), direction and closest Scheme area (see section 8.5.1) from the Order limits	Importance
		<p><i>pratensis</i> with locally dominant Common Bent <i>Agrostis capillaris</i> and False Oat-grass. Among the forbs Meadow Buttercup <i>Ranunculus acris</i> is scattered across the site with numerous patches of Great Burnet <i>Sanguisorba officinalis</i>, Lady's Bedstraw <i>Galium verum</i> and Meadow Vetchling <i>Lathyrus pratensis</i>. Other species include Pepper-saxifrage <i>Silaum silaus</i>, Red Clover <i>Trifolium pratense</i>, Lesser Stitchwort <i>Stellaria graminea</i> and Common Bird's-foot-trefoil <i>Lotus corniculatus</i>.</p>		
Mother Drain, Upper Ings LWS	2.12	<p>A long length of drainage ditch/channel with Spiked Milfoil <i>Myriophyllum spicatum</i> and marginal Reed Sweet-grass, Reed canary-grass, Creeping Bent <i>Agrostis stolonifera</i> and Duckweed <i>Lemna</i> species.</p> <p>Forty-six Water Beetle species and 11 water bug species have been recorded. The nationally near threatened <i>Hydrochus elongatus</i> at its only Nottinghamshire location and Nationally scarce <i>Hygrotus quinquelineatus</i> are recorded from the site. The drain also supports an assemblage of local species, some of which have a high local conservation interest including a Local A water beetle <i>Limnebius nitidus</i> together with 15 Local B species. Notably Local B <i>Notonecta maculata</i> and <i>Notonecta viridis</i> water bugs are also recorded from the drain.</p>	Approximately 955 m north of the Order limits (Grid Connection Corridor)	County
Torksey Ferry Road Ditch LWS	0.14	<p>Trackside ditch with waterlogged decomposing grasses including Reed Canary-grass <i>Phalaris arundinacea</i> and rush (a species of <i>Juncus</i>), supporting the near threatened water beetle <i>Agabus uliginosus</i>. Three Local B water beetle species <i>Cercyon convexiusculus</i>, <i>Cymbiodyta marginellus</i> and <i>Ilybius montanus</i> have also been recorded.</p>	Approximately 985 m east of the Order limits (Grid Connection Corridor)	County
Priory Farm LWS	12.90	<p>This area is predominantly wooded, but with a partially open southern fringe. At the northern end there is an east-west track bisecting a strip of pasture that has a shallow ditch on its northern edge</p>	Approximately 985 m north of the Order limits (Solar and Energy Storage)	County
Thornhill Lane Drain, Littleborough LWS	0.14	<p>This stretch of drain meanders through intensively farmed arable land. It supports a variety of aquatic plants including Blunt-fruited Water-starwort <i>Callitriche obtusangula</i> and the county-rare Opposite-leaved Pondweed <i>Groenlandia densa</i>. Among the marginal species are Branched Bur-reed <i>Sparganium erectum</i>, Reed</p>	Approximately 1.62 km west of the Order limits (Solar and Energy Storage Park)	County

Non-statutory site name and designation	Area (ha)	Description	Distance (km / m), direction and closest Scheme area (see section 8.5.1) from the Order limits	Importance
		Sweet-grass and Reed Canary-grass. The drain supports a number of rushes <i>Juncus</i> sp., along with Pink Water-speedwell, Water-cress <i>Nasturtium officinale</i> and Amphibious Bistort.		
Retford Road Wood, Rampton LWS	1.18	A mature deciduous woodland with a valuable ground flora.	Approximately 1.63 km west of the Order limits (Grid Connection Corridor)	County

- 8.7.6 Five areas of ancient woodland were identified within 2km of the Order limits. These are:
- Burton Wood – circled by the Solar and Energy Storage Park, although excluded from the Order limits;
 - Stag Wood – approximately 190m to the north of the Order limits;
 - Thurlby / Castors Wood – approximately 825m to the north of the Order limits;
 - an unnamed ancient woodland, approximately 1.9km to the north of the Order limits; and
 - Lea Wood – approximately 1.9km to the north of the Order limits.
- 8.7.7 The locations of these ancient woodland sites are presented in **Volume 2: Figure 8-2** of this ES [EN010131/APP/3.2].

Habitats

- 8.7.8 The Order limits (as defined in **Chapter 2: The Scheme** of this ES [EN010131/APP/3.1]) encompass approximately 824 ha (with the Solar and Energy Storage Park being approximately 652 ha and the Grid Connection Corridor being 172 ha) and are dominated by arable fields (cultivated disturbed land – arable in Table 8-7) (c. 659 ha). This intensive arable farming (with crops in 2022 including Wheat, Field beans, Maize and *Miscanthus*) is reliant on a high degree of control of the water table achieved through a network of temporary drainage ditches and drains, as well as inputs of fertiliser and the use a range of pesticides.
- 8.7.9 Other habitat (see Table 8-7) within the Order limits includes improved and semi-improved neutral grassland fields (c. 109ha), mature trees and hedges (c. 46km), small, wooded copses (c. 4.7ha) and two ponds. The surrounding habitat is mainly arable with mature broadleaved woodland (plantation, semi-natural and ancient). There are individual and clusters of residential properties located adjacent to the Order limits.
- 8.7.10 The broad terrestrial habitat types present within the Order limits were identified during the Phase 1 Habitat survey, undertaken in August and September 2021; and April to August 2022. These habitats were further defined by detailed habitat surveys (such as for arable flora and hedgerows, see **Volume 3, Appendix 8-C** of this ES [EN010131/APP/3.3]) that were undertaken between June and September 2022 (see Table 8-1). The broad habitats are summarised in Table 8-7, alongside area calculations (taken from digitised maps of the Phase 1 Habitats) and their biodiversity importance. The locations of these habitats are presented in **Volume 2: Figure 8-3** of this ES [EN010131/APP/3.2].
- 8.7.11 Habitat data, required to calculate the biodiversity net gain or net loss have been collected in the Phase 1 Habitat survey and updated, as necessary, through subsequent surveys (such as arable flora and hedgerow surveys, see Table 8-1) and condition assessments to ensure a comprehensive baseline of data for the BNG assessment.

Table 8-7 Broad habitat types within the Order limits

Habitat	Area (ha) / length (km)	% of Site area	Biodiversity Importance	Rationale
A1.1.1 - Broadleaved woodland - semi-natural (including ancient woodland)	<0.1ha	<1	Local	HaPI (see Section 8.6.8)- Lowland Mixed Deciduous Woodland and Wet Woodland; and LBAP habitat in Lincolnshire (Ref 8-67). Small copses of non-designated mature semi-natural woodland adjacent to the Order limits, but unlikely to meet District or County importance due to very small extent within the Order limits and that this habitat is present more widely beyond the Zol in the local area. Five woodlands adjacent to the Order limits are listed as ancient woodland (see Section 8.7.6). Many trees within the Order limits are veteran or potentially veteran and/ or ancient trees occurring within hedges and along lanes within or immediately adjacent to the Order limits. Further information is presented in the arboricultural impact assessment, provided in ES Volume 3: Appendix 9-G [EN010131/APP/3.3] .
A1.1.2 - Broadleaved woodland - plantation	4.59ha	1	Site	Not a HaPI.
A1.3.2 – Mixed woodland – plantation	<0.1ha	<1	Site	Not a HaPI
A2.1 - Scrub - dense/continuous	1.26ha	<1	Site	Not a HaPI.
A2.2 - Scrub – scattered (including linear areas)	4.19ha / 1.30km	<1	Site	Not a HaPI.
B1.2 - Acid grassland - semi-improved	0.58ha	<1	Up to County	HaPI; and LBAP habitat in Lincolnshire (Ref 8-67) and Nottinghamshire (Ref 8-68). Small area of this habitat is present within the Grid Connection Corridor (Cottam Power Station) and amounts to 3.9% of this habitat type occurring in Nottinghamshire (1,500ha in the county) (Ref 8-69).
B2.2 - Neutral grassland - semi-improved	<0.1ha	<1	Site	Not a HaPI
B4 - Improved grassland	40.29 ha	5	Site	Whilst improved grassland is not a HaPI, grassland either side of the River Trent is improved grassland but qualifies as a priority habitat

Habitat	Area (ha) / length (km)	% of Site area	Biodiversity Importance	Rationale
				(Coastal and Floodplain Grazing Marsh), as identified on MAGIC (Ref 8-38).
B5 - Marsh/marshy grassland	0.26 ha	<1	Local	HaPI; and Fens, marsh and swamp is an LBAP habitat in Nottinghamshire (Ref 8-68). Very small extent of this habitat within the Solar and Energy Storage Park and considered of Local value as it adds to the wider resource.
B6 - Poor semi-improved grassland	68.11 ha	8	Site	Not a HaPI
C1.1 - Bracken - continuous	0.32ha	<1	Site	Not a HaPI
C3.1 - Other tall herb and fern - ruderal	0.32 ha	<1	Site	Not a HaPI
F1 – Swamp (reedbed)	0.29 ha	<1	Local	HaPI; and Reedbed is an LBAP habitat in Lincolnshire (Ref 8-67); Fens, Marshes and Swamp is an LBAP habitat in Nottinghamshire (Ref 8-68). Very small extent of reedbed is present within the Order limits, with this habitat surrounding a single pond within the Solar and Energy Storage Park and along fringes of ditches. Due to small extent, it does not meet LWS selection criteria for this habitat in Lincolnshire (Ref 8-70) or Nottinghamshire (Ref 8-71).
G1 - Standing water	<0.1 ha	<0.01	Local	Ponds meeting certain criteria are a HaPI and can be defined as permanent (or seasonal) waterbodies up to 2 ha in extent and qualify as being a priority habitat if they meet one or more criteria for UKBAP classification, including supporting species of high conservation importance. The two water bodies within the Order limits contain little to no macrophytes or other aquatic vegetation and have little other ecological value. Furthermore, these water bodies are not a stand-alone habitat within the wider area, as similar habitat can be found in the surrounding area. Therefore, the water bodies within the Order limits are unlikely to reach the required level to fulfil the criteria of a priority habitat and are considered as being of no more than Local importance.

Habitat	Area (ha) / length (km)	% of Site area	Biodiversity Importance	Rationale
G2 - Running water (including the River Trent and wet ditches)	2.01 ha / 6.53 km	<1	County	Main Rivers are a HaPI (River Trent, Marton Drain, Seymour Drain). The River Trent is within and crossed by the Grid Connection Corridor.
Hardstanding	23.45 ha	2.4	Site	Not a HaPI.
J1.1 - Cultivated/disturbed land - arable	659.65 ha	80	Arable - Site Arable field margins - Local	The c. 657 ha of arable land is not a HaPI. However, arable field margins (herbaceous strips or blocks around arable fields that are managed specifically to provide benefits for wildlife) are present within the Order limits and are a HaPI and LBAP habitat in Lincolnshire and Nottinghamshire.
J1.2 - Cultivated/disturbed land - amenity grassland	1.15 ha	<1	Site	Not a HaPI
J1.3 - Cultivated/disturbed land - ephemeral/short perennial	0.57 ha	<1	Site	Not a HaPI
Hedgerows (intact and defunct)	33.91 km	-	Up to County	HaPI, legally protected under the Hedgerows Regulations (Ref 8-11). LBAP habitat in Lincolnshire and Nottinghamshire.
Hedgerows with trees (intact and defunct)	12.14 km	-	Up to County	HaPI, legally protected under the Hedgerows Regulations (Ref 8-11). LBAP habitat in Lincolnshire and Nottinghamshire
J2.4 - Fence	1.78 km	-	Site	Not a HaPI
J2.6 - Dry ditch	12.38 km	-	Site	Not a HaPI
J3.6 - Buildings	1.23 ha	<1	Site	Not a HaPI
J4 - Bare ground	1.06 ha	<1	Site	Not a HaPI
J5 - Other habitat (manure heaps / bailed straw / cover crops)	14.36 ha	1.7	Site	Not a HaPI

Legally protected and notable species

- 8.7.12 The data search, obtained in October 2021 from LERC and NBGRC, returned records of protected and notable species within the 2 km search radius from the Order limits and from the preceding ten years. These protected and notable species, including species of biodiversity importance are summarised in relevant technical reports, included as **Volume 3: Appendices 8-B to 8-L** of this ES [EN010131/APP/3.3].
- 8.7.13 Table 8-8 presents a summary of protected or notable animal species that have been identified as present, or potentially present, within the Order limits and their respective Survey Areas (see Table 8-1) alongside an evaluation including importance / value (sensitivity) and rationale of the ecological features for each species. Full descriptions of the baseline conditions are presented in **Volume 3: Appendices 8-B to 8-L** of this ES [EN010131/APP/3.3].
- 8.7.14 The assessment of biodiversity importance of species has been made for the entirety of the Order limits. Where the biodiversity importance of a receptor is specific to a particular area of the Order limits (e.g. occurring within the Solar and Energy Storage Park only), then this is specified with population size or specific species in Table 8-8.

Table 8-8 Summary of baseline details for legally protected and notable species, alongside assessment of biodiversity importance of ecological features

Ecological feature and technical appendix	Baseline Detail	Biodiversity Conservation Receptor	Biodiversity Importance	Rationale
Flora species (Appendix 8-C of this ES [EN010131/APP/3.3]).	The data search returned no records of notable flora. No protected flora species were recorded within the Order limits. Dwarf Spurge was the only notable arable flora species noted within the Order limits.	Notable arable flora species	Site Importance	A single notable species (Dwarf Spurge) recorded within the Solar and Energy Storage Park.
Terrestrial Invertebrates (Appendix 8-D of this ES [EN010131/APP/3.3]).	The data search returned records of 35 invertebrate species, including two species of beetle; one butterfly species (Small Heath butterfly <i>Coenonympha pamphilus</i>); and 32 moth species There is small areas of grassland habitat and arable margins within the Solar and Energy Storage Park that are likely to be of more value to terrestrial invertebrates, than the remainder of the Order limits. Three notable species were recorded in May 2022. No legally protected species recorded and one SPI (see Section 8.6.8) (Small Heath butterfly) recorded.	Notable terrestrial invertebrate species associated with grassland margins and grassland habitats	Local Importance	Three notable species recorded within the Solar and Energy Storage Park and no legally protected species recorded, or likely to occur. A single SPI (see Section 8.6.8) recorded (Small Heath butterfly) within the Solar and Energy Storage Park.
Aquatic Macrophytes (Appendix 8-E of this ES [EN010131/APP/3.3])	WFD classification for Tributary 1 of Padmoor Drain was Poor, while Seymour Drain and Ditch 3 were Moderate. Seymour Drain had a high abundance of the Schedule 9 Invasive Non-Native	Notable aquatic macrophyte species as per the citations of LWS locally.	Flat-stalked pondweed – Local Importance Other macrophytes – Site importance	Flat-stalked pondweed is listed as near threatened on the GB Red List and vulnerable on the England Red list. The species is under-recorded but is likely to be rare in the County.

Ecological feature and technical appendix	Baseline Detail	Biodiversity Conservation Receptor	Biodiversity Importance	Rationale
	<p>Species (INNS), Nuttall's waterweed <i>Elodea nuttallii</i>, and a low abundance of flat-stalked pondweed <i>Potamogeton friesii</i>, which is listed as near threatened on the GB Red List and vulnerable on the England Red list. No other notable or protected macrophyte species were found.</p>			<p>All other macrophytes are common and widespread, with the notable presence of INNS Nuttall's waterweed. Macrophyte community was somewhat limited by regular management of ditches for drainage purposes in a predominantly arable landscape, including dredging and weed cutting.</p>
<p>Aquatic macroinvertebrates (Appendix 8-E of this ES [EN010131/APP/3.3])</p>	<p>Tributary 1 of Padmoor Drain had Fairly High conservation value, while Seymour Drain, Ditch 3, Cow Pasture Lane, and Marton Drain were of Moderate conservation value. The Fairly High value at Padmoor Drain was by the nationally scarce water beetle <i>Scarodytes halensis</i>. Water beetle <i>Hygrotus quinquelineatus</i> (RDB Nationally Scarce) recorded in Mother Drain in desk study.</p>	<p>Aquatic macroinvertebrate assemblage, potentially notable as per the citations of LWS locally.</p>	<p>Water beetles <i>Scarodytes halensis</i> and <i>Hygrotus quinquelineatus</i> – Local Importance Other macroinvertebrates – Site importance</p>	<p>The assemblage of aquatic macroinvertebrates, and to some extent macrophytes, are indicative of the notable aquatic species assemblages listed in the citations of several Local Wildlife Sites (LWS) in and around the Scheme boundary.</p>
<p>Fish (Appendix 8-E of this ES [EN010131/APP/3.3])</p>	<p>Atlantic salmon <i>Salmo salar</i> are known to use the River Trent as a migratory route. The closest record to Site was a capture in a seine net at Stoke Bardolph (SK 64980 41715) approximately 60km upstream of the Site in November 2021. European Eel <i>Anguilla anguilla</i> are recorded in Padmoor drain and are likely to be present both</p>	<p>Notable and protected fish species present in water bodies within the Order Limits.</p>	<p>Atlantic salmon and European eel – County importance Other fish species – Site importance</p>	<p>Atlantic salmon is listed in Annex II of the Habitats Directive and is a SPI. European eel is also a SPI and is afforded protection under the Eel Regulations, which places an onus on developers to maintain eel passage and prevent eel entrainment. Though these records did not fall within the drains and ditches assessed in the present report, migratory species such as salmon, sea trout, European eel, and lamprey will be present within the River Trent at the crossing point, and there is</p>

Ecological feature and technical appendix	Baseline Detail	Biodiversity Conservation Receptor	Biodiversity Importance	Rationale
	<p>in this watercourse and its tributaries and other connected water bodies. Eel also make use of ditches and standing water bodies.</p> <p>Lamprey Petromyzontidae, spined loach <i>Cobitis taenia</i> and bullhead <i>Cottus gobio</i> are also recorded in the River Trent.</p>			<p>potential for these and other fish species to utilise water bodies connected to the River Trent.</p>
<p>Great Crested Newt (Appendix 8-F of this ES [EN010131/APP/3.3]).</p>	<p>The desk study identified the presence of this species in ponds to the north-west of the Solar and Energy Storage Park and to the east of the Grid Connection Corridor in Cottam. A review of Ordnance Survey mapping identified 58 water bodies within 500m of the Order limits. The suitability of 28 of these waterbodies occurring within 250m of the Order limits and scoped in for further survey, was assessed by collecting specified data which were used to calculate a Habitat Suitability Index (HSI) for each water body. Water sampling and eDNA analysis was then undertaken on 15 waterbodies which had been assessed as being suitable for Great Crested Newt and within 250m of the Order limits (the Survey Area) to determine the</p>	<p>Great Crested Newt presence in two water bodies outside of the Order limits.</p>	<p>Great Crested Newt - Local Importance</p>	<p>Great Crested Newt is listed on Schedule 5 of the WCA (Ref 8-1), which affords them protection under Section 9, as amended by the Countryside Rights of Way Act (2000) (Ref 8-5) and are also protected under Regulation 42 and Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (Ref 8-6). They are listed on Annex II and IV of the Habitats Directive (Ref 8-3), are included as SPI in England under Section 41 of the NERC Act 2006 (Ref 8-9).</p> <p>Great Crested Newt was not found within the Order limits. Surveys did identify presence of this species in two water bodies outside of the Order limits (116m and 36m from the Order limits, see Appendix 8-F of this ES [EN010131/APP/3.3]). Notwithstanding the international legislation that protects the species, due to presence within two water bodies within 500 m of the Order limits, a Great Crested Newt population of only Local Importance is considered to be present within the Survey Area.</p>

Ecological feature and technical appendix	Baseline Detail	Biodiversity Conservation Receptor	Biodiversity Importance	Rationale
	<p>presence or absence of Great Crested Newt.</p> <p>Positive eDNA samples for Great Crested Newt were returned from two water bodies outside of the Order limits (within 500 m of the Order limits).</p>			
<p>Reptiles and other amphibians (Appendix 8-G of this ES [EN010131/APP/3.3]).</p>	<p>The data search returned small numbers (<10) of records of Grass Snake <i>Natrix helvetica</i> within the study area and records of three other amphibian species (Smooth Newt <i>Lissotriton vulgaris</i>, Common Frog <i>Rana temporaria</i> and Common Toad <i>Bufo bufo</i>).</p> <p>Grass Snake and Common Lizard were recorded within suitable habitat within the Order limits during field surveys. Common Frog were recorded breeding in a single waterbody within the Order limits. No Common Toad or other amphibians were recorded.</p>	<p>Grass Snake and Common Lizard within the Order limits.</p> <p>Common Frog present within the Order limits, but no other amphibian species recorded.</p>	<p>Reptiles - Local Importance</p> <p>Other amphibians – Site Importance</p>	<p>Reptiles are protected from intentional injuring or killing under the WCA (Ref 8-1) and are SPI under Section 41 of the NERC Act (2006) (Ref 8-9). Low populations of both Common Lizard and Grass Snake are present in two areas within the Order limits.</p>
<p>Breeding Birds (Appendix 8-H of this ES [EN010131/APP/3.3]).</p>	<p>74 bird species were recorded within the survey area during surveys for breeding birds, with territories for 48 species confirmed and nine possible or probable territories, resulting in a</p>	<p>Common nesting bird species and an assemblage of notable birds (general breeding bird assemblage) breeding within the Order limits.</p>	<p>Up to County Importance</p>	<p>All nesting birds are protected under the WCA (Ref 8-1). Habitat present across the extent of the Order limits supports nesting birds.</p> <p>The arable land within the Order limits supports a number of notable species during the breeding season, including Yellowhammer, Linnet <i>Linaria cannabina</i> and Skylark <i>Alauda arvensis</i>; all are</p>

Ecological feature and technical appendix	Baseline Detail	Biodiversity Conservation Receptor	Biodiversity Importance	Rationale
Non-breeding (wintering and passage) birds (Appendix 8-I of this ES [EN010131/APP/3.3]).	breeding bird assemblage of 57 species across the Order limits. Territories of five specially protected species, included as Annex 1 species (Ref 8-2) and/ or included in Schedule 1 of the WCA, 1981 (Ref 8-1) confirmed or thought probably or possibly to be holding territories within the survey area.	Two territories of Black Redstart within the Zol (200m Survey Area) of the Grid Connection Corridor (Nottinghamshire) Zol	County Importance	BoCC (Ref 8-72) Red or Amber list species or listed as SPI (Ref 8-9).
		Population of Skylark within the Solar and Energy Storage Park	District Importance	Population of Skylark, a ground-nesting bird species included as an SPI (Ref 8-9) and on the BoCC Red List (Ref 8-72) is of likely District Importance in West Lindsey.
		Single territories of Quail, Hobby and Barn Owl within the Solar and Energy Storage Park and single territory of Peregrine within the Zol of the Grid Connection Corridor (Nottinghamshire)	Local Importance	Specially protected species owing to inclusion on Schedule 1 of the WCA (Ref 8-1). Populations of Quail, Hobby, Barn Owl and Peregrine do not approach the 1% level of the national or county populations.
	62 bird species recorded during the wintering bird surveys.	Assemblage of wintering birds within the Order limits.	Species Diversity is up to County importance.	No wintering bird population approaches the 1% level of the national population, which would constitute a nationally significant wintering bird population. Three species, listed on Annex I of the EC Birds Directive (Ref 8-2) were recorded within the survey area: Little Egret <i>Egretta garzetta</i> , Golden Plover <i>Pluvialis apricaria</i> and Kingfisher <i>Alcedo atthis</i> . Thirteen SPI (Ref 8-9) were recorded within the survey area.

Ecological feature and technical appendix	Baseline Detail	Biodiversity Conservation Receptor	Biodiversity Importance	Rationale
Bats (Appendix 8-J of this ES [EN010131/APP/3.3]).	<p>The desk study identified that the closest bat roost to the Order limits is a Soprano Pipistrelle <i>Pipistrellus pygmaeus</i> roost in Gate Burton, approximately 50m west of the Order limits (at its closest point). Based on the field data collected from the PRA survey and bat activity surveys, there are likely to be roosts within or close to the Order limits of Common Pipistrelle <i>Pipistrellus pipistrellus</i>, Soprano Pipistrelle, Noctule <i>Nyctalus noctula</i>, Leisler's Bat <i>Nyctalus leisleri</i>, Myotis bat species (<i>e.g.</i> Daubenton's Bat <i>Myotis daubentonii</i>) and Brown Long-eared Bat <i>Plecotus auritus</i>.</p> <p>Species recorded on the activity surveys (activity transects and static bat detectors) in 2022 comprised at least seven species: Common Pipistrelle, Soprano Pipistrelle, Brown Long-eared Bat, Noctule, Leisler's Bat, <i>Nyctalus</i> sp. (Noctule or Leisler's), Daubenton's Bat,</p>	<p>Foraging / commuting activity throughout of common and rarer bat species with potential for roosts within and adjacent to the Order limits.</p>	<p>Foraging / commuting habitat for the overall bat assemblage – up to County Importance. Common and Soprano Pipistrelle – up to County importance. Habitat for Noctule, Leisler's, Brown Long-eared Bat, Daubenton's bat, Whiskered bat and potentially other Myotis species - Local importance.</p>	<p>Twelve species, included on the Birds of Conservation Concern (BoCC) Red List (Ref 8-72) and 23 species, included on the BoCC Amber list (Ref 8-72), were recorded within the survey area. The remaining species are all included on the Green list and are of least conservation concern.</p> <p>All bat species and their roosts are legally protected in the UK under the WCA (Ref 8-1) and Conservation of Habitats and Species Regulations (Ref 8-6), which implemented the Habitats Directive (Ref 8-3). Seven bat species are also included as SPI under Section 41 of the NERC Act (Ref 8-9).</p> <p>Biodiversity importance of foraging and commuting bats based on species rarity, estimated numbers of bats, presence of nearby roosts and type / complexity of community/foraging features. All potential roosts currently to be retained and not disturbed.</p>

Ecological feature and technical appendix	Baseline Detail	Biodiversity Conservation Receptor	Biodiversity Importance	Rationale
	Whiskered bat <i>Myotis mystacinus</i> , and unknown <i>Myotis</i> species.			
Otter (Appendix 8-K of this ES [EN010131/APP/3.3]).	Otters were found to use the River Trent with recent desk study records nearby. No Otter holts, couches or resting sites recorded within the Order limits.	Population of Otter using the River Trent	Local Importance	Otter is protected under Schedule 5 of the WCA (Ref 8-1) and under The Conservation of Habitats and Species Regulations 2017 (Ref 8-6). Otters have an estimated British population of 11,000 and are increasing in population size and range. There are of IUCN Least Concern Status in England. The absence of holts, couches or resting sites within the survey area means the Order limits is likely to only support an Otter Population of Local Importance.
Water Vole (Appendix 8-K of this ES [EN010131/APP/3.3]).	Water Vole presence recorded in ditches within the Solar and Energy Storage Park. Presence in suitable watercourses within the Grid Connection Corridor, inferred by records within this area from the desk study.	Population of Water Vole in ditches within the Order limits	District Importance	Water Vole are protected under Schedule 5 of the WCA (Ref 8-1). A low population size recorded but in consideration of this species' declining status in a national and county context, the population of Water Vole is potentially of District importance.
Badger (Appendix 8-L of this ES [EN010131/APP/3.3]).	Nine Badger setts, seven of which were in active use were identified within 50 m of the Order limits. Of these seven active setts there were three well-used main setts and three well-used outliers, with one partially used outlier sett.	At least four separate Badger social groups present within or in the vicinity of the Order limits.	Local Importance	Badgers are protected under The Protection of Badgers Act 1992 (Ref 8-10), however, they remain common and widespread throughout Lincolnshire and Nottinghamshire.

Ecological feature and technical appendix	Baseline Detail	Biodiversity Conservation Receptor	Biodiversity Importance	Rationale
Other mammals (including Brown Hare and Hedgehog)	<p>The data search returned records of Brown Hare and this species has been recorded within the Order limits during other ecological surveys.</p> <p>The data search returned records of Hedgehog within the study area (see Section 8.5). This species has the potential to occur across the Order limits.</p>	<p>Presence of Brown Hare within the Order limits.</p> <p>Assumed presence of Hedgehog within the Order limits.</p>	Local Importance	<p>No surveys have been undertaken for other mammals and whilst Brown Hare, Hedgehog and Polecat are all SPI in England (Ref 8-9) any incidental records of these species were recorded during other ecological surveys. Whilst only Brown Hare was recorded within the Order limits, an assumption has been made of potential presence of other mammal species across the Order limits and mitigation designed appropriately to avoid impacts to these species (if present).</p>
Invasive non-native animal and plant species	<p>The data search returned records of invasive species, including Muntjac <i>Muntiacus reevesi</i>, American Mink, Mitten Crab <i>Eriocheir sinensis</i>, American Mink, New Zealand Pigmyweed <i>Crassula helmsii</i>, Himalayan Balsam <i>Impatiens glandulifera</i> and Japanese Knotweed <i>Reynoutria japonica</i>. None of these records were from within the Order limits. Canadian pondweed <i>Elodea canadensis</i> was also recorded in desk study in a tributary of the River Trent.</p> <p>No invasive non-native species, including Muntjac and Mink, were recorded within the Order limits during ecological surveys, other than Nuttall's waterweed in Seymour Drain.</p>	<p>Potential impacts upon native species and habitats within and outside the Order limits due to the spread of invasive non-native species, and associated biosecurity risks, e.g. due to the spread of water-borne diseases such as crayfish plague and invasion of ditches by New Zealand Pigmyweed.</p>	N/A	<p>Section 14 and Schedule 9 of the WCA (Ref 8-1) and Schedule 2 of The Invasive Alien Species (Enforcement and Permitting) Order 2019 (Ref 8-15).</p>

Future Baseline

- 8.7.15 The future baseline scenarios are set out in **Chapter 5: EIA Methodology** of this ES [EN010131/APP/3.1].
- 8.7.16 This section considers those changes to the baseline conditions, described above, that might occur in the absence of the Scheme and during the time period over which the Scheme would be in place.
- 8.7.17 The habitat within the Order limits and up to 50m from the Order limits is dominated by arable fields (cropped on rotation) with a few fields of semi-improved grassland, bordered by mature trees and hedges, woodlands (including ancient woodland) and two ponds (see Table 8-7). The River Trent is to the west of the village of Gate Burton.
- 8.7.18 In the short to medium term, in the absence of the Scheme, these habitats have and will continue to provide a number of species with potential habitat such as arable farmland for ground-nesting breeding birds. In the long term, in the absence of the Scheme, habitats on site will be under agricultural management and therefore the distribution of some species will change in response to cropping, whilst the assemblages may remain broadly the same.
- 8.7.19 Any changes to the baseline between now and the future scenario have been taken into account in the assessment and when determining mitigation measures. The level of disturbance from crop husbandry, e.g. ground preparation and combine harvesting as well as agri-chemical inputs are likely to remain the same. Likewise, the water table will continue to be maintained at its unnatural level and certain crops will be irrigated as part of their cultivation.
- 8.7.20 Irrespective of whether the Scheme were to proceed or not, the current national and local trend is for a decline in species diversity and abundance, e.g. farmland birds and continuing decline in insect and plant biodiversity associated with arable agriculture, and these declines are likely to continue throughout the duration of the Scheme.

Construction Period (assumed to be 2025-2028)

- 8.7.21 Based on current trends, species abundance and diversity are likely to remain similar to the existing baseline conditions during the construction period, although the trajectory for the majority of species is continued decline.
- 8.7.22 If the Scheme did not proceed, the majority of existing habitats are likely to continue being present, although some changes in habitat extent, composition and structure will occur as a result of ecological succession e.g. the gradual establishment of tree and shrub seedlings within woodland areas and along hedgerows. These resultant gradual changes in habitat composition are unlikely to materially alter the ecological baseline and therefore the habitats and species present are very unlikely to undergo significant change prior to 2025 and up to 2028.

Operation (assumed to be 2028-2088)

- 8.7.23 Based on current projections the long-term, i.e. the next 60 years, will continue to see a decline in biodiversity, including species associated with the baseline

conditions present within the Order limits. This will have implications for the species assemblages present during opening and operation of the Scheme.

8.7.24 Local planning policy targeted at halting and reversing these declines is set out in **Volume 3: Appendix 8-A** of this ES [EN010131/APP/3.3].

8.7.25 If the Scheme did not progress, based on available information, whilst there is likely to be an overall decline in biodiversity, there are no reasons to expect that there would be any marked change in the broad habitat types associated with the Scheme between opening in 2028 and 2088 (based on an estimated 60-year operation). It is noted however, that changing climatic conditions resulting from climate change may influence the resilience of certain habitats and species, such as grasslands and their associated faunal communities. Habitats such as broad-leaved trees and scrub will be more mature but are likely to support a broadly similar species assemblage and arable farmland will also be managed accordingly, maintaining broadly similar species assemblages.

Decommissioning (assumed to be 2088-2091)

8.7.26 The future baseline conditions in 2088 are currently unknown and more difficult to predict given the time period that would need to lapse between now and then. They are likely to be similar to those at the start of construction (2025), although habitats such as plantation woodland would have matured further, though some may have been felled or partially cropped. Species assemblages are also likely to have changed in accordance with the site conditions, with changes in biodiversity likely to occur as climate change continues at its current pace. Effects could include changes in species habitats and compositions and consequently changes in species assemblages and distribution. A **Framework DEMP [EN010131/APP/7.5]** has been prepared to support the DCO submission and will be finalised prior to the decommissioning. This has included measures which will be adaptive to accommodate climate related changes in the environment present within the Order limits at the time of decommissioning.

Important Ecological Features

8.7.27 Table 8-9 summarises the IEFs that are relevant to the Scheme. Based on CIEEM guidelines (Ref 8-34) and using professional judgement, features of Site importance, *i.e.* less than Local importance, are not considered further in the assessment process.

Table 8-9 Summary of IEFs

IEF	Importance / Sensitivity (see Table 8-2)	Reason for valuation
Ashton's Meadow SSSI	National	Statutory site of biodiversity conservation importance and therefore qualifies as High Importance .
Lea Marsh SSSI	National	Statutory site of biodiversity conservation importance and therefore qualifies as High Importance .

IEF	Importance / Sensitivity (see Table 8-2)	Reason for valuation
Fifteen sites of county importance (LWSs – see Table 8-6)	County	Non-statutory sites of biodiversity conservation importance, qualifying as Medium Importance .
Habitat – broadleaved woodland (including ancient / semi-natural woodland)	County	Habitat of ecological importance included as a Priority Habitat or LBAP habitat. Therefore, this habitat qualifies as being of Medium Importance , owing to the adjacent blocks of ancient / semi-natural woodland.
Habitat – acid grassland (semi-improved) within the Grid Connection Corridor	County	Habitat of ecological importance included as a Priority Habitat or LBAP habitat. Small extent of this habitat (c. 0.6 ha) but amounts to 3.9% of the habitat type occurring in Nottinghamshire and therefore, this habitat qualifies as being of Medium Importance .
Habitat – Coastal and Floodplain Grazing Marsh within the Grid Connection Corridor	County	Coastal and Floodplain Grazing Marsh either side of the River Trent qualifies as a habitat of ecological importance included as a Priority Habitat and LBAP habitat. Therefore, this habitat qualifies as being of Medium Importance .
Habitat - Marsh / marshy grassland within the Solar and Energy Storage Park	Local	Habitat of ecological importance included as a Priority Habitat or LBAP habitat. Considered as being of Low Importance due to small extent (c 0.3 ha) of this habitat within the Order limits.
Habitat - Swamp	Local	Habitat of ecological importance included as a Priority Habitat or LBAP habitat. Considered as being of Low Importance due to small extent (c. 0.3 ha) of this habitat within the Order limits.
Habitat – Standing Water	Local	Habitat of ecological importance included as a Priority Habitat or LBAP habitat. Considered as being of Low Importance as only two ponds within the Order limits and neither fulfil the criteria of a priority habitat.
Habitat – Running Water	County	The River Trent is within the Order limits and qualifies as being of Medium Importance .
Habitat – arable flora	Local	Four fields containing a single notable species (Dwarf Spurge) and qualifies as Low Importance .
Habitat – hedgerows	Up to County	The network of hedgerows across the Order limits will be of value to birds, bats, and other fauna, therefore hedgerows qualify as being of Medium Importance .
Terrestrial Invertebrates	Local	Small areas of habitat of greater value to terrestrial invertebrates, confined to arable margins and grassland areas. Three notable species recorded on the Solar and Energy Storage Park. Therefore, qualifies as being of Low Importance .
Aquatic macrophytes	Up to Local	Flat-stalked pondweed is listed as near threatened on the GB Red List and vulnerable on the England Red list. The species is under-recorded but is likely to be rare in the County and is therefore of Low Importance .
Aquatic macroinvertebrates	Up to Local	The assemblage of aquatic macroinvertebrates, and to some extent macrophytes, are indicative of the notable aquatic species assemblages listed in the citations of several Local

IEF	Importance / Sensitivity (see Table 8-2)	Reason for valuation
		Wildlife Sites (LWS) in and around the Scheme boundary, and is therefore of Low Importance .
Fish	Up to County	Atlantic salmon is listed in Annex II of the Habitats Directive and is a SPI. European eel is also a SPI and is afforded protection under the Eel Regulations, which places an onus on developers to maintain eel passage and prevent eel entrainment. These species are therefore of Medium Importance .
Great Crested Newt	Local	Presence of this species confirmed in two ponds outside of the Order limits. Therefore, qualifies as being of Low Importance .
Reptiles	Local	Presence of small population of two reptile species confirmed within the Order limits. Therefore, qualifies as being of Low Importance .
Breeding birds – general breeding bird assemblage	Up to County	Populations of common and notable breeding bird species, of up to County importance, and therefore qualifies as being of Medium Importance .
Breeding birds – territories of Black Redstart within the Grid Connection Corridor Zol	County	Population of Black Redstart within the Grid Connection Corridor Zol qualifies as being of Medium Importance .
Breeding birds – territories of Skylark within the Solar and Energy Storage Park	District	Population of Skylark within the Solar and Energy Storage Park qualifies as being of Medium Importance .
Breeding birds – territories of specially protected species	Local	Population of Quail, Hobby and Barn Owl within the Solar and Energy Storage Park qualifies as being of Low Importance . Population of Peregrine within the Grid Connection Corridor Zol qualifies as being of Low Importance .
Wintering birds	Up to County	Species Diversity qualify as being of Medium Importance .
Bats	Up to County	Potential for roosts within the Order limits and would qualify as being of Medium Importance .
Otter within the Grid Connection Corridor	Local	Presence of this species using the River Trent, although no Otter holts, couches or resting sites identified and therefore, qualifies as being of Low Importance .
Water Vole	District	Presence of this species within the Order limits and qualifies as being of Medium Importance due to low population recorded, but in consideration of National and County declines of this species.
Badger	Local	Badgers occurring within the Order limits are of Low Importance , due to the presence of four separate social groups within, or in the vicinity of, the Order limits.

IEF	Importance / Sensitivity (see Table 8-2)	Reason for valuation
Other mammals	Local	Presence of Brown Hare and potential presence of other mammals across the Order limits and would qualify as being of Low Importance .

8.8 Potential Impacts

8.8.1 Mitigation measures being incorporated in the design and construction of the Scheme are set out below. Prior to the implementation of the mitigation, the Scheme has the potential to affect ecology and biodiversity (positively or negatively), during construction, operation and during decommissioning, in the following ways:

Construction (assumed to be 2025-2028)

8.8.2 Impacts on biodiversity features during construction of the Scheme are likely to include:

Negative impacts:

- Habitat loss – direct impacts associated with changes in land use resulting from the Scheme, for example temporary works associated with site clearance, and permanent land-take (mainly arable land) associated with the installation of the Scheme.
- Fragmentation of populations or habitats – indirect impacts due to the Scheme dividing a habitat, group of related habitats, site or ecological network, or the creation of partial or complete barriers to the movement of species, with a consequent impairment of ecological function.
- Disturbance – indirect impacts resulting from a change in normal conditions (light, noise, vibration, human activity) that result in individuals or populations of species changing behaviour or range.
- Habitat degradation – direct or indirect impacts resulting in the reduction in the condition of a habitat and its suitability for some or all of the species it supports, for example changes in chemical water quality or changes in surface flow or groundwater.
- Species mortality – direct impacts on species populations associated with mortalities due to construction activities, for example site clearance.
- Introduction of invasive species – the movement of personnel, equipment and plant machinery, potentially facilitates the introduction of invasive species.

Beneficial impacts

- Indirect beneficial impacts through a possible reduction of agricultural chemical inputs to watercourses / reduction in pesticide use on crops within the local area resulting in an increase in invertebrate abundance and diversity.

Operation (assumed to be 2028-2088)

8.8.3 Impacts on biodiversity features during the operational phase of the Scheme are likely to include:

Negative impacts:

- Potential attraction of aquatic invertebrates to solar panels, causing displacement and mortality;
- Potential avoidance of species using the Order limits, such as bats and birds, due to indirect impacts through operational lighting;
- Potential noise attraction or disturbance from BESS and operational compounds;
- Disturbance of sensitive species during operational maintenance activities; and
- Fragmentation of habitats causing a barrier effect, e.g. due to fencing.

Beneficial impacts

- Increases in permanent habitat of greater floristic diversity than arable farmland, increasing invertebrate assemblages and abundance;
- Increased connectivity through enhanced planting of woodland and hedgerows;
- Wide undeveloped field margins and areas of natural regeneration providing enhanced nesting and foraging habitats for farmland birds, small mammals, amphibians and reptiles;
- Shift of drainage regime to a more natural water-table;
- Potential attraction and increases in species foraging around and within the Order limits, such as bats and birds, from increases in prey items (e.g. flying insects);
- Potential increases in abundance and distribution of species, due to lack of human disturbance and changes in habitat (such as agricultural practices) within the Order limits; and
- Indirect beneficial impacts through a possible reduction of agricultural chemical inputs to watercourses / reduction in pesticide use on crops within the local area resulting in an increase in invertebrate abundance and diversity.

Decommissioning (assumed to be 2088-2091)

8.8.4 Impacts on biodiversity features during decommissioning of the Scheme are likely to be the same as construction. However, field surveys would be required in advance of decommissioning to define the ecological baseline at the time of decommissioning and to ensure that impacts on ecological features are identified to ensure avoidance and if not feasible, mitigation. Upon decommissioning the above-ground physical infrastructure will be removed, and the land within the Order limits will be returned to landowners in the condition as at the end of operation, including the established habitats and associated species, to allow landowners to return the land to its original use.

8.9 Embedded Mitigation Measures

- 8.9.1 In line with planning policy (see Section 8.3), the Scheme design has sought avoidance of IEFs as a first principal. Where this has not been possible, then embedded mitigation measures have been added to form an integral, committed and deliverable part of the scheme design or comprise standard construction practices. They are assumed to be implemented and are therefore factored into the determination of significant effects. The following embedded mitigation measures have been identified.

Construction

- 8.9.2 Primary avoidance and mitigation measures have been embedded into the Scheme to minimise construction impacts on biodiversity and these are presented in the following sections.

Scheme design

- 8.9.3 The Scheme design has evolved to avoid statutorily and non-statutorily designated sites. Measures embedded within the Scheme design ensure that designated sites are not impacted during construction, operation or decommissioning e.g. through siting construction routes away from and outwith designated sites, incorporating suitable buffer zones and erection of temporary construction fencing to avoid incursion into exclusion zones.

Habitat Avoidance Measures

- 8.9.4 From the outset the Scheme has been designed to avoid key nature conservation and ecological features present within or adjacent to the Order limits. Accordingly, the following buffers from key habitat features have been applied within the Solar and Energy Storage Park:
- All woodlands, including ancient woodland – at least 15m;
 - All trees within hedgerows and individual trees – protected by clearly defined root protection areas, concordant with the requirements for each individual tree;
 - All watercourses (where practicable) – at least 10m from the centre line of the watercourse; and
 - All hedgerows – at least 5m.

Framework Construction Environmental Management Plan

- 8.9.5 The implementation of the **Framework CEMP [EN010131/APP/7.3]**, secured through the DCO, includes measures to manage the environmental effects of the Scheme and to demonstrate compliance with environmental legislation. Accordingly, the Framework CEMP details the measures required (see below) to mitigate any construction related effects on biodiversity, including those associated with dust deposition, air pollution, pollution incidents, water quality, light, noise and vibration.

Vegetation Clearance

- 8.9.6 Vegetation clearance will be undertaken in advance of construction and at an appropriate time of year so as to avoid the nesting bird period and incidental injuring or killing of reptiles and amphibians. Therefore, construction will avoid the nesting bird period *i.e.*, March to August (inclusive) for vegetation clearance and, in areas supporting reptiles, would be undertaken at an

appropriate time of year, concordant with requirements for other species (such as nesting birds and Brown Hare). Any vegetation clearance proposed within the nesting bird period will be checked for the presence of any nests by a suitably qualified ornithologist, prior to vegetation removal, and if active nests are found, then appropriate buffer zones would be put in place and the area monitored until the young birds have fledged. Vegetation supporting reptiles will be cut in a phased approach, firstly cutting to 30 cm, then, following a period of no less than 24 hours, to 15cm and then to ground level, after another 24 hours. In areas where reptiles or amphibians have been identified, any habitat features within such areas which may conceal sheltering reptiles and amphibians (log piles, rubble mound bunds, any other debris etc.) will not be dismantled during their inactive season (November to February inclusive).

Security Perimeter Fencing

- 8.9.7 A security perimeter fence will be implemented early in the construction phase to secure the Order limits and prevent construction activity in proximity to peripheral habitats and retained habitats within the Order limits. The fence design will include gaps to allow mammals that may use woodland habitats, including small deer, Badger, Brown Hare and Hedgehog, to pass underneath at strategic locations. Equally, in some locations, gaps will be avoided to allow the security fencing to act as an anti-predator fence, particularly in areas targeted at providing habitat for ground-nesting birds.

Construction Lighting

- 8.9.8 Where lighting is required, it will conform to best practice guidelines with respect to minimising light spill into habitats. With reference to **ES Volume 1, Chapter 2: The Scheme [EN010131/APP/3.1]**, temporary construction site lighting, in the form of mobile lighting towers with a power output of 8 kilo volt-amperes (kVAs), will be required in areas where natural lighting is unable to reach (sheltered/confined areas) and during core working hours within winter months. All construction lighting will be deployed in accordance with the following recommendations to prevent or reduce the impact on human and ecological receptors:

- The use of lighting will be minimised to that required for safe site operations and security;
- Lighting will be controlled by infrared settings;
- Lighting will utilise directional fittings to minimise outward light spill and glare (e.g. via the use of light hoods/cowls which direct light below the horizontal plane, preferably at an angle greater than 20° from horizontal); and
- Lighting will be directed towards the middle of the Order limits rather than towards the boundaries.

Drilling Methods for Watercourse Crossings

- 8.9.9 During construction of the Grid Connection Corridor, the River Trent and the majority of smaller watercourses (those within allocated avoidance areas (as shown on **ES Volume 3: Appendix 2-B (Figure 1) [EN010131/APP/3.3]**)) will be crossed using underground techniques (e.g. horizontal directional drilling (HDD) techniques that would not disturb the watercourse), with the depth of the cable below the bed to be greater than 2 m.

- 8.9.10 However, there are six watercourse crossings that are outside of the avoidance areas could require open cut installation techniques. For these crossings it is assumed that water flow would be maintained by damming and over pumping. These watercourses are generally ephemeral ditches and if works are carried out in the drier months this would reduce the risk of pollution propagating downstream, although this cannot be guaranteed.
- 8.9.11 Within avoidance areas (as shown on **ES Volume 3: Appendix 2-B (Figure 1) [EN010131/APP/3.3]**), setbacks of at least 10 m from the water's/channel edge from all watercourses is considered sufficient to mitigate for potential hazards such as chemical and soils spills into watercourses and avoid potential direct impacts to watercourses, as well as Otter, which occasionally use the River Trent for commuting and foraging. The **Framework CEMP [EN010131/APP/7.3]** will specify requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching watercourses during flood events during construction. A full list detailing crossing methods and an explanation of these techniques is provided in **Chapter 9: Water Environment** of this ES [EN010131/APP/3.1].

Drainage Strategy

- 8.9.12 A **Scheme Outline Drainage Strategy ES Volume 3: Appendix 9-C. [EN010131/APP/3.3]** has been developed to manage surface water runoff and will reduce the likelihood and severity of potential pollution incidents and flooding affecting watercourses and the local ditch network to reduce or eliminate adverse effects for aquatic and riparian species and habitats.

Wildlife Legislation Compliance

- 8.9.13 To comply with relevant wildlife legislation, pre-construction surveys, such as Phase 1, badger and/or bat walkovers (if roost features are impacted), will be undertaken to support the baseline survey findings. The purpose of these pre-construction surveys is to ensure mitigation during the construction phase is based on the latest protected species information. This will also be required for any protected species licensing that may be identified as being necessary at detailed design stage. These surveys will also provide an update on the presence and location of any invasive species, the findings of which will inform the implementation of measures to prevent their spread into the wild. These surveys will inform the production of a Biosecurity Management Plan which will set out procedures to ensure that no invasive species are brought onto the Order limits (e.g. WCA Schedule 9 species (Ref 8-1) and will be secured through the **Framework CEMP [EN010131/APP/7.3]**. In the event that any future infestations of invasive non-native species are identified prior to and or during the development process, exclusion zones will be established around them, and an Ecological Clerk of Works (ECoW) contacted for advice as required.
- 8.9.14 During construction and operation, Reasonable Avoidance Measures (RAMs), including appropriate buffers (of up to 30 m) around any identified Badger setts, or trees with bat roost potential (a buffer of 15 m) throughout the Scheme (e.g. from solar arrays and along the Grid Connection Corridor).
- 8.9.15 Implementation of measures to avoid animals being injured or killed within construction working areas, such as through the inclusion of perimeter fencing

and covering excavations or providing a means of escape, will exclude them from such areas and prevent them falling into and becoming trapped in excavations.

8.9.16 Details of how the Scheme design's embedded avoidance and mitigation measures interact with IEFs are presented in Table 8-10.

Table 8-10 Embedded Mitigation Measures

Baseline details	Embedded Mitigation
Designated Sites	
Statutory sites (Ashton's Meadow SSSI and Lea Marsh SSSI)	<p>Scheme Design: The Scheme design avoids all statutory sites of biodiversity conservation importance (see Table 8-5), with the closest site being 540m from the Order limits (see Table 8-5).</p>
Non-statutory sites (15 sites of county importance)	<p>Scheme Design: The Scheme design avoids any direct impact on all 15 of the non-statutory sites of biodiversity conservation importance (see Table 8-6) with only one non-statutory site (Cow Pasture Lane Drains LWS) being within the Grid Connection Corridor (see Table 8-6). Indirect effects are avoided on two Local Wildlife Sites immediately adjacent to the Order limits (Knaith Park Woodland (15 m from Order limits) and Coates Wetland (35m)). The remaining 12 LWSs are further than 200m away from the Order limits.</p> <p>Construction: The Grid Connection Corridor crossing of Cow Pasture Lane Drains LWS will be undertaken using HDD methods to lay cabling, therefore avoiding impacts to the drain and hedge, with setbacks of at least 10m from the centreline of the drain, which is considered sufficient to mitigate for potential hazards such as chemical and soils spills into watercourse and avoid potential direct impacts to the LWS and riparian habitats. Access for construction of the Grid Connection Corridor will utilise an existing access track that runs alongside Cow Pasture Lane Drains LWS. However, where there is a need to cross the LWS, this will be via a Bailey bridge, rather than culvert to minimise negative impacts. Construction compounds will be setback from this LWS with a minimum 10m from the centre line of the watercourse. Furthermore, measures to ensure incursion into this LWS does not occur will be put in place, e.g. security fencing, which will be implemented at an early stage. With respect to Cow Pasture Lane Drains, Knaith Park Woodland and Coates Wetlands LWSs, the Framework CEMP [EN010131/APP/7.3] specifies requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching watercourses during flood events during construction. A full list of the crossing methods and an explanation of these techniques is provided in Chapter 9: Water Environment of this ES [EN010131/APP/3.1].</p>
Habitats	
Broad-leaved woodland (including ancient / semi-natural)	<p>Scheme Design:</p>

Baseline details

Embedded Mitigation

woodland) occurring within, or adjacent to, the Order limits

The Scheme design retains all woodland habitats, with undeveloped buffers of at least 15 m between woodlands and the Scheme, thereby avoiding any direct impact on this habitat type.

Construction:

The **Framework CEMP [EN010131/APP/7.3]** specifies requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching any woodland through flood events during construction, thereby avoiding any indirect impact on this habitat type.

Acid Grassland (semi-improved)

Scheme Design:

The Scheme design will avoid direct and indirect impacts on the small area (0.58 ha) of this habitat, which is located within the Grid Connection Corridor at Cottam Power Station.

Construction:

The **Framework CEMP [EN010131/APP/7.3]** specifies requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching the patch of acid grassland through flood events during construction.

Furthermore, measures to ensure incursion into this habitat does not occur will be put in place, e.g. security fencing, which will be implemented at an early stage.

Coastal and Floodplain Grazing Marsh

Scheme Design:

The Scheme has been designed to avoid direct and indirect impacts to this habitat, which is located either side of the River Trent.

Construction:

The crossing of the River Trent will be undertaken using HDD methods to lay cabling, therefore avoiding impacts to watercourses, including the Coastal and Floodplain Grazing Marsh either side of the River Trent, with launch and exit pits located outside of this habitat, which is considered sufficient to mitigate for potential hazards such as chemical and soils spills into watercourses and avoid potential direct impacts to the River Trent, Coastal and Floodplain Grazing Marsh and Otter, which use the river for commuting and foraging. The **Framework CEMP [EN010131/APP/7.3]** specifies requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching watercourses (and riparian habitats) through flood events during construction.

Marsh / Marshy Grassland

Scheme Design:

The Scheme has evolved to remove the areas of marshy grassland from the developable areas of the Scheme. Therefore, this habitat will be retained and measures taken to avoid any direct or indirect impacts (see below).

Construction:

Whilst the Scheme design avoids this habitat, owing to a proposed access road within the vicinity of this habitat, measures to ensure incursion into this habitat does not occur will be put in place, e.g. security fencing, which will be implemented at an early stage to protect retained habitats from incursion during construction.

Baseline details

Embedded Mitigation

Baseline details	Embedded Mitigation
Swamp and Standing water (ponds)	<p>The Framework CEMP [EN010131/APP/7.3] specifies requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching marsh / marshy grassland through flood events during construction.</p> <hr/> <p>Scheme Design: The Scheme has been designed to ensure standing water habitats are outside of the developable areas of the Scheme. Therefore, this habitat (which occurs on the margins of standing water and within some watercourses) will be retained, and measures taken to avoid direct or indirect impacts.</p> <hr/> <p>Construction: Whilst the Scheme design avoids this habitat, measures to ensure incursion into this habitat does not occur will be put in place, e.g. security fencing, which will be implemented at an early stage to protect retained habitats from incursion during construction. The Framework CEMP [EN010131/APP/7.3] specifies requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching swamp and standing waters through flood events during construction.</p>
Running Water	<p>Scheme Design: The Scheme has been designed to ensure running water habitats are outside of the developable areas of the Scheme. Therefore, this habitat will be retained, and measures taken to avoid direct or indirect impacts.</p> <p>Construction: Within the Solar and Energy Storage Park, the use of existing watercourse crossing points will be used for construction access, where practicable. More information on the crossing points and methods are presented in Chapter 9: Water Environment of this ES [EN010131/APP/3.1]. Within the Grid Connection Corridor, the crossing of the River Trent will be undertaken using HDD methods to lay cabling, therefore avoiding impacts to watercourses, including the Coastal and Floodplain Grazing Marsh either side of the River Trent, with launch and exit pits located outside of this habitat, which is considered sufficient to mitigate for potential hazards such as chemical and soils spills into watercourses and avoid potential direct impacts to the River Trent, Coastal and Floodplain Grazing Marsh and Otter, which use the river for commuting and foraging. The Framework CEMP [EN010131/APP/7.3] specifies requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching watercourses during flood events during construction. A full list of crossing methods and an explanation of these techniques is provided in Chapter 9: Water Environment of this ES [EN010131/APP/3.1].</p>
Arable Flora	<p>Scheme Design: The Scheme design retains and avoids direct and indirect impacts to the majority of arable margins within the Solar and Energy Storage Park.</p> <p>Construction:</p>

Baseline details

Embedded Mitigation

Whilst the Scheme design retains arable margins, measures to ensure incursion into these habitats does not occur will be put in place, e.g. security fencing, which will be implemented at an early stage to protect retained habitats from incursion during construction.

The **Framework CEMP [EN010131/APP/7.3]** specifies requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching retained habitats through flood events during construction.

Hedgerows

Scheme Design:

The Scheme has been designed to ensure hedgerows are outside of the developable areas of the Scheme. Therefore, the majority of this habitat will be retained, and measures taken to avoid direct or indirect impacts.

Construction:

Whilst the Scheme design avoids this habitat, measures to ensure incursion into this habitat does not occur will be put in place, e.g. security fencing, which will be implemented at an early stage to protect retained habitats from incursion during construction.

The **Framework CEMP [EN010131/APP/7.3]** specifies requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching hedgerows through flood events during construction.

Species

Terrestrial Invertebrates

Scheme Design:

The Scheme design retains and avoids direct and indirect impacts to the majority of habitats of value to terrestrial invertebrates, including woodland, grassland margins, ditches, scrub and hedgerows within the Solar and Energy Storage Park.

Construction:

Whilst the Scheme design retains habitats of greater terrestrial invertebrate interest, measures to ensure incursion into these habitats does not occur will be put in place, e.g. security fencing, which will be implemented at an early stage to protect retained habitats from incursion during construction.

The **Framework CEMP [EN010131/APP/7.3]** specifies requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching retained habitats through flood events during construction.

Aquatic macrophytes and macroinvertebrates

Scheme Design:

The Scheme design retains and avoids direct and indirect impacts to the majority of habitats of value to aquatic macrophytes and macroinvertebrates, including watercourses and ditches, and their riparian zones.

Construction:

Whilst the Scheme design retains habitats of greater aquatic interest, measures to ensure incursion into these habitats does not occur will be put in place, e.g. security fencing, which will be implemented at an early stage to protect retained habitats from incursion during construction.

Baseline details

Embedded Mitigation

Baseline details	Embedded Mitigation
Fish	<p>The Framework CEMP [EN010131/APP/7.3] specifies requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching retained habitats through flood events during construction, and excessive siltation from runoff during construction.</p> <hr/> <p>Scheme Design: The Scheme design retains and avoids direct and indirect impacts to the majority of habitats of value to fish, including watercourses and ditches, notably the River Trent and its tributaries.</p> <p>Construction: During activities where there are direct impacts to watercourses or water bodies, for example through drain-down, culverting, or open-trenching, the following mitigation is proposed:</p> <ul style="list-style-type: none">• Avoidance of key fish migration timings wherever possible e.g., avoiding key fish migration seasons (April to June for European eel; September to November for Atlantic salmon).• Fish rescue and/or translocation during drain-down of watercourses or water bodies, and during the installation of culverts or over-pumping for open trenching through watercourses/ditches; and• Consideration given to invasive non-native species (INNS) known to be present in water bodies, most notably Nuttall's waterweed, with appropriate biosecurity measures implemented. <p>The following pollution prevention measures will be implemented:</p> <ul style="list-style-type: none">• Prevent erosion and runoff by minimising vegetation and soil disturbance. Ensure the implementation of exclusion buffer zones (10m) for the full length of watercourses within the construction buffer zone. Include further preventative measures, such as runoff/settlement ponds and/or silt fencing if necessary;• Where construction vehicles are required to pass over the water bodies, vehicles/plant must be cleaned away from the water in dedicated vehicle washing areas to prevent potential pollutants entering the surface water system, before crossing over the water body;• Control the spread of dust and sediment through fine water spraying of vehicle routes;• Regularly service, monitor and inspect on-site plant for leaks to prevent construction spillages and to ensure pollutants do not enter the waterways. Refuel plant and machinery in dedicated refuelling areas, with drip-trays used routinely and spill kits available; and• Cover and protect all surface water drainage systems from pollution and sediment input. <p>The Framework CEMP [EN010131/APP/7.3] specifies requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching retained habitats through flood events during construction, and excessive siltation from runoff during construction.</p> <hr/>
Great Crested Newt	<p>Scheme Design: Ponds supporting Great Crested Newt are outside of the Order limits and will be retained. Furthermore, the construction of solar photovoltaic (PV) panels within the Solar and Energy Storage Park has been designed to avoid habitat suitable to support Great</p> <hr/>

Baseline details

Embedded Mitigation

Crested Newt, such as grassland, ditches and hedgerows within 250 m of a pond supporting Great Crested Newt (but outside of the Order limits).

Construction:

Whilst the Scheme design retains standing water habitats that support Great Crested Newt, measures to ensure incursion into these habitats does not occur will be put in place, e.g. security fencing, which will be implemented at an early stage to protect retained habitats from incursion during construction.

The **Framework CEMP [EN010131/APP/7.3]** specifies requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching retained habitats through flood events during construction.

Construction of the Grid Connection Corridor, within 250 m of a pond supporting Great Crested Newt will predominantly be constructed in low value habitats (arable farmland) for this species and will avoid all habitat within 100 m of this pond. However, semi-improved grassland and scrub habitat (between 100 m and 250 m from the pond) is of potentially greater value to transient (dispersing / commuting) Great Crested Newt and an approximate area of 0.3 ha of this habitat will be impacted upon during construction of the Grid Connection Corridor. Given the proximity of this habitat to a pond supporting Great Crested Newt (between 100m and 250m from the pond), Natural England's Rapid Risk Assessment tool was used to assess the potential for impacts to occur to Great Crested Newt. The results of this rapid risk assessment indicated that an offence was likely ('Amber: Offence Likely') and Natural England's approach is to consider options for re-designing the development (location, layout, methods, duration or timing) so that the effects are minimised. It also recommends that the exact location of development in relation to resting places, dispersal areas and barriers to movement is critically examined prior to determining whether a derogation licence under the Habitats Regulations (Ref 8-6) is required. On evaluation, the habitats of potential value to Great Crested Newt within the Grid Connection Corridor (such as semi-improved grassland and scrub) are separated from the pond through an existing access track (tarmac), agricultural buildings / a residential property and are beyond 100 m from the pond. There is no hibernacula present within the semi-improved grassland and refugia surveys, undertaken in September to October 2022 (see **ES Volume 3, Appendix 8-G [EN010131/APP/3.3]**), did not record any Great Crested Newt. Therefore, whilst there is a small risk of encountering Great Crested Newts during construction of the Grid Connection Corridor, mitigation measures will be required to reduce or eliminate this risk and ensure that UK and European legislation relating to this species is adhered to. Therefore, works will be undertaken under Reasonable Avoidance Measures (RAMs) and these measures will be formalised into the Framework CEMP, secured through the DCO. To mitigate against harm to any amphibians present, the following precautionary methods of working are deemed appropriate for the works within 250 m of the pond supporting Great Crested Newt.

A finger-tip search for Great Crested Newt will be undertaken within areas of suitable Great Crested Newt habitat, within 250 m of a pond supporting this species. Following this, habitat manipulation will be overseen by a suitably qualified ecologist (SQE) acting as an Ecological Clerk of Works (ECoW) and will comprise the following general principles:

- The on-site vegetation within the areas of habitat suitable for Great Crested Newt will be cut short during winter, between November and February (when amphibians are hibernating). If this is not possible (*i.e.* vegetation clearance during the Great Crested Newt active season), the vegetation will be cut in a phased approach, firstly cutting to 30 cm, then, following a period of no less than 24 hours, can be cut to 15cm and then to ground level, after another 24 hours.

Baseline details

Embedded Mitigation

- The vegetation will then be kept short to displace any amphibians, which may be present, away from the works when they emerge in the early spring and discourage amphibians from moving into the Order limits from the surrounding habitat.
- Vegetation (including topsoil) will be carefully removed using an excavator using a toothed bucket. These works will be supervised by an SQE.
- Any habitat features which may conceal hibernating amphibians (log piles, rubble mound bunds, any other debris etc.) will not be dismantled during winter months (between November and February) and will be conducted during the amphibian active season (*i.e.* March (dependent on weather) to October) during warm weather conditions (*i.e.* above 5°C) to avoid killing or injuring potential hibernating amphibians.

In the unlikely event that any Great Crested Newt are discovered during these works, then such works must cease immediately and a SQE must be consulted to determine how to proceed. If other amphibians are discovered during vegetation clearance it is proposed that these are relocated to suitable habitat nearby in suitable weather conditions.

Reptiles

Scheme Design:

The Scheme design retains and avoids the majority of habitats of value to reptiles, including woodland, grassland margins, ditches, scrub and hedgerows within the Solar and Energy Storage Park.

Construction:

Vegetation clearance throughout the Order limits and, in particular, where reptiles have been identified will be undertaken in advance of construction and at an appropriate time of year so as to avoid incidental injuring or killing of reptiles, concordant with the requirements for other species, such as nesting birds and Brown Hare. Vegetation manipulation will follow the methods prescribed for Great Crested Newt, above. There will be no need to undertake any relocation of reptiles within the Order limits.

Whilst the design of the Solar and Energy Storage Park retains habitats of greatest value to reptiles, measures to ensure incursion into these habitats does not occur will be put in place, *e.g.* security fencing, which will be implemented at an early stage to protect retained habitats from incursion during construction.

The **Framework CEMP [EN010131/APP/7.3]** specifies requirements for the safe storage of chemicals / other hazardous materials (*e.g.* fuel) reaching retained habitats through flood events during construction.

Wintering birds

Scheme Design:

The Scheme design retains and avoids direct and indirect impacts to the majority of habitats of value to wintering birds, including woodland, grassland margins, scrub and hedgerows within the Solar and Energy Storage Park.

Construction:

Whilst the Scheme design retains habitats of greatest value to wintering birds, measures to ensure incursion into these habitats does not occur will be put in place, *e.g.* security fencing, which will be implemented at an early stage to protect retained habitats from incursion during construction.

Baseline details

Embedded Mitigation

The **Framework CEMP [EN010131/APP/7.3]** specifies requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching retained habitats through flood events during construction.

Breeding birds – general breeding bird assemblage

Scheme Design:

The Scheme design retains and avoids the majority of habitats of value to breeding birds, including woodland, grassland margins, scrub and hedgerows within the Solar and Energy Storage Park. The Scheme design, therefore, ensures that notable farmland bird species that are reliant on such habitats, including Yellowhammer, Linnet, Dunnock and Reed Bunting, are not impacted upon by the Scheme.

Construction:

The **Framework CEMP [EN010131/APP/7.3]** specifies requirements for vegetation clearance to avoid the nesting bird period, where practicable *i.e.*, March to August (inclusive). Should any vegetation clearance be required within the nesting bird period this will be checked, prior to vegetation removal, for the presence of nesting birds, by a suitably qualified ornithologist. If active nests are found, then these will be avoided with appropriate buffer zones put in place and the area monitored until the young birds have fledged and, or the nesting attempt has ceased.

Breeding birds – territories of Black Redstart within the Grid Connection Corridor Zol

Scheme Design:

Territories of this species were recorded outside of the Order limits within Cottam Power Station (within 200 m of the Grid Connection Corridor) and therefore, these territories will remain unaffected by the Scheme. The Scheme design will avoid the loss of any habitat of potential value to breeding Black Redstart.

Construction:

The **Framework CEMP [EN010131/APP/7.3]** specifies requirements for pre-commencement surveys to be undertaken to determine the presence of breeding Black Redstart. If present prior to construction commencing then the ECoW (experienced ornithologist) will advise as to whether a no disturbance buffer is required to avoid disturbance to this Schedule 1 breeding species.

Breeding birds – territories of Skylark within the Solar and Energy Storage Park

Scheme Design:

Throughout the Order limits, areas of undeveloped land have been included within the Scheme to provide permanent habitat for ground-nesting birds such as Skylark.

Breeding birds – territories of specially protected species

Scheme Design:

The Scheme design retains and avoids habitats of value to specially protected breeding birds. Habitats where territories were recorded in 2022, including grassland (Quail), woodland (Hobby) and mature trees and buildings (Barn Owl) within the Solar and Energy Storage Park will be retained. Territories of Peregrine were recorded outside of the Order limits within Cottam Power Station (within 200 m of the Grid Connection Corridor) and therefore, Peregrine will remain unaffected by the Scheme as the Scheme design will avoid the loss of any habitat of value to breeding Peregrine. The Scheme design, therefore, ensures that species that are reliant on such habitats are not impacted upon by the Scheme.

Construction:

Baseline details

Embedded Mitigation

The **Framework CEMP [EN010131/APP/7.3]** specifies requirements for pre-commencement surveys to be undertaken to determine the presence of breeding Schedule 1 birds. If present prior to construction commencing, then the ECoW (experienced ornithologist) will advise as to whether a no disturbance buffer is required to avoid disturbance to Schedule 1 breeding species.

Bats

Scheme Design:

The Scheme design retains and avoids habitats of value to bats, including woodland, scrub and hedgerows within the Solar and Energy Storage Park.

Construction:

Whilst the Scheme design retains habitats of greatest value to bats, measures to ensure incursion into these habitats does not occur will be put in place, e.g. security fencing, which will be implemented at an early stage to protect retained habitats from incursion during construction.

The **Framework CEMP [EN010131/APP/7.3]** specifies requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching retained habitats through flood events during construction.

Otter and Water Vole (see also Running Water)

Scheme Design:

The Scheme has been designed to ensure running water habitats are outside of the developable areas of the Scheme. Therefore, this habitat will be retained and measures taken to avoid direct or indirect impacts.

Construction:

The crossing of the River Trent and other watercourses of value to Otter and Water Vole will be undertaken using HDD methods to avoid impacts to watercourses, including riparian habitats. Set-backs of a minimum of 10 m from the centreline of the watercourse is considered sufficient to mitigate for potential hazards such as chemical and soils spills into watercourses and avoid potential direct impacts to watercourses and species such as Otter, which use the River for commuting and foraging. The **Framework CEMP [EN010131/APP/7.3]** specifies requirements for the safe storage of chemicals / other hazardous materials (e.g. fuel) reaching watercourses during flood events during construction. A full list of crossing methods and an explanation of these techniques is provided in **Chapter 9: Water Environment** of this ES [EN010131/APP/3.1].

Pre-construction surveys will be undertaken to support the baseline survey findings where intrusive crossing methods of watercourses are proposed within the Order limits. The purpose of these pre-construction surveys is to ensure mitigation during the construction phase is based on the latest protected species information. Should there have been any changes to Otter or Water Vole distribution within the Order limits, Natural England licences and mitigation measures (such as the use of Bailey bridges to facilitate the access road and non-intrusive crossing for cabling) will be updated accordingly.

Badger

Scheme Design:

The Scheme can be designed to avoid Badger setts within the Order limits. All setts within the Scheme will have an appropriate exclusion zone of 30m around the sett to prevent disturbance and accidental damage.

Construction:

Baseline details

Embedded Mitigation

Pre-construction surveys will be undertaken to support the baseline survey findings. The purpose of these pre-construction surveys is to ensure mitigation during the construction phase is based on the latest protected species information. Where there have been any changes to Badger distribution, Natural England licences and mitigation measures will be updated accordingly.

Implementation of measures to avoid animals being injured or killed within construction working areas, through excluding them from such areas and preventing them from falling into and becoming trapped in excavations. No excavations will remain open overnight and if excavations are required to be left open, ramps will be provided to allow animals a means of escape.

Other mammals (including Brown Hare and Hedgehog)

Scheme Design:

The Scheme design retains and avoids the majority of habitats of value to other mammals, including woodland, grassland margins, ditches, scrub and hedgerows within the Solar and Energy Storage Park.

Construction:

Vegetation clearance will be undertaken in advance of construction and at an appropriate time of year so as to avoid incidental injuring or killing of animals, including Brown Hare and concordant with the requirements for other species such as nesting birds and reptiles.

Implementation of measures to avoid animals being injured or killed within construction working areas, through excluding them from such areas and preventing them from falling into and becoming trapped in excavations. No excavations will remain open overnight and if excavations are required to be left open, ramps will be provided to allow animals a means of escape.

Operation

8.9.17 The **Framework OEMP [EN010131/APP/7.4]** details the measures required to minimise operational impacts, including:

- No part of the Scheme will be continuously lit. Manually operated, and motion-detection lighting will be utilised for operational and security purposes around electrical infrastructure such as inverters, transformers and switchgear across the Solar PV Array Areas, and within the compounds and substations. Lighting will be directed downward and away from boundaries. No visible lighting will be utilised at the site perimeter fence, aside from the site entrance points.
- The **Scheme Outline Drainage Strategy ES Volume 3: Appendix 9-C. [EN010131/APP/3.3]** will include measures to manage surface water runoff during operation and will reduce the likelihood and severity of potential pollution incidents and flooding affecting watercourses and the local ditch network to reduce or eliminate adverse effects for aquatic and riparian species and habitats.
- The creation and subsequent management of habitats will be determined by the characterisation of the existing baseline. However, management will seek to maximise floristic diversity, which will require low density and short frequency, sheep grazing (conservation grazing) or an appropriate, sensitive mowing regime.
- Any required management of vegetation within the Scheme will need to be undertaken in accordance with legislative requirements associated with breeding birds *i.e* undertaken outside of the bird nesting season (typically March to August inclusive).
- A programme of surveillance and monitoring will be established prior to operation to ensure that biodiversity measures are implemented according to plan with necessary remediation. These elements will be informed by an Ecology Advisory Group established pre-construction, invitees including Natural England, Nottinghamshire and Lincolnshire County Councils and wildlife trusts.

Decommissioning

8.9.18 The **Framework DEMP [EN010131/APP/7.5]** will set out measures to mitigate any decommissioning related effects on biodiversity. Whilst the majority of mitigation measures will be similar to those during construction (as above), pre-decommissioning surveys are likely to be required to inform on any mitigation and protected species licensing, as required at the time of decommissioning. The surveillance and monitoring undertaken during the operation phase will help to inform the decommissioning. The Ecology Advisory Group established to inform the implementation of biodiversity enhancement, surveillance and monitoring and remediation will also inform on the planning for and implementation of decommissioning being aware of and having responded to new legislation and policy with respect to biodiversity over the 60 years of the project's life.

8.10 Assessment of Likely Impacts and Effects

- 8.10.1 This section assesses the likely impacts and potential effects of the Scheme (see Section 8.8 of this chapter) on the IEFs identified in Table 8-9, based on the characterisation of the baseline conditions and in the absence of any mitigation over and above that which is embedded in the design (as described in Section 8.9).
- 8.10.2 An initial consideration of potential impacts and effects arising from the construction, operation and decommissioning phases of the Scheme on the IEFs identified in Table 8-9 is provided in Table 8-11 to Table 8-12, to set the focus of the more detailed assessment that follows.

Sites statutorily and non-statutorily designated for their biodiversity value

- 8.10.3 The statutory and non-statutory designated sites that have been considered are presented in Table 8-11. Where there is the potential for an impact, as identified in section 8.8, to occur and have an effect on the designated site then this is stated. The significance of that effect is then assessed further on in this chapter.

Table 8-11 Determination of relevant ecological features – Designated Sites

IEF	Importance (see section 8.6)	Assessment of Likely Impacts on IEF (see section 8.8)	Potential for an effect to occur?	
Ashton's Meadow SSSI (located 540 m from the Order limits)	High	<p>Construction: This SSSI (primary designation being grassland habitats) is approximately 540m to the west of the Order limits and there are no ecological or hydrological connections between this SSSI and the Order limits.</p> <p>The construction of the Scheme will not directly impact on habitat within Ashton's Meadow SSSI, owing to the distance between this SSSI and the Order limits.</p> <p>There will be no fragmentation of habitats, or of populations of species using habitats, within Ashton's Meadow SSSI during construction.</p> <p>There will be no disturbance to Ashton's Meadow SSSI or habitat degradation through preparation of the Order limits, although the construction of the Scheme will result in dust generation, along with noise and visual disturbance. Noise (see Chapter 11: Noise and Vibration of this ES [EN010131/APP/3.1]) and visual disturbance (see Chapter 10: Landscape and Visual Amenity of this ES [EN010131/APP/3.1]) will not impact on the integrity or the functioning of Ashton's Meadow SSSI, owing to the distance between this SSSI and the Order limits.</p> <p>The implementation of standard environmental protection measures during construction, such as dust suppression and pollution prevention, will be adopted and these measures have been formalised into the Framework CEMP [EN010131/APP/7.3], secured through the DCO. Consequently, construction related pollution will be mitigated and will not affect the integrity of this SSSI site.</p> <p>There will be no species mortality of any species associated with Ashton's Meadow SSSI, during construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of Ashton's Meadow SSSI.</p>	No	
		<p>Operation: The distance between the SSSI and the Order limits is approximately 540m and there are no pathways (e.g. habitat loss or disturbance to designated site features occurring during operation of the Scheme (such as through noise, water quality changes, lighting or visual)), during operation of the Scheme which could affect Ashton's Meadow SSSI.</p>		No
		<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction. The decommissioning of the Scheme will not directly impact on habitat within Ashton's Meadow SSSI, owing to the distance between this SSSI site and the Order limits.</p>		No

IEF	Importance (see section 8.6)	Assessment of Likely Impacts on IEF (see section 8.8)	Potential for an effect to occur?
		<p>There will be no fragmentation of habitats, or of populations of species using habitats, within Ashton's Meadow SSSI during decommissioning.</p> <p>There will be no disturbance to this SSSI site, habitat degradation or species mortality and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. These measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	
<p>Lea Marsh SSSI (located 1.9km from the Order limits)</p>	<p>High</p>	<p>Construction: This SSSI (primary designation being an unimproved floodplain meadow) is 1.9km to the north-west of the Order limits and there are no ecological or hydrological connections between this SSSI and the Scheme.</p> <p>The construction of the Scheme will not directly impact on habitat within Lea Marsh SSSI, owing to the distance between this SSSI and the Order limits.</p> <p>There will be no fragmentation of habitats, or of populations of species using habitats, within Lea Marsh SSSI during construction.</p> <p>There will be no disturbance to Lea Marsh SSSI or habitat degradation through preparation of the Order limits, although the construction of the Scheme will result in dust generation, along with noise and visual disturbance. Noise (see Chapter 11: Noise and Vibration of this ES [EN010131/APP/3.1]) and visual disturbance (see Chapter 10: Landscape and Visual Amenity of this ES [EN010131/APP/3.1]) will not impact on the integrity or the functioning of Lea Marsh SSSI, owing to the distance between this site and the Order limits.</p> <p>The implementation of standard environmental protection measures during construction, such as dust suppression and pollution prevention, will be adopted and these measures have been formalised into the Framework CEMP [EN010131/APP/7.3], secured through the DCO. Consequently, construction related pollution will be mitigated and will not affect the integrity of this SSSI.</p> <p>There will be no species mortality of any species associated with Lea Marsh SSSI, during construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of Lea Marsh SSSI.</p>	<p>No</p>
		<p>Operation: The distance between the SSSI and the Order limits is 1.9km and there are no pathways (e.g. habitat loss or disturbance to designated site features occurring during</p>	<p>No</p>

IEF	Importance (see section 8.6)	Assessment of Likely Impacts on IEF (see section 8.8)	Potential for an effect to occur?
		<p>operation of the Scheme (such as through noise, water quality changes, lighting or visual)), during operation of the Scheme which could affect Lea Marsh SSSI.</p>	
		<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction. The decommissioning of the Scheme will not directly impact on habitat within Lea Marsh SSSI, owing to the distance between this SSSI site and the Order limits. There will be no fragmentation of habitats, or of populations of species using habitats, within Lea Marsh SSSI during decommissioning. There will be no disturbance to this SSSI site, habitat degradation or species mortality and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. These measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Cow Pasture Lane Drains LWS (within the Order limits)	Medium	<p>Construction: Cow Pasture Lane Drains LWS is designated for its drain and associated defunct hedge. This LWS is within the footprint of the Grid Connection Corridor, however the drain and hedge will be avoided during construction, with crossing methods to lay cabling utilising non-intrusive methods (see Chapter 2: The Scheme of this ES[EN010131/APP/3.1]) and with setbacks of 10 m from the centre line of the drain to protect riparian habitats (see Section 8.9). These measures to remove impacts on the LWS have been formalised into the Framework CEMP [EN010131/APP/7.3], secured through the DCO.</p> <p>Access for construction of the Grid Connection Corridor will utilise an existing access track that runs alongside the eastern side of Cow Pasture Lane Drains LWS. Any access to the western side of Cow Pasture Lane Drains LWS will, principally, seek to avoid crossing of this LWS although there is potential for a temporary bailey bridge to be placed over the LWS to facilitate any crossing. As a result, this may lead to a temporary degradation in habitats within the LWS through shading.</p> <p>Construction compounds will be setback from this LWS with a minimum 10 m from the centre line of the watercourse. Furthermore, measures to ensure incursion into this LWS does not occur will be put in place, e.g. security fencing, which will be implemented at an early stage. Owing to the HDD construction methods to cross this LWS, there will be no fragmentation of habitats, or of populations of species using habitats, within Cow Pasture Lane Drains LWS during construction of the Grid Connection Corridor.</p>	Yes

IEF

Importance (see section 8.6) Assessment of Likely Impacts on IEF (see section 8.8)

Potential for an effect to occur?

Any construction within the vicinity of this LWS may require temporary lighting, which has the potential to spill into adjacent habitats. With reference to **Chapter 2: The Scheme [EN010131/APP/3.1]**, construction working hours during summer months will be 7am until 7pm Monday to Friday and during construction in the winter months (where working hours will be 8am until 6pm, Monday to Friday), mobile lighting towers with a power output of 8 kVAs will be used. Any lighting that is required for the construction of the Scheme will be directed away from existing retained and sensitive habitats to minimise light disturbance to species associated with these habitats (see also Section 8.9). Any requirements for task-specific lighting during construction will be designed to be downward directional and will only be used for the duration of the task. All temporary lighting will need to satisfy health and safety requirements, as well as minimising potential effects on the surrounding areas by minimising sky glow, glare and light spillage. The direction of required construction lighting (facing away from Cow Pasture Lane Drains LWS and into the Scheme and existing boundary features (trees, watercourses, hedgerows)) will also reduce the potential for light spill on sensitive habitats from construction activities.

Construction of the Grid Connection Corridor will result in dust generation (see **Chapter 15: Other Environmental Topics** of this ES [EN010131/APP/3.1]), along with noise (see **Chapter 11: Noise and Vibration** of this ES [EN010131/APP/3.1]) and visual disturbance (see **Chapter 10: Landscape and Visual Amenity** of this ES [EN010131/APP/3.1]) and there is potential for pollutant spills and surface runoff into this LWS and/ or connected watercourses, which have the potential to adversely affect habitats and species within the LWS. The implementation of standard environmental protection measures (such as dust suppression and pollution prevention) will be adopted during construction and these measures have been formalised into the **Framework CEMP [EN010131/APP/7.3]**, secured through the DCO. With the implementation of standard environmental protection measures, there will be no indirect impacts to Cow Pasture Lane Drains LWS that will affect the integrity of the LWS.

There will be no species mortality of any species associated with Cow Pasture Lane Drains LWS, as a result of construction of the Scheme.

Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of Cow Pasture Lane Drains LWS.

Operation: Cow Pasture Lane Drains LWS is within the Grid Connection Corridor and, during operation of the Scheme, there are no pathways (e.g. habitat loss or disturbance to

No

IEF	Importance (see section 8.6)	Assessment of Likely Impacts on IEF (see section 8.8)	Potential for an effect to occur?
		designated site features such as through noise, water quality, air quality, lighting or visual) which could affect this LWS.	
		Decommissioning: Decommissioning impacts will be similar, or lower (if medium voltage buried cables remain <i>in situ</i>), to those occurring during construction, with the retention and avoidance of Cow Pasture Lane Drains LWS and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. These measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.	No
Knaith Park Wood LWS (located approximately 15 m from the Order limits)	Medium	<p>Construction: Knaith Park Wood LWS is a woodland LWS which is directly adjacent to the Solar and Energy Storage Park (but separated by the Order limits through a minor road). The construction of the Scheme will not directly impact on habitat within Knaith Park Wood LWS and measures to ensure incursion into this LWS does not occur will be put in place, e.g. security fencing. Furthermore, buffers from woodland habitats are embedded into the design of the Scheme (see Section 8.9). These measures have been formalised into the Framework CEMP [EN010131/APP/7.3], secured through the DCO. There will be no fragmentation of habitats, or of populations of species using habitats, within Knaith Park Wood LWS during construction. Boundary vegetation, such as hedgerows connecting woodland sites will be retained, which will maintain connectivity for species across the Order limits. Furthermore, the construction of the majority of the Scheme will be screened by existing vegetation, which will prevent disturbance to species using woodland habitats in Knaith Park Wood LWS.</p> <p>Any construction within the vicinity of Knaith Park Wood LWS may require temporary lighting, which has the potential to spill into adjacent habitats. With reference to Chapter 2: The Scheme [EN010131/APP/3.1], construction working hours during summer months will be 7am until 7pm Monday to Friday and during construction in the winter months (where working hours will be 8am until 6pm, Monday to Friday) mobile lighting towers with a power output of 8 kVAs will be used. Any lighting that is required for the construction of the Scheme will be directed away from existing retained and sensitive habitats to minimise light disturbance to species associated with these habitats. Any requirements for task-specific lighting during construction will be designed to be downward directional and will only be used for the duration of the task. All temporary lighting will need to satisfy health and safety requirements, as well as minimising potential effects on the surrounding areas by minimising</p>	No

IEF	Importance (see section 8.6)	Assessment of Likely Impacts on IEF (see section 8.8)	Potential for an effect to occur?
		<p>sky glow, glare and light spillage. The direction of required construction lighting (facing away from Knaith Park Wood LWS and into the Scheme) will also reduce the potential for light spill on sensitive habitats from construction activities.</p> <p>During construction, there is potential for pollutant spills and surface runoff into watercourses hydrologically connected to Knaith Park Wood LWS, which has the potential to adversely affect woodland habitats and, consequently, species associated with them. Embedded mitigation measures, with regards to the management of construction site run-off, the management of spillage risk, the management of flood risk, the management of risk to morphology of waterbodies (as described in Chapter 9: Water Environment [EN010131/APP/3.1]) will ensure that no indirect impacts to watercourses, which in turn could affect Knaith Park Wood LWS occurs. Buffer zones, of a minimum of 15 m between woodland habitats (including Knaith Park Wood LWS) (see Section 8.9) and any development is embedded into the Scheme and standard environmental protection measures (such as dust suppression and pollution prevention) will be implemented and adopted during construction. These measures are included within the Framework CEMP [EN010131/APP/7.3], secured through the DCO. With the buffer zones and implementation of standard environmental protection measures, there will be no indirect impacts to this LWS. There will be no species mortality of any species associated with Knaith Park Wood LWS, as a result of construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of Knaith Park Wood LWS during construction.</p>	
		<p>Operation: The management of surface water, including for PV array runoff, BESS runoff and foul water drainage (see also Chapter 9: Water Environment [EN010131/APP/3.1]) will ensure no hydrological impacts occur and that there are consequently no impacts upon Knaith Park Wood LWS during operation of the Scheme.</p> <p>There are no pathways (<i>e.g.</i> habitat loss or disturbance to woodland, such as through noise, lighting or visual), during operation of the Scheme which could affect Knaith Park Wood LWS.</p>	No
		<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction. There will be no disturbance to this LWS, habitat degradation or species mortality and any impacts at the time of decommissioning would be mitigated fully in line with</p>	No

IEF	Importance (see section 8.6)	Assessment of Likely Impacts on IEF (see section 8.8)	Potential for an effect to occur?
<p>relevant legislative and policy requirements. These measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>			
<p>Coates Wetland LWS (located approximately 35 m from the Order limits)</p>	<p>Medium</p>	<p>Construction: Coates Wetland LWS is designated for its habitat (including wetland) and is directly adjacent to the Grid Connection Corridor of the Scheme, with ecological and hydrological connections between this LWS and the Scheme.</p> <p>The construction of the Scheme will not directly impact on habitat within Coates Wetland LWS and measures to ensure incursion into this LWS does not occur will be put in place, e.g. security fencing (see also Section 8.9). These measures have been formalised into the Framework CEMP [EN010131/APP/7.3], secured through the DCO.</p> <p>There will be no fragmentation of habitats, or of populations of species using habitats within Coates Wetland LWS during construction. Boundary vegetation, such as hedgerows and ditches will be retained, which will maintain connectivity for species across the Order limits. Any construction within the vicinity of this LWS may require temporary lighting, which has the potential to spill into adjacent habitats. With reference to Chapter 2: The Scheme [EN010131/APP/3.1], construction working hours during summer months will be 7am until 7pm Monday to Friday and during construction in the winter months (where working hours will be 8am until 6pm, Monday to Friday), mobile lighting towers with a power output of 8 kVAs will be used. Any lighting that is required for the construction of the Scheme will be directed away from existing retained and sensitive habitats to minimise light disturbance to species associated with these habitats. Any requirements for task-specific lighting during construction will be designed to be downward directional and will only be used for the duration of the task. All temporary lighting will need to satisfy health and safety requirements, as well as minimising potential effects on the surrounding areas by minimising sky glow, glare and light spillage. The direction of required construction lighting (facing away from Coates Wetland LWS and into the Scheme) will also reduce the potential for light spill on sensitive habitats from construction activities.</p> <p>During construction, there is potential for pollutant spills and surface runoff into watercourses hydrologically connected to Coates Wetland LWS, which has the potential to adversely affect aquatic habitats and, consequently, species associated with them. Embedded mitigation measures, with regards to the management of construction site run-off, the management of spillage risk, the management of flood risk, the management of risk to morphology of waterbodies (as described in Chapter 9: Water Environment [EN010131/APP/3.1]) will ensure that no indirect impacts to watercourses, which in turn could affect Coates Wetland</p>	<p>No</p>

IEF	Importance (see section 8.6)	Assessment of Likely Impacts on IEF (see section 8.8)	Potential for an effect to occur?
		<p>LWS occurs. Standard environmental protection measures (such as dust suppression and pollution prevention) will be implemented and adopted during construction. These measures are included within the Framework CEMP [EN010131/APP/7.3], secured through the DCO. With the implementation of standard environmental protection measures, there will be no indirect impacts to this LWS during construction.</p> <p>There will be no species mortality of any species associated with Coates Wetland LWS, as a result of construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of Coates Wetland LWS during construction.:</p> <hr/> <p>Operation: Coates Wetlands LWS is within 50m of the Grid Connection Corridor and, during operation of the Scheme, there are no pathways (e.g. habitat loss or disturbance to designated site features such as through noise, water quality, air quality, lighting or visual) which could affect this LWS.</p> <hr/> <p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction and therefore there are no pathways (e.g. habitat loss or disturbance to designated site features such as through noise, water quality, air quality, lighting or visual) which could affect this LWS during decommissioning.</p> <p>There will be no disturbance to this LWS, habitat degradation or species mortality and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. These measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	<p>No</p> <hr/> <p>No</p>
<p>Littleborough Lagoons LWS, Thurlby Wood LWS, Out Ings LWS, Cottam Wetlands LWS, Broad Lane Grassland, North Leverton LWS, Mother Drain, Upper Ings LWS, Torksey Ferry Road Ditch LWS, Priors Farm LWS, 5/2324 (Cottam Ponds)</p>	<p>All Medium</p>	<p>Construction: These non-statutory designated sites (all LWS) are all outside the Order limits, the closest of which is Cottam Wetlands LWS, which is approximately 205 m from the Order limits.</p> <p>The construction of the Scheme will not directly impact on habitat within these non-statutory designated sites.</p> <p>There will be no fragmentation of habitats, or of populations of species using habitats within any of these non-statutory designated sites during construction. Boundary vegetation, such as hedgerows and ditches will be retained.</p> <p>Preparation of the Order limits and the construction of the Scheme will result in dust generation, along with noise and visual disturbance. Noise (see Chapter 11: Noise and</p>	<p>No</p>

IEF	Importance (see section 8.6)	Assessment of Likely Impacts on IEF (see section 8.8)	Potential for an effect to occur?
<p>LWS, Ashton's Meadow LWS, Thornhill Lane Drain, Littleborough LWS, Retford Road Wood, Rampton LWS (all located at a distance greater than 200 m from the Order limits)</p>		<p>Vibration of this ES [EN010131/APP/3.1] and visual disturbance (see Chapter 10: Landscape and Visual Amenity of this ES [EN010131/APP/3.1]) will not impact on the integrity or the functioning of these sites, owing to the distance between these non-statutory designated sites and the Order limits. Furthermore, the construction of the majority of the Scheme will be screened by existing vegetation.</p> <p>During construction, there is potential for pollutant spills and surface runoff into watercourses hydrologically connected to these sites, which have the potential to adversely affect habitats and, consequently, species associated with them. Embedded mitigation measures, with regards to the management of construction site run-off, the management of spillage risk, the management of flood risk, the management of risk to morphology of waterbodies (as described in Chapter 9: Water Environment [EN010131/APP/3.1]) will ensure that no indirect impacts to watercourses, which in turn could affect these LWS's occurs. Standard environmental protection measures (such as dust suppression and pollution prevention) will be implemented and adopted during construction. These measures have been formalised into the Framework CEMP [EN010131/APP/7.3], secured through the DCO.</p> <p>There will be no species mortality of any species associated with these designated sites, as a result of construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of these non-statutory designated sites.</p>	
		<p>Operation: The management of surface water, including for PV array runoff, BESS runoff and foul water drainage (see also Chapter 9: Water Environment [EN010131/APP/7.3]) will ensure no hydrological impacts occur and that there are consequently no impacts upon any non-statutory sites during operation of the Scheme.</p> <p>There are no pathways (e.g. habitat loss or disturbance to habitats, such as through noise, lighting or visual), during operation of the Scheme which could affect any LWS.</p>	No
		<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction. There will be no disturbance to these LWS's, habitat degradation or species mortality and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. These measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No

Habitats and Species

8.10.4 The relevant ecological features that have been identified and assessed are presented in Table 8-12. Where there is the potential for an impact, as identified in Section 8.8, to occur and have an effect on the ecological feature then this is stated. The significance of that effect is then assessed further on this chapter.

Table 8-12 Determination of relevant ecological features – Habitats and Species

IEF	Importance (refer to Section 8.6)	Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
Broad-leaved woodland (including ancient woodland)	Medium	<p>Construction: A small area (<0.1 ha) of semi-natural broad-leaved woodland habitat was recorded within the Order limits, with the majority of woodland habitat (including Burton Wood) outside of the Order limits. All woodland within the Order limits will be retained and the construction of the Scheme will not directly impact broad-leaved woodland and measures to ensure incursion into this habitat does not occur will be put in place, e.g. security fencing. The security fencing for the Scheme will be implemented at an early stage to protect retained habitats from incursion during construction. Furthermore, buffers from woodland habitats are embedded into the design of the Scheme (see Section 8.9). These measures are included within the Framework CEMP [EN010131/APP/7.3], secured through the DCO.</p> <p>There will be no fragmentation of woodland habitats, or of populations of species using woodlands, during construction. Boundary vegetation, such as hedgerows connecting woodland sites will be retained, which will maintain connectivity for species across the Order limits. Furthermore, the construction of the majority of the Scheme will be screened by existing vegetation, which will prevent disturbance to species using woodland habitats.</p> <p>Buffer zones, of a minimum of 15m between woodland habitats (see Section 8.9) and any development is embedded into the Scheme and standard environmental protection measures (such as dust suppression and pollution prevention) will be implemented and adopted during construction. These measures have been formalised within the Framework CEMP [EN010131/APP/7.3] and secured through the DCO. With the buffer zones and implementation of standard environmental protection measures, there will be no indirect impacts to broad-leaved woodland.</p> <p>Woodland habitats across the Order limits will be retained and there will be no species mortality of any species using woodland habitats during construction of the Scheme. Where individual trees are removed (e.g. for access), the implementation of standard mitigation measures (such as nesting bird checks), will ensure there is no species mortality.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon broad-leaved woodland during construction of the Scheme.</p>	No
		<p>Operation: There are no impact pathways (e.g. habitat loss or degradation to woodland), during operation of the Scheme which could affect broad-leaved woodland.</p>	No
		<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction. There will be no disturbance to woodland habitats, habitat degradation or species mortality and any impacts at the</p>	No

IEF	Importance (refer to Section 8.6)	Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
<p>time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. These measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>			
Acid Grassland (semi-improved)	Medium	<p>Construction: The construction of the Scheme will not directly impact the small area (0.58 ha) of acid grassland within the Grid Connection Corridor (Cottam Power Station) (see ES Volume 2: Figure 8-3 [EN010131/APP/3.2]) and measures to ensure incursion into this habitat does not occur will be put in place, e.g. security fencing. Furthermore, there are existing features, such as hard-standing, which would be more appropriate for lay-down and other construction areas.</p> <p>During construction, there is potential for pollutant spills and surface runoff into grassland habitat and these spills have the potential to adversely affect this habitat. However buffers of undeveloped land at least 10 m in width from watercourses and standard environmental protection measures, including dust suppression and pollution prevention (see Section 8.9) will be implemented and adopted during construction, formalised through the Framework CEMP [EN010131/APP/7.3], secured through the DCO.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon acid grassland during construction of the Scheme.</p>	No
<p>Operation: There are no impact pathways (e.g. habitat loss or degradation to grassland), during operation of the Scheme which could affect acid grassland.</p>			
<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction. There will be no disturbance to acid grassland, habitat degradation or species mortality and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. These measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>			
Coastal and Floodplain and Grazing Marsh	Medium	<p>Construction: This habitat was recorded within the Grid Connection Corridor, adjacent to both banks of the River Trent. This habitat is within the avoidance area (as shown on ES Volume 3: Appendix 2-B (Figure 1) [EN010131/APP/3.3]) and there will be no direct loss of coastal floodplain and grazing marsh habitat and there will be no fragmentation of habitats, or of populations of species using habitats, during construction. Construction methods across the River Trent and adjacent coastal and floodplain grazing marsh will utilise HDD methods, with launch and exit pits outside of this habitat.</p> <p>During construction, there is potential for pollutant spills and surface runoff into the floodplain habitats and these spills have the potential to adversely affect habitats and species associated with running water habitats. However undeveloped buffers from watercourses and standard environmental protection measures, including dust suppression and pollution prevention (see Section 8.9) will be implemented and</p>	No

IEF	Importance (refer to Section 8.6)	Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
		<p>adopted during construction, formalised through the Framework CEMP [EN010131/APP/7.3], secured through the DCO.</p> <p>The implementation of standard mitigation measures (such as nesting bird checks) will ensure there is no mortality of any species associated with this habitat, as a result of construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon floodplain and grazing marsh during construction of the Scheme.</p>	
		<p>Operation: There are no impact pathways (e.g. habitat loss or degradation), during operation of the Scheme which could affect floodplain and grazing marsh as this habitat is within the Grid Connection Corridor.</p>	No
		<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction. There will be no disturbance to floodplain grazing marsh, habitat degradation or species mortality and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. These measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Marsh / Marshy Grassland	Low	<p>Construction: The construction of the Scheme will not directly impact the area of marshy grassland within the Solar and Energy Storage Park as this habitat is outside of the developable area and away from areas that will be included for Solar PV arrays. Measures to ensure incursion into this habitat does not occur will be put in place, e.g. security fencing, which will be implemented at an early stage to protect retained habitats from incursion during construction. These measures are included within the Framework CEMP [EN010131/APP/7.3] and secured through the DCO.</p> <p>There will be no fragmentation of habitats, or of populations of species using marshy grassland habitats during construction.</p> <p>During construction, there is potential for pollutant spills and surface runoff which has the potential to adversely affect habitats and, consequently, species associated with them. Embedded mitigation measures, with regards to the management of construction site run-off, the management of spillage risk, the management of flood risk, the management of risk to morphology of waterbodies (as described in Chapter 9: Water Environment [EN010131/APP/3.1]) will ensure that no indirect impacts to marshy grassland occurs. Standard environmental protection measures (such as dust suppression and pollution prevention) will be implemented and adopted during construction. These measures are included within the Framework CEMP [EN010131/APP/7.3] and secured through the DCO.</p>	No

IEF	Importance (refer to Section 8.6)	Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
		<p>The implementation of standard mitigation measures (such as nesting bird checks) will ensure there is no mortality of any species associated with this habitat, as a result of construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon marshy grassland during construction of the Scheme.</p>	
		<p>Operation: There are no impact pathways (e.g. habitat loss or degradation), during operation of the Scheme which could affect marshy grassland.</p>	No
		<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction. There will be no disturbance to marshy grassland, habitat degradation or species mortality and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. These measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Swamp (reedbed)	Low	<p>Construction: The construction of the Scheme will not directly impact swamp habitat, which is found around the pond and in ditches within the Order limits. Measures to ensure incursion into this habitat does not occur, such as security fencing will be put into place during construction.</p> <p>There will be no fragmentation of swamp habitats, or of populations of species using swamp habitats, during construction. Surrounding habitat will be converted from arable to grassland, which will improve connectivity for any species associated with swamp habitat (such as amphibians).</p> <p>During construction, there is potential for pollutant spills and surface runoff which has the potential to adversely affect habitats and, consequently, species associated with them. Embedded mitigation measures, with regards to the management of construction site run-off, the management of spillage risk, the management of flood risk, the management of risk to morphology of waterbodies (as described in Chapter 9: Water Environment [EN010131/APP/3.1]) will ensure that no indirect impacts to swamp habitats occurs. Standard environmental protection measures (such as dust suppression and pollution prevention) will be implemented and adopted during construction. These measures are included within the Framework CEMP [EN010131/APP/7.3] and secured through the DCO.</p> <p>The implementation of standard mitigation measures (such as nesting bird checks) will ensure there is no mortality of any species associated with this habitat, as a result of construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon marshy grassland during construction of the Scheme.</p>	No

IEF	Importance (refer to Section 8.6)	Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
		<p>Operation: There are no impact pathways (e.g. habitat loss or degradation), during operation of the Scheme which could affect swamp habitats.</p>	No
		<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction. There will be no disturbance to swamp habitats, habitat degradation or species mortality and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. These measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Standing Water	Low	<p>Construction: All standing water (ponds) present within the Order limits will be retained and measures embedded within the Scheme design to protect retained habitats during construction, such as that security fencing will be established at an early stage to protect retained habitats from incursion during construction. Therefore, there will be no direct loss of standing water habitat.</p> <p>There will be no fragmentation of habitats, or of populations of species using standing water habitats (such as amphibians), during construction and swamp habitat (see above) and marginal vegetation around ponds will be retained. Furthermore, surrounding habitat will be converted from arable to grassland, which will improve connectivity for any species associated with standing water (such as amphibians).</p> <p>During construction, there is the potential that preparation of the Order limits and construction of the Scheme will result in dust and other pollutants (such as emissions from construction vehicles and oil-spills) which may impact ponds, through surface water run-off. Implementation of standard environmental protection measures during construction, such as dust suppression and pollution prevention, will be adopted and these measures are formalised through the Framework CEMP [EN010131/APP/7.3], secured through the DCO. Embedded mitigation measures, with regards to the management of construction site run-off, the management of spillage risk, the management of flood risk, the management of risk to morphology of waterbodies will be included in the assessment of the water environment (Chapter 9: Water Environment [EN010131/APP/3.1]) to ensure that no indirect impacts to standing water habitats occurs. Consequently, pollution during construction will not affect the integrity of ponds and of those species using ponds.</p> <p>There will be no species mortality of any species using standing water habitats during construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon standing water within the Order limits.</p>	No
		<p>Operation: There are no impact pathways (e.g. habitat loss or degradation), during operation of the Scheme which could affect standing water.</p>	No

IEF	Importance (refer to Section 8.6)	Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
		<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction. There will be no disturbance to standing water, habitat degradation or species mortality and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. These measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Running Water	Medium	<p>Construction: This habitat is found throughout the Order limits. Tributary 1 of Padmoor Drain will have an existing culvert extended by 2m; Tributary 2 of Padmoor Drain will be culverted for 6m for a new crossing and an existing culvert extended by 2m; Marton Drain will be culverted for 6m for a new crossing; Seymour Drain will be culverted for 6m for a new crossing; five ditches will be culverted, each with the installation of a new 6m culvert; therefore there will be a direct loss of running water habitat and there will be potential fragmentation of habitats, or of populations of species using habitats (see Table 8-10). Construction methods for the Grid Connection Corridor across the River Trent and the majority of other watercourses will utilise HDD methods to install the cable. A temporary construction access track will be required (where practicable, this will be an aluminium trackway) and this will be designed to minimise disturbance to the ground and to drainage lines and watercourses and adhere to the appropriate watercourse buffer of 10m. Within the Solar and Energy Storage Park, there are approximately 27 watercourse crossings, which are required for access. The majority of these are existing crossing points that may require improvement, although any such improvements will ensure that running water habitats are not impacted upon. However, indicative new crossing points have been included within the design to facilitate construction and, where these are made, will be used to cross watercourses and these will be permeable. Localised SuDS, such as swales and infiltration trenches, will be used to control runoff to remove any indirect impacts to running water habitats. A full list of crossing methods and an explanation of these techniques is provided in Chapter 9: Water Environment of this ES [EN010131/APP/3.1].</p> <p>Any construction within the vicinity of watercourses may require temporary lighting, which has the potential to spill into the River Trent. Artificially lighting of these habitats may disrupt species' movements. Therefore, any lighting that is required for the construction of the Scheme will be directed away from existing retained and sensitive habitats to minimise light disturbance to species associated with these habitats. Any requirements for task-specific lighting during construction will be designed to be downward directional and will only be used for the duration of the task. All temporary lighting will need to satisfy health and safety requirements, as well as minimising potential effects on the surrounding areas by minimising sky glow, glare and light spillage.</p>	Yes

IEF	Importance (refer to Section 8.6) Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
	<p>During construction, there is potential for pollutant spills and surface runoff into the River Trent and other watercourses and these spills have the potential to adversely affect habitats and species associated with running water habitats. However, standard environmental protection measures (see Section 8.9) will be implemented and adopted during construction, formalised through the Framework CEMP [EN010131/APP/7.3] and these measures will include dust suppression and pollution prevention. Consequently, indirect effects (such as disturbance and habitat degradation) to the River Trent and other watercourses during construction will not occur.</p> <p>There will be no species mortality of any species associated with running water during construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon running water.</p>	
	<p>Operation: There are no pathways (e.g. habitat loss, disturbance of habitats and pollution), during operation of the Scheme which could affect retained habitats.</p>	No
	<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction. There will be no disturbance to running water, habitat degradation or species mortality and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. These measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Arable Flora	<p>Construction: There were very low frequencies of notable arable flora recorded and arable margins will be retained, buffered and their quality improved through positive management.</p> <p>All retained habitats present within the Order limits will be protected during construction, and security fencing will be installed at an early stage to protect retained habitats from incursion during construction.</p> <p>During construction, there is the potential that preparation of the Order limits and construction of the Scheme will result in dust and other pollutants (such as emissions from construction vehicles and oil-spills) which may impact habitats supporting arable flora. Implementation of standard environmental protection measures during construction, such as dust suppression and pollution prevention, will be adopted and these measures are formalised through the Framework CEMP [EN010131/APP/7.3], secured through the DCO. Embedded mitigation measures, with regards to the management of construction site run-off, the management of spillage risk, the management of flood risk, the management of risk to morphology of waterbodies will be included in the assessment of the water environment (Chapter 9: Water Environment [EN010131/APP/3.1]) to ensure that no indirect impacts to retained habitats occurs.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon arable flora.</p>	No

IEF	Importance (refer to Section 8.6)	Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
		Operation: There are no pathways (e.g. habitat loss, disturbance of habitats or pollution), during operation of the Scheme which could affect arable flora.	No
		Decommissioning: Decommissioning impacts will be similar to those occurring during construction with retention and avoidance of the majority of habitats supporting arable flora at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.	No
Hedgerows	Medium	<p>Construction: Hedgerows are located across the Order limits. Whilst the embedded mitigation includes the retention and avoidance of the majority of hedgerows, there will be a loss of sections of hedgerow during construction, to facilitate access routes, the Grid Connection Corridor and new fence lines. These habitats will be restored, post-construction, but there is likely to be a temporary (short-term) adverse effect on this habitat type.</p> <p>Buffer zones, of a minimum of 5 m between hedgerows (see Section 8.9) and any solar development is embedded into the Scheme and standard environmental protection measures (such as dust suppression and pollution prevention) will be implemented and adopted during construction. These measures will be included within the Framework CEMP [EN010131/APP/7.3] submitted with the ES as part of the DCO submission. With the buffer zones and implementation of standard environmental protection measures, there will be no indirect impacts to the majority of hedgerows.</p> <p>Where sections of hedgerows are removed (e.g. for access), the implementation of standard mitigation measures (such as nesting bird checks), will ensure there is no species mortality.</p>	Yes
		Operation: There are no impact pathways (e.g. habitat loss or degradation), during operation of the Scheme which could affect hedgerows.	No
		Decommissioning: Decommissioning impacts will be similar or lower to those occurring during construction. Given, that access tracks and entrance points will be created during construction and maintained through operation, it is predicted that there will be minimal disturbance to hedgerows and no habitat degradation or species mortality, with any impacts at the time of decommissioning mitigated fully in line with relevant legislative and policy requirements. These measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.	No

IEF	Importance (refer to Section 8.6)	Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
Terrestrial Invertebrates	Low	<p>Construction: Habitats of value to terrestrial invertebrates, including woodland, hedgerows, scrub, ditches and arable margins will be retained, buffered and their quality improved through positive management and additional planting.</p> <p>All retained habitats present within the Order limits will be protected during construction, and security fencing will be installed at an early stage to protect retained habitats from incursion during construction.</p> <p>During construction, there is the potential that preparation of the Order limits and construction of the Scheme will result in dust and other pollutants (such as emissions from construction vehicles and oil-spills) which may impact habitats supporting terrestrial invertebrates. Implementation of standard environmental protection measures during construction, such as dust suppression and pollution prevention, will be adopted and these measures are formalised through the Framework CEMP [EN010131/APP/7.3], secured through the DCO. Embedded mitigation measures, with regards to the management of construction site run-off, the management of spillage risk, the management of flood risk, the management of risk to morphology of waterbodies will be included in the assessment of the water environment (Chapter 9: Water Environment [EN010131/APP/3.1]) to ensure that no indirect impacts to retained habitats occurs. Consequently, pollution during construction will not affect the integrity of retained habitats supporting terrestrial invertebrates.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon terrestrial invertebrates.</p>	No
		<p>Operation: There are no pathways (e.g. habitat loss, disturbance of habitats or pollution), during operation of the Scheme which could affect terrestrial invertebrates.</p>	No
		<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction with retention and avoidance of the majority of habitats supporting terrestrial invertebrates (such as woodland, hedgerows and grassland margins) at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Great Crested Newt	Low	<p>Construction: The majority of habitats of value to Great Crested Newt using the Order limits (including ponds, woodland, hedgerows, scrub, ditches and arable margins) will be retained and buffered during construction. All retained habitats present within the Order limits will be protected during construction, and security fencing will be installed at an early stage to protect retained habitats from incursion during construction.</p>	No

IEF	Importance (refer to Assessment of Likely Impacts on IEF (refer to Section 8.8) Section 8.6)	Potential for an effect to occur?
	<p>During construction, there is the potential that preparation of the Order limits and construction of the Scheme will result in dust and other pollutants (such as emissions from construction vehicles and oil-spills) which may impact habitats supporting Great Crested Newt. Implementation of standard environmental protection measures during construction, such as dust suppression and pollution prevention, will be adopted and these measures are formalised through the Framework CEMP [EN010131/APP/7.3], secured through the DCO. Embedded mitigation measures, with regards to the management of construction site run-off, the management of spillage risk, the management of flood risk, the management of risk to morphology of waterbodies will be included in the assessment of the water environment (Chapter 9: Water Environment [EN010131/APP/3.1]) to ensure that no indirect impacts to retained habitats occurs. Consequently, pollution during construction will not affect the integrity of retained habitats supporting Great Crested Newt.</p> <p>The implementation of mitigation measures (such as timing of vegetation clearance and undertaking vegetation manipulation in a sensitive and phased manner, see Section 8.9) will ensure there is no mortality of any Great Crested Newt as a result of construction of the Scheme.</p> <p>Pre-construction surveys for Great Crested Newt will be undertaken to determine baseline conditions remain the same as currently recorded and, where any changes to Great Crested Newt presence are identified then mitigation measures will be updated accordingly. With the implementation of embedded and essential mitigation measures, there will be no species mortality during construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon Great Crested Newt.</p>	
	<p>Operation: There are no pathways (e.g. habitat loss, disturbance of habitats or pollution), during operation of the Scheme which could affect Great Crested Newt.</p>	No
	<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction with retention and avoidance of habitats supporting Great Crested Newt (such as water bodies) at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Reptiles	<p>Construction: Habitats of value to reptiles using the Solar and Energy Storage Park, including woodland, hedgerows, scrub, ditches and arable margins will be retained and buffered during construction. All retained habitats present within the Solar and Energy Storage Park will be protected during construction, and</p>	No

IEF	Importance (refer to Section 8.6)	Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
		<p>security fencing will be installed at an early stage to protect retained habitats from incursion during construction.</p> <p>During construction, there is the potential that preparation of the Order limits and construction of the Scheme will result in dust and other pollutants (such as emissions from construction vehicles and oil-spills) which may impact habitats supporting reptiles. Implementation of standard environmental protection measures during construction, such as dust suppression and pollution prevention, will be adopted and these measures are formalised through the Framework CEMP [EN010131/APP/7.3], secured through the DCO. Embedded mitigation measures, with regards to the management of construction site run-off, the management of spillage risk, the management of flood risk, the management of risk to morphology of waterbodies will be included in the assessment of the water environment (Chapter 9: Water Environment [EN010131/APP/3.1]) to ensure that no indirect impacts to retained habitats occurs. Consequently, pollution during construction will not affect the integrity of retained habitats supporting reptiles.</p> <p>The implementation of standard mitigation measures (such as timing of vegetation clearance and undertaking vegetation manipulation in a sensitive and phased manner, see Section 8.9) will ensure there is no mortality of any reptiles as a result of construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon reptiles.</p>	
		<p>Operation: There are no pathways (e.g. habitat loss, disturbance of habitats or pollution), during operation of the Scheme which could affect reptiles.</p>	No
		<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction with retention and avoidance of habitats supporting reptiles (such as woodland edge, scrub and grassland) at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Breeding birds – General breeding bird assemblage	Medium	<p>Construction: The construction of the Scheme will lead to the loss of arable habitat, used by a small number of breeding bird species such as Skylark. Habitats supporting the majority of the breeding bird assemblage, such as hedgerows and woodland areas will be retained, which will not affect the majority of breeding bird species found across the Order limits. The loss of any arable habitat will lead to the temporary displacement of ground-nesting breeding bird species reliant on this habitat, such as Skylark and will require replacement habitat (see Section 8.9 and below). Retained habitats, such as hedgerows and</p>	No

IEF	Importance (refer to Section 8.6) Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
	<p>woodland, will maintain occupation of the majority of breeding bird species and therefore the majority of breeding bird species found across the Order limits will not be affected.</p> <p>The construction of the Scheme will be undertaken over many months and will not impact upon retained habitats used by breeding birds (such as woodland and hedgerows), which will maintain connectivity across the Order limits for the majority of breeding bird species. Therefore, there will be no fragmentation of habitats used by breeding birds.</p> <p>Best practice construction methods as detailed in the Framework CEMP [EN010131/APP/7.3], secured through the DCO, includes implementation of measures to minimise noise, lighting and vibration disturbance to breeding birds to ensure that, where construction of the Scheme is undertaken within the bird breeding season (typically March to August inclusive), then disturbance to breeding birds in adjacent and retained habitats will be minimised.</p> <p>The construction of the Scheme, if undertaken within the bird breeding season (typically March to August inclusive) has the potential to cause mortality to breeding birds in habitats that are to be removed. The majority of vegetation clearance will be undertaken outside of this period. However, where construction cannot avoid nesting birds, then nesting bird checks will need to be undertaken by an ornithologist prior to construction (where this occurs within the breeding season) to ensure there is no species mortality. Therefore, there will be no species mortality of any breeding bird species associated during construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the general breeding bird assemblage.</p>	
	<p>Operation: There are no pathways (e.g. habitat loss, disturbance of habitats or pollution), during operation of the Scheme which could affect breeding birds.</p>	No
	<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction with retention and avoidance of habitats supporting breeding birds (such as woodland and hedgerows) at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Breeding birds – population of Black Redstart	<p>Construction: There will be no direct loss of habitat used by Black Redstart during construction of the Scheme. This species was recorded outside of the Order limits within Cottam Power Station and there will be no loss of nesting habitat used by Black Redstart.</p>	No

IEF	Importance (refer to Section 8.6) Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
	<p>There will be no fragmentation of habitats used by Black Redstart.</p> <p>This species is included on Schedule 1 of the WCA and is a species that can be sensitive to disturbance. Whilst territories for this species were outside of the Order limits, any construction of the Scheme, and where undertaken during the bird breeding season (typically March to August, inclusive), is likely to result in temporary disturbance to these species. Chapter 11: Noise and Vibration of the ES [EN010131/APP/3.1] identifies that there will be increased noise levels during construction works, e.g. site clearance, which may cause some disturbance, however this would be temporary with no permanent residual effect.</p> <p>With the implementation of embedded mitigation measures (see Section 8.9), there will be no species mortality of Black Redstart.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon this species during construction of the Scheme.</p>	
	<p>Operation: There are no pathways (e.g. habitat loss, disturbance of habitats or pollution), during operation of the Scheme which could affect breeding Black Redstart.</p>	No
	<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction with retention and avoidance of habitats supporting breeding Black Redstart (if present) at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Breeding birds – Population of Skylark	<p>Medium</p> <p>Construction: The loss of arable habitat, which in turn will lead to the displacement of breeding Skylark reliant on this habitat, will be avoided and mitigated through the retention of existing grassland and undeveloped mitigation areas (see section 8.9). However, there may be a short-term impact whilst habitats succeed.</p> <p>Good industry practice construction methods as detailed in the Framework CEMP [EN010131/APP/7.3] will include implementation of measures to minimise noise, lighting and vibration disturbance to breeding Skylark.</p> <p>The implementation of standard mitigation measures (such as timing of vegetation clearance to avoid the bird breeding season) will ensure there is no species mortality during construction of the Scheme.</p>	Yes
	<p>Operation: There are no pathways (e.g. habitat loss, disturbance of habitats or pollution), during operation of the Scheme which could affect breeding Skylark.</p>	No

IEF	Importance (refer to Section 8.6)	Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
		<p>Decommissioning: All habitats used by breeding Skylark will be retained at decommissioning so potentials impacts will not arise from loss of habitat. As per construction, good industry practice methods will be implemented to minimise noise, lighting and vibration disturbance to breeding Skylark.</p> <p>The implementation of standard mitigation measures (such as timing of vegetation clearance to avoid the bird breeding season) will ensure there is no species mortality during decommissioning of the Scheme. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Breeding birds – population of specially protected species (Quail, Hobby, Barn Owl and Peregrine)	Low	<p>Construction: There will be no direct loss of habitat used by Quail, Hobby, Barn Owl and Peregrine during construction of the Scheme. Quail rely on arable farmland and grassland habitats to establish territories and the grassland location of the single Quail territory in 2022 has been removed from the developable area of the Scheme and will be retained. Hobby rely on woodland, scrub and hedgerow habitats for nesting, the majority of which will be retained during construction. Barn Owl nest in mature trees, buildings and in artificial nesting sites such as nest boxes. All such habitats (where found within the Order limits) will be retained during construction. The provision of additional nest boxes (for Barn Owl) and creation of new habitats (such as hedgerows for Hobby) will increase the availability of potential nesting and foraging habitat on and adjacent to the Order limits for these species. Peregrine was recorded outside of the Order limits within Cottam Power Station and there will be no loss of nesting habitat used by this species.</p> <p>There will be no fragmentation of habitats used by Quail, Hobby, Barn Owl or Peregrine during construction of the Scheme. Quail are largely sedentary when breeding and therefore the retention of grassland habitats and creation of new habitats will ensure there are no impacts on this species. Hobby feed on small birds and insects (such as dragonflies), which are taken on the wing. Therefore, construction of the Scheme will not impair this species’ ability to hunt. Barn Owl forage in grassland (including margins and open grassland fields) and along ditches and woodland edge. All such habitats will be retained, and their area increased during construction of the Scheme and therefore, there will be no impacts on foraging Barn Owl during construction of the Scheme. The construction of the Scheme will not fragment any habitats used by Peregrine, an aerial hunter.</p> <p>Quail, Hobby, Barn Owl and Peregrine are all species that are included on Schedule 1 of the WCA and all are sensitive to disturbance. All four species had territories within 200m of the Order limits. Any construction of the Scheme within this distance and where undertaken during the bird breeding season (typically March to August, inclusive) is likely to result in temporary disturbance to these species. Chapter 11: Noise and</p>	No

IEF	Importance (refer to Section 8.6)	Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
		<p>Vibration of the ES [EN010131/APP/3.1], identifies that there will be increased noise levels during construction works, e.g. site clearance, which may cause some disturbance, however this would be temporary with no permanent residual effect.</p> <p>With the implementation of embedded mitigation measures (see Section 8.9), there will be no species mortality of Quail, Hobby, Barn Owl and Peregrine due to construction of the Scheme as there are no impacts that could cause mortality.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon these species during construction of the Scheme.</p>	
		<p>Operation: During operation, no part of the Scheme will be continuously lit (see Chapter 2: The Scheme [EN010131/APP/3.1]) and any lighting will be directional (into the Scheme and using directional fittings), manually operated and for operational and security purposes around electrical infrastructure (as described in Chapter 2: The Scheme). Therefore, lighting will not impact upon Quail, Barn Owl and Hobby that utilise retained habitats (such as woodland, grassland and hedgerows), newly created habitats (such as grassland or cover crops) within the Scheme or adjacent habitats (used by Peregrine).</p> <p>The management of surface water, including for PV array runoff, will ensure no hydrological impacts occur on retained and newly created habitats and that there are consequently no impacts upon habitats supporting these species.</p> <p>Therefore, there are no impact pathways (e.g. habitat loss, disturbance of habitats and pollution), during operation of the Scheme.</p>	No
		<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction with retention and avoidance of habitats supporting breeding birds at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Wintering Birds	Up to Medium	<p>Construction: The construction of the Scheme will lead to the loss of arable habitat, although the amount of permanent habitat loss within the Order limits has been minimised as far as reasonably practicable to ensure the majority of wintering birds are not affected. Hedgerows and woodland areas will be retained and new habitats will be created.</p>	No

IEF	Importance (refer to Section 8.6) Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
	<p>There will be no fragmentation of habitats used by non-breeding (wintering) birds as the majority of hedgerows will be retained. Connectivity across the Order limits will be improved with the creation of new hedgerows (see Section 8.9).</p> <p>Best practice construction methods, as detailed in the Framework CEMP [EN010131/APP/7.3], secured through the DCO, will include implementation of measures to minimise noise, lighting and vibration disturbance, which will in turn remove any potential disturbance to wintering birds in retained habitats.</p> <p>There will be no species mortality during construction of the Scheme.</p> <p>Therefore, there are no impact pathways that could affect wintering birds during construction of the Scheme.</p>	
	<p>Operation: There are no impact pathways (e.g. habitat loss, disturbance of habitats and pollution), during operation of the Scheme which could affect wintering birds.</p>	No
	<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction with retention and avoidance of habitats supporting wintering birds (such as woodland edge, scrub and grassland) at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Bats	<p>Up to Medium</p> <p>Construction: The construction of the Scheme will avoid features used by roosting bats, such as woodland and hedgerows and any trees identified as being of potential to support roosting bats. There will be no loss of important habitats used by bats anywhere within the Order limits.</p> <p>The construction of the Scheme will be undertaken over many months and will not impact upon hedgerows and other boundary features associated with habitats with the potential to support roosting bats, which will retain connectivity across the Order limits for commuting and foraging and therefore will not indirectly impact upon roosting bats. Therefore, there will be no fragmentation of habitats used by bats.</p> <p>During construction, there is potential for disturbance and light pollution which could adversely affect habitats used by roosting bats. However, standard environmental protection measures will be implemented and adopted during construction, as detailed in the Framework CEMP [EN010131/APP/7.3], secured through the DCO. This will include measures for dust suppression, pollution prevention, screening of important habitats and measures to control light spill. Consequently, indirect effects to habitats supporting bats during construction will be avoided.</p> <p>There will be no species mortality during construction of the Scheme.</p>	No

IEF	Importance (refer to Section 8.6)	Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
		Therefore, there are no impact pathways, either directly or indirectly, that would impact upon roosting bats.	
		<p>Operation: During operation, no part of the Scheme will be continuously lit and any lighting will be directional (into the Scheme and using directional fittings), manually operated and for operational and security purposes around electrical infrastructure. Therefore, lighting will not impact upon retained habitats (such as woodland and hedgerows) and any bats using such habitats for roosting.</p> <p>Therefore, there are no pathways (e.g. habitat loss and/ or disturbance, such as noise, lighting or visual), during operation of the Scheme which could affect roosting bats.</p>	No
		<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction with retention and avoidance of habitats supporting bats (such as woodland edge, mature trees) at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Otter	Low	<p>Construction: The construction of the Scheme will avoid ditches and watercourses where Otter were recorded (the River Trent) and these will be retained and suitably buffered (see Section 8.9). There will be no loss of habitat used by Otter anywhere within the Order limits. The construction of the Scheme will be offset (>10 m) from all watercourses, including those used by Otter, as detailed in the embedded design mitigation (see Section 8.9). These offsets will prevent disturbance to riparian habitats and any Otter using them.</p> <p>The construction of the Grid Connection Corridor, where this crosses watercourses that are used by Otter, will utilise HDD methods to cross under watercourses (see Chapter 2: The Scheme of this ES [EN010131/APP/3.1]) and utilisation of these HDD measures for construction (with appropriate setbacks) will therefore avoid disturbance to species, habitat loss and direct mortality for Otter.</p> <p>During construction, there is potential for pollutant spills and surface runoff into watercourses which could adversely affect habitats and species. However, standard environmental protection measures will be implemented and adopted during construction, formalised through the Framework CEMP [EN010131/APP/7.3], secured through the DCO. These measures will include dust suppression and pollution prevention. Consequently, indirect effects to watercourses supporting Otter during construction will not occur.</p> <p>Pre-construction surveys for riparian mammals will be undertaken to determine baseline conditions remain the same as currently recorded and, where any changes to Otter distribution are identified then mitigation</p>	No

IEF	Importance (refer to Section 8.6)	Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
		<p>measures will be updated accordingly. With the implementation of embedded and essential mitigation measures, there will be no species mortality during construction of the Scheme. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon Otter.</p>	
		<p>Operation: There are no impact pathways (e.g. habitat loss or degradation), during operation of the Scheme which could affect Otter.</p>	No
		<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction with retention and avoidance of habitats supporting bats (such as woodland and running water) at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Water Vole	Medium	<p>Construction: The construction of the Scheme will avoid ditches and watercourses where Water Vole were recorded, and these will be retained and suitably buffered (see Section 8.9). There will be no loss of habitat used by Water Vole anywhere within the Order limits. The construction of the Scheme will be offset (>10 m) from any peripheral watercourses, used by Water Vole, as detailed in the embedded design mitigation (see Section 8.9). These offsets will prevent disturbance to riparian habitats and any Water Vole using them.</p> <p>The construction of the Grid Connection Corridor and any internal access across the Order limits, where this crosses watercourses used by Water Vole, will utilise non-intrusive methods to avoid physical disturbance to the watercourse (see Chapter 2: The Scheme of this ES [EN010131/APP/3.1]) therefore avoiding disturbance to species, habitat loss and direct mortality for Water Vole.</p> <p>During construction, there is potential for pollutant spills and surface runoff into watercourses which could adversely affect habitats and species. However, standard environmental protection measures will be implemented and adopted during construction, formalised through the Framework CEMP [EN010131/APP/7.3], secured through the DCO. These measures will include dust suppression and pollution prevention. Consequently, indirect effects to watercourses supporting Water Vole during construction will not occur.</p> <p>Pre-construction surveys for riparian mammals will be undertaken to determine baseline conditions remain the same as currently recorded and, where any changes to Water Vole distribution are identified then mitigation measures will be updated accordingly. With the implementation of embedded and essential mitigation measures, there will be no species mortality during construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon Water Vole.</p>	No

IEF	Importance (refer to Section 8.6) Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
	<p>Operation: There are no impact pathways (e.g. habitat loss or degradation), during operation of the Scheme which could affect Water Vole.</p>	No
	<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction with retention and avoidance of habitats supporting Water Vole (such as running water) at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Aquatic macrophytes and macroinvertebrates	<p>Construction: The construction of the Scheme will avoid ditches and watercourses which support aquatic macrophytes and macroinvertebrates where possible, and these will be retained and suitably buffered (see Section 8.9). The construction of the Scheme will be offset (>10 m) from any peripheral watercourses, as detailed in the embedded design mitigation (see Section 8.9). These offsets will prevent disturbance to aquatic and riparian habitats.</p> <p>Where watercourses and ditches are culverted, culverts will be designed to allow continued connectivity along the watercourse, with a natural bed and no drop inlet or outlet. Where watercourses are open-cut for cable crossings, impacts will be temporary and habitats will reinstate within two years, with aquatic species re-colonising naturally from adjacent habitats.</p> <p>The construction of the Grid Connection Corridor and any internal access across the Order limits, where this crosses watercourses, will utilise non-intrusive methods to avoid physical disturbance to the watercourse (see Chapter 2: The Scheme of this ES [EN010131/APP/3.1]) therefore avoiding disturbance to species, habitat loss and direct mortality for aquatic species.</p> <p>During construction, there is potential for pollutant spills and surface runoff into watercourses which could adversely affect habitats and species. However, standard environmental protection measures will be implemented and adopted during construction, formalised through the Framework CEMP [EN010131/APP/7.3], secured through the DCO. These measures will include dust suppression and pollution prevention. Consequently, indirect effects to watercourses supporting aquatic species during construction will not occur.</p> <p>With the implementation of embedded and essential mitigation measures, there will be no species mortality during construction of the Scheme.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon aquatic macrophytes or macroinvertebrates.</p>	No

IEF	Importance (refer to Section 8.6) Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
	<p>Operation: There are no impact pathways (e.g. habitat loss or degradation), during operation of the Scheme which could affect aquatic macrophytes or macroinvertebrates.</p> <p>Artificial horizontally polarising surfaces (e.g., solar panels), the reflection-polarisation characteristics of which are similar to those of water, can attract water-leaving polarotactic insects posing a potential threat to these species. Aquatic macroinvertebrates in their terrestrial or airborne phase may be attracted to these surfaces, which may then disrupt their life cycle. Some aquatic insects are attracted to solar panels although this is an unusual event dependent on the coincidence of a number of suitable conditions to trigger such behaviour. The likelihood of aquatic insects from the local aquatic habitat of Low Importance being attracted to large open areas of shiny surfaces is low given that such species will preferentially use smaller shiny surfaces. Most of the aquatic insect species recorded are of low conservation value, and do not use open water areas for any of their behaviours (i.e., few Odonata were recorded for example). The impact of solar panels on these aquatic insects would therefore be negligible.</p>	No
	<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction with retention and avoidance of habitats supporting aquatic macrophytes or macroinvertebrates (such as running water) at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Fish	<p>Medium</p> <p>Construction: The construction of the Scheme will avoid ditches and watercourses which support fish where possible, and these will be retained and suitably buffered (see Section 8.9). The construction of the Scheme will be offset (>10 m) from any peripheral watercourses, as detailed in the embedded design mitigation (see Section 8.9). These offsets will prevent disturbance to aquatic habitats supporting fish.</p> <p>Where watercourses and ditches are culverted, culverts will be designed to allow continued connectivity and fish passage along the watercourse, with a natural bed and no drop inlet or outlet. Where watercourses are open-cut for cable crossings, impacts will be temporary and habitats will reinstate within two years, with aquatic species re-colonising naturally from adjacent habitats; however, fish rescue may be required during construction where de-watering or over-pumping is required.</p> <p>The construction of the Grid Connection Corridor and any internal access across the Order limits, where this crosses watercourses, will utilise non-intrusive methods to avoid physical disturbance to</p>	No

IEF	Importance (refer to Section 8.6) Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
	<p>the watercourse (see Chapter 2: The Scheme of this ES [EN010131/APP/3.1]) therefore avoiding disturbance to species, habitat loss and direct mortality for aquatic species.</p> <p>During construction, there is potential for pollutant spills and surface runoff into watercourses which could adversely affect fish. However, standard environmental protection measures will be implemented and adopted during construction, formalised through the Framework CEMP [EN010131/APP/7.3], secured through the DCO. These measures will include dust suppression and pollution prevention. Consequently, indirect effects to watercourses supporting fish during construction will not occur.</p> <p>With the implementation of embedded and essential mitigation measures, there will be no species mortality during construction of the Scheme.</p> <p>Impacts on watercourses (including the River Trent) through HDD and construction activities (i.e., sediment mobilisation, noise, and vibration) will be avoided through measures formalised through the Framework CEMP [EN010131/APP/7.3], secured through the DCO, including HDD a minimum of 2m below the bed of the watercourse, avoiding key fish migration seasons (April to June for European eel; September to November for Atlantic salmon), ensuring a buffer of at least 10m from the banktop of any watercourse, and directing lighting away from the watercourse.</p> <p>Therefore, there are no impact pathways, either directly or indirectly, that would impact upon fish species.</p> <hr/> <p>Operation: There are no impact pathways (e.g. habitat loss or degradation), during operation of the Scheme which could affect fish.</p> <hr/> <p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction with retention and avoidance of habitats supporting fish (running water) at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No
Badger	<p>Construction: The Works Plans [EN010131/APP/5.2] allow the Scheme to be designed to avoid the loss of Badger setts, therefore the construction of the Scheme will retain and avoid the current locations of Badger setts recorded within the Order limits, with appropriate buffers (see Section 8.9). These measures are included within the Framework CEMP [EN010131/APP/7.3], secured through the DCO. Pre-construction Badger surveys will be undertaken to determine baseline conditions remain the same as currently recorded</p>	No

IEF	Importance (refer to Assessment of Likely Impacts on IEF (refer to Section 8.8) Section 8.6)	Potential for an effect to occur?
	<p>and, where Badger setts are identified as being lost, or if any changes to Badger distribution are identified then a Natural England licence will be required and mitigation measures updated accordingly (see Section 8.9).</p> <p>There will be no fragmentation of habitats used by Badger as the Scheme has embedded sufficient buffers from retained habitats to ensure that Badger can move freely across the Order limits. Any perimeter fencing will be permeable to Badgers (see Section 8.9),</p> <p>During construction, there is potential for pollutant spills and surface runoff into habitats, which in turn could affect species using them. However, standard environmental protection measures will be implemented and adopted during construction, formalised through the Framework CEMP [EN010131/APP/7.3], secured through the DCO. These measures will include dust suppression and pollution prevention. Consequently, indirect effects to habitats supporting Badger during construction will not occur.</p>	
	<p>Operation: During operation, no part of the Scheme will be continuously lit (see Chapter 2: The Scheme [EN010131/APP/3.1]) and any lighting will be directional (into the Scheme and using directional fittings), manually operated and for operational and security purposes around electrical infrastructure (as described in Chapter 2: The Scheme). Therefore, lighting will not impact upon Badger that utilise retained habitats (such as woodland and hedgerows), newly created habitats (such as grassland or cover crops) or on Badger setts.</p> <p>The management of surface water, including for PV array runoff, will ensure no hydrological impacts occur on Badger setts, or retained and newly created habitats and that there are consequently no impacts upon Badger.</p> <p>Connectivity across the Order limits will be improved with the creation of new hedgerows and grassland, therefore increasing foraging opportunities for Badger.</p> <p>Therefore, there are no impact pathways (e.g. habitat loss, disturbance of habitats and pollution), during operation of the Scheme which could affect Badger and there are likely to be beneficial effects to this species.</p>	No
	<p>Decommissioning: Whilst the distribution of Badger on site during decommissioning cannot be predicted, as per construction, it is predicted that the Scheme will be able to retain and avoid habitats supporting Badger (and their setts). Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No

IEF	Importance (refer to Section 8.6)	Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
Other Mammals (Brown Hare and Hedgehog)	Low	<p>Construction: The construction of the Scheme will convert arable farmland, used by Brown Hare, into permanent grassland. Hedgerows, scrub and woodland (potentially used by Hedgehog) will be retained and avoided.</p> <p>There will be no fragmentation of habitats used by Brown Hare or Hedgehog as the Scheme has embedded sufficient buffers from retained habitats to ensure that both species can move freely across the Order limits. Any perimeter fencing will be permeable to both species (see Section 8.9).</p> <p>Connectivity across the Order limits will be improved with the creation of new hedgerows and grassland, therefore increasing foraging opportunities for both species.</p> <p>During construction, there is potential for pollutant spills and surface runoff into habitats, which in turn could affect species using them. However, standard environmental protection measures will be implemented and adopted during construction, formalised through the Framework CEMP [EN010131/APP/7.3], secured through the DCO. These measures will include dust suppression and pollution prevention. Consequently, indirect effects to habitats supporting other mammals during construction will not occur.</p> <p>The construction of the Scheme, if undertaken within the Brown Hare breeding season (typically March to August inclusive) has the potential to cause mortality to this species using habitats that are to be removed. However, the construction of the Scheme will be undertaken over many months and therefore any impacts upon Brown Hare during construction are likely to be localised and short-term. Additionally, there will be no species mortality of Hedgehog as this species, if present, would occupy retained habitats such as woodland and hedgerows. Therefore, there will be no species mortality of Brown Hare or Hedgehog during construction of the Scheme</p> <p>Therefore, there are no impact pathways (e.g. habitat loss, disturbance of habitats and pollution), during construction of the Scheme which could affect Brown Hare or Hedgehog.</p>	No
		<p>Operation: During operation, no part of the Scheme will be continuously lit and any lighting will be directional (into the Scheme and using directional fittings), manually operated and for operational and security purposes around electrical infrastructure. Therefore, lighting will not impact upon retained or newly created habitats.</p> <p>The management of surface water, including for PV array runoff, will ensure no hydrological impacts occur on retained and newly created habitats and that there are consequently no impacts upon species using them (such as Brown Hare or Hedgehog).</p> <p>The conversion of arable farmland to grassland and creation of new habitats (such as hedgerows) will improve connectivity across the Order limits for both species.</p>	No

IEF	Importance (refer to Section 8.6) Assessment of Likely Impacts on IEF (refer to Section 8.8)	Potential for an effect to occur?
	<p>Therefore, there are no pathways (e.g. habitat loss and/ or disturbance, such as noise, lighting or visual), during operation of the Scheme which could affect Brown Hare or Hedgehog and there are likely to be beneficial effects to both species.</p>	
	<p>Decommissioning: Decommissioning impacts will be similar to those occurring during construction with retention and avoidance of habitats supporting other mammals (such as woodland edge, scrub, grassland) at the time of decommissioning. Any impacts would require mitigating, fully in line with relevant legislative and policy requirements at the time of decommissioning and these measures are included within the Framework DEMP [EN010131/APP/7.5] of this ES.</p>	No

Significance of Effects

- 8.10.5 The impacts and effects (both beneficial and adverse) associated with the construction, operation and decommissioning of the Scheme are outlined in the sections below. The assessments have been undertaken following consideration of the embedded mitigation measures as described in Section 8.9.
- 8.10.6 Taking into account the embedded mitigation measures as detailed in Section 8.9 of this chapter, the potential for the Scheme to generate effects on IEFs was evaluated using the methodology as detailed in Section 8.6 of this chapter. The aim of the evaluation was to identify potentially significant effects and determine the need for additional mitigation measures to those detailed in Section 8.9 of this chapter.
- 8.10.7 Accordingly, the evaluation has identified that during construction, the following impacts on IEFs that have been taken forward for further assessment:
- Temporary degradation of habitats within Cow Pasture Lane Drains LWS;
 - Direct loss of hedgerows within the Order limits; and
 - Permanent loss of Skylark breeding habitat.
- 8.10.8 The evaluation has concluded that the operation of the Scheme will not lead to any impacts on IEFs.
- 8.10.9 The effects of decommissioning of the Scheme are likely to be similar to those for construction, but with recognition that many of the potential impacts associated with the creation of internal accesses will not be relevant during decommissioning. Habitats and protected or notable species are likely to be subject to temporary damage of habitats and disturbance to species during decommissioning activities. Therefore, appropriate measures will need to be put in place to minimise degradation of habitats and disturbance of species, appropriate to the legislative and policy requirements at the time of decommissioning. It is reasonable to assume that measures included within the **Framework DEMP [EN010131/APP/7.5]** of this ES will be needed to control this. The Ecology Advisory Group will inform this process and suitably qualified ecologists should be in place to oversee compliance.
- 8.10.10 Taking into account that relevant legislation and policy will need to be adhered to when decommissioning takes place, appropriate measures will be put in place to monitor and manage the impact of decommissioning activities on IEFs.

Construction

Temporary degradation of habitats within Cow Pasture Lane Drains LWS

- 8.10.11 Whilst the necessity for an access track to cross Cow Pasture Lane Drains LWS will principally seek to avoid crossing the LWS, there is potential that a new crossing point may be required to facilitate construction-related traffic. To minimise impacts on the LWS and avoid habitat loss, a new crossing point (if required) would be in the form of a bailey bridge, approximately 6m wide which

would be erected over the LWS for a temporary period during construction within this area. A temporary crossing would potentially impact the LWS through shading, although adverse shading (*i.e.* where impacts are irreversible) is generally reliant on a long period of exposure, which is typically in excess of two growing seasons or longer.

8.10.12 Whilst a temporary Bailey bridge would cause localised shading, the Bailey bridge would be *in situ* for no longer than 24 months, which is not long enough to cause permanent and irreversible damage to habitats within the LWS. Furthermore, the majority of plant species recorded within the LWS and cited on the LWS notification (including Meadowsweet and Amphibious Bistort) are shade-tolerant and will therefore not be adversely affected. Furthermore, control measures would be put in place to ensure indirect impacts (such as pollution) does not occur.

8.10.13 Taking into account embedded protection measures and Scheme design to minimise the impact of construction activities on the LWS, if a Bailey bridge is required then the impacts of a 6m wide bridge that is temporary in duration (and affecting no more than a maximum of two growing seasons) which would not impact on the integrity of the LWS, it is assessed that the magnitude of this potential impact is **low**, which results in a temporary **negligible** effect, that is **not significant** to the LWS.

Direct loss of hedgerows within the Order limits

8.10.14 Construction activities are predicted to result in the potential for the loss of small sections of species poor hedgerow as a result of grid connection cables, fences and access routes. The majority of hedgerows across the Order limits, including those which are species rich have been avoided. Any replanting required has been embedded within the Scheme design for creation of hedgerows, however this may take time to develop and therefore, there is likely to be a temporary (short-term) adverse effect on this habitat type in some areas. Once hedgerows establish along with additional hedgerow planting proposed across the Order limits, it is predicted that the Scheme will be able to deliver a net gain in this habitat and the overall impact will be beneficial. Taking into account embedded protection measures and Scheme design to minimise the impact of construction activities causing direct loss of small sections of species poor hedgerows only, it is assessed that the magnitude of this impact is **low**, which results in a temporary **minor adverse** effect, that is **not significant** to the overall hedgerow resource present within the Order limits or effects the integrity of any particular hedgerow.

Permanent loss of Skylark breeding habitat

8.10.15 The survey of breeding birds (**Appendix 8-H** of this ES [EN010131/APP/3.3]) identified 78 territorial males present across the Solar and Energy Storage Park, with noticeable concentrations to the east of the railway line, where the landscape is dominated by large, open arable fields with species-poor hedgerows. However, Skylark were still present to the west of the railway line where fields have more mature hedgerows and areas of broad-leaved woodland. The prevalent crop type to the west of the railway line in 2022 was autumn sown wheat, with a mixture of autumn sown field beans, autumn sown wheat and *Miscanthus* biofuel crop to the east of the railway line. Autumn sown

cereals (and other crops) are now a typical feature of the arable environment and, whilst suitable for nesting Skylark during the early spring, can quickly become too tall, as well as be prone to more frequent spraying and earlier harvesting. This can result in nest loss, as well as an overall reduction in the number of broods and/ or nesting attempts. As Skylark in arable habitats are particularly susceptible to nest failure or low fledgling success, through predation and lower abundances of invertebrate food, than say natural unimproved grasslands (causing adults to forage over greater distances), any reduction in brood numbers can consequently reduce the productivity of the local population. Whilst, 78 territorial males were recorded from surveys of the Solar and Energy Storage Park, nests are not actively searched for during territory mapping surveys and so the number of active nests or indeed breeding attempts or success fledgling is unknown. So, whilst the number of territorial males provides an idea of the overall potential habitat resource, it is not necessarily a good indicator for assessing the quality of that habitat and its overall productivity for the Skylark population. The dominance of autumn sown and biofuel crops, would suggest that the number of broods and/ or breeding attempts is likely to be low, which in turn is likely to result in low productivity and juvenile recruitment into the local breeding population.

- 8.10.16 It is acknowledged that construction activities will result in the loss of arable farmland used by breeding Skylark. Without measures providing suitable nesting and foraging habitats being incorporated within the Scheme design then there is the potential for a long-term effect on a Skylark population of importance at a District (medium sensitivity) level. The magnitude of this impact would be high, resulting in a **moderate adverse** effect that is **significant** as it undermines the long-term viability/ stability of the population.
- 8.10.17 Additional mitigation to reduce this effect has been developed and is identified below in Sections 8.10.26 to 8.10.33.

Operation

- 8.10.18 The evaluation has concluded that the operation of the Scheme will not lead to any impacts on IEFs identified.

Decommissioning

- 8.10.19 The evaluation has concluded that the decommissioning of the Scheme is not predicted to have any impacts on IEFs identified at this stage.

Summary of Magnitude of Impact and Significance of effect

- 8.10.20 Table 8-13 summarises the sensitivity (value) of IEFs, impacts and effects resulting from construction of the Scheme. No impacts and effects, arising from operation or decommissioning of the Scheme have been identified at this stage.

Table 8-13 Summary of Magnitude of Impact and Significance of Effect

Receptor	Sensitivity (value)	Description of Impact	Magnitude of Impact	Effect Category	Potential for significant effect?
Hedgerows	Up to Medium (County)	Temporary loss of habitat	Medium	Minor adverse	No
Skylark	Medium (District)	Permanent loss of habitat	High	Moderate adverse	Yes

Additional Mitigation

8.10.21 As identified in Table 8-13, additional mitigation measures are required to avoid significant adverse effects on breeding Skylark.

8.10.22 However, through evolution of the Scheme design, including mitigation requirements for other environmental disciplines, sufficient areas of habitat creation, alongside extensive habitat enhancements have been incorporated to offset the impact of loss of arable farmland for breeding Skylark as well as provide extensive benefits for other IEFs and wider biodiversity. These additional mitigation measures and enhancements are set out in this section, alongside an assessment of the impact and significance of any effect to the IEF. This will determine whether the Scheme results in any residual effects to IEFs.

8.10.23 Throughout the Order limits, new habitats will be created to increase the biodiversity of the Scheme. Other habitats to be included are bare ground, cover crops, hedgerows, tree and scrub planting, as set out in the **Outline LEMP [EN010131/APP/7.10]**. These habitats will provide landscape scale benefits for wildlife through increased habitat provision and connectivity and will be of value to a wide range of fauna.

8.10.24 Vegetation would be established through natural regeneration or in the case of grasslands from seed collection from the grasslands identified within the Order limits and through a suitable long-term habitat management regime. Consideration will be paid to microclimatic conditions when identifying appropriate species. Management will be undertaken in a variety of ways to ensure maximum biodiversity gains, with grassland managed by either low intensity grazing or infrequent hay cutting to allow plant species to flower and seed.

8.10.25 For the purposes of BNG, the habitat creation for the Scheme will seek to achieve overall net gains in habitat units for biodiversity and for river and hedgerow habitats. Whilst the majority of habitat potentially to be lost is of low ecological value and of no more than Local importance, e.g. arable farmland, embedded design measures described above will be used in the final assessment to ensure no net loss in important habitat types.

Skylark

8.10.26 Additional mitigation measures to offset the loss of arable farmland for breeding and foraging Skylark have been incorporated within the Scheme

design and are set out below. The locations of proposed measures are illustrated on the Outline Landscape Masterplan in Annex A of the **Outline LEMP [EN010131/APP/7.10]**.

- 8.10.27 Approximately 122 ha of undeveloped land, including large areas of over 6.7 ha in three locations, has been incorporated into the Scheme design. These areas will be subject to grassland creation, with a combination of tussocky grass and floristic diverse seed mixes used to maximise both nesting habitat, but also invertebrate prey for chicks as well as seeds for adults. Management of these areas will ensure that the sward does not exceed 60 cm and any management activities are restricted for the full extent of the breeding season (typically March to August inclusive), allowing for potential of up to four broods.
- 8.10.28 In addition to these larger undeveloped areas, wide margins (c.15 m) have been left alongside numerous internal access tracks. A similar treatment to the larger undeveloped areas will be applied to these linear habitats, providing nesting opportunities and mosaics of bare ground and diversity grassland for foraging and territory defence.
- 8.10.29 Wide grassland margins and undeveloped corners of fields, particularly along the periphery of the Scheme have been incorporated into the design to enhance foraging for Skylark nesting both onsite and offsite and to allow for an element of displacement from the Scheme and absorption into neighbouring habitats.
- 8.10.30 In habitat areas targeted for Skylark management existing hedgerows, where practicable, will be maintained at their current height, to minimise further loss of 'openness' of these areas. Further to this, to reduce predation from ground predators, particularly in areas where existing woodlands and mature hedgerows may provide a sync for predators, the perimeter security fencing will not contain passages for mammals, as is proposed elsewhere throughout the Scheme, which will reduce nest predation.
- 8.10.31 The Scheme has also allowed for areas to be set aside for overwinter foraging resources. These seed rich area will increase the chances of overwinter survival of adult and juvenile birds, improving potential recruitment of individuals into the local breeding population.
- 8.10.32 Whilst the above measures will not provide like for like mitigation for all territorial males recorded, as discussed in Section 8.10.15, providing improved habitat quality, which is permanent, not subject to agricultural rotations, pesticide application or early harvesting, in combination with measures to reduce predation, will increase both nesting densities and productivity over the lifespan of the project.
- 8.10.33 With the application of the mitigation measures set out above, the magnitude of habitat loss is reduced to **low**, resulting in a **minor adverse to negligible effect** which is **not significant** to the Skylark population.

8.11 Enhancement Measures

- 8.11.1 The following habitat creation and enhancements have been included within the Scheme design for biodiversity. A number of the mitigation measures

identified within the LEMP are embedded or additional mitigation for the purposes of the landscape and visual assessment and provide enhancement for biodiversity beyond those mentioned above.

Woodland planting

- 8.11.2 Woodland planting (also referred to as buffers) and native tree belts will be established to reinforce the retained existing woodland and tree belts. These are proposed in areas too narrow to be planted as woodland but at 10 to 15m width will provide a more substantial block of planting than a hedgerow with specimen trees. Woodland buffers and native tree belts are characteristic of the existing landscape and provide ecological value, forming important wildlife corridors between existing woodlands. The locations of proposed native tree belts and woodland buffers are illustrated on the Outline Landscape Masterplan in Annex A of the **Outline LEMP [EN010131/APP/7.10]**.

Hedgerows

- 8.11.3 New hedgerows with trees will be established to supplement the existing, retained hedgerows with trees. These will provide both a valuable habitat, forming important wildlife corridors and re-enforcing existing ones. Hedgerows will be maintained at a minimum of 3m high and 'infilled' where there are gaps in existing hedgerows.
- 8.11.4 Lengths of new, species rich, hedgerow will be planted to compensate for any lost, using three core species: Hawthorn, Blackthorn *Prunus spinosa* and Field Maple with others to add diversity including: Oak, Hornbeam, Holly *Ilex aquifolium*, Hazel *Corylus avellana*, Spindle *Euonymus europaeus*, Crab Apple *Malus sylvestris*, Elder *Sambucus nigra*, Buckthorn *Rhamnus cathartica*, Dogwood *Cornus sanguinea* and a disease resistant cultivar of English Elm *Ulmus procera*.
- 8.11.5 Gaps in currently defunct hedges will be planted with suitable native species to improve the connectivity of habitats (such as between ancient and other broad-leaved woodland) within and adjacent to the Order limits. New areas of tree planting around infrastructure will be provided to provide both screening from Scheme infrastructure and to improve habitat connectivity as well to the increase the area of hedge / woodland habitat within the Order limits. New scrub habitat and wider hedgerows (up to 8m wide) will be created in selected areas to provide suitable habitat for declining farmland birds such as Yellowhammer and Tree Sparrow *Passer montanus*. Hedgerows and trees will be allowed to grow tall and wide to provide maximum benefits for biodiversity and this natural regeneration will encourage a mosaic of successional habitats, forming broad habitat corridors throughout the Scheme. These measures are incorporated in the **OLEMP [EN010131/APP/7.10]** and secured through the DCO.

Scrub

- 8.11.6 Scrub composed of native shrubs is proposed adjacent to hedgerows to increase the shrub habitat and enhance biodiversity. This will create and maintain a diverse mosaic of scrub and grassland habitat, which includes providing shelter and food resources for birds and other wildlife.

Natural re-generation areas

- 8.11.7 An area 15 to 25 m wide adjacent to existing ponds and woodland both within and outside the Order limits will be encouraged to naturally regenerate. There will be no routine management of these areas. Natural regeneration will further increase biodiversity and provide an opportunity to observe the gradual structural transition from grassland to canopy woodland habitats.

Species rich grassland

- 8.11.8 Species-rich grassland will be established across the Scheme, under the PV panels and in set aside areas. Conservation margins sown with a wild bird seed mix will also be established. By establishing a diverse sward of grasses and herbs biodiversity will increase, enhancing value for wildlife. The wild bird seed mix in the conservation margins will provide a cover crop habitat for game birds and food source for over-wintering farmland birds such as Skylark, Linnet and Yellowhammer.
- 8.11.9 The locations for creating species-rich grassland are illustrated on the Outline Landscape Masterplan, Annex A of the **Outline LEMP [EN010131/APP/7.10]**. The exact location and proportion of margin types within the conservation margins will be tailored to the needs of the sites biodiversity. Following best practice, the conservation margins will be 12 m in width, and at least 50 m in length.

Pond restoration and planting around ponds

- 8.11.10 Existing ponds in poor condition will be restored with the aim of maximising their wildlife value. This will partly be achieved by de-silting to ensure that they remain at least partly wet during normal conditions, allowing amphibians and invertebrates to complete their life cycles. Where existing ponds are overshadowed by mature trees, including poplars, willows and oak pollards, these trees will be prioritised for re-pollarding, to increase light and decrease leaf fall onto the ponds. Scrub clearance and de-silting around ponds will be phased over five years, to prevent the site-wide loss of existing shaded pond habitats and to provide ponds in various stages of natural succession to provide a wider range of niches for wildlife. Water features tend to be colonised naturally, therefore no planting is considered necessary or desirable in these areas.

Provision of habitat boxes

- 8.11.11 A range of artificial bird and bat boxes will be installed in existing woodland areas, on retained individual trees and existing trees in hedgerows to increase the availability of nesting and roosting features and enhance the value of the woodlands for these species' groups.
- 8.11.12 A total of 40 bird nest boxes and 30 bat roost boxes of varying types to suit different species of birds and bats will be installed within the retained woodland areas on suitable trees, on individual trees and on hedgerow trees, in locations to be determined by an ecologist at the time of installation.
- 8.11.13 Bird and bat boxes made from long lasting materials (such as Woodcrete) will be used and would be expected to have a life expectancy of 20-25 years.

Where replacements are required, then these will be erected to ensure provision throughout the lifespan of the project.

8.11.14 A minimum of five tree mounted or tower mounted Barn Owl boxes will be provided in the Order limits located >1km from main roads.

Creation of habitat piles

8.11.15 Habitat piles and hibernacula would be constructed throughout the Scheme in suitable areas, such as close to ponds or watercourse, using natural materials generated during clearance of the site, such as logs, turf, and grass strimming. These would provide refuge and hibernation opportunities for amphibians and reptiles, as well as dead wood habitat for invertebrates, which would in turn benefit fauna such as bats and birds.

8.11.16 With the implementation of the above enhancements the Scheme has the potential to generate beneficial effects for a range of the IEFs identified in section 8.9. Where relevant, these are outlined in Table 8-14.

Table 8-14 Summary of Enhancement and Significance of Effect

IEF	Enhancement description	Residual Effect
Broad-leaved woodland (including ancient / semi-natural woodland) occurring within, or adjacent to, the Order limits	Natural re-generation of areas surrounding woodland within the Order limits, along with enhanced planting, will allow the expansion of existing woodlands, as well as providing further natural buffers to ancient woodlands. This will further secure the long-term future of these woodlands and is in line with the expectations of national and local planning policy.	Moderate beneficial effect – Significant
Hedgerows	Gaps in currently defunct hedges will be planted with suitable native species to enhance the biodiversity of the hedgerow and improve the connectivity of habitats (such as between ancient and other broad-leaved woodland) within and adjacent to the Order limits. New areas of tree planting will be provided to create screening from Scheme infrastructure, improve habitat connectivity and increase the area of hedgerow (and woodland habitat) within the Order limits. Tree planting will be avoided in any areas where there may be ecological features which require open landscapes. Hedgerows and trees will be allowed to grow tall and wide to provide maximum benefits for biodiversity and this natural regeneration will encourage a mosaic of successional habitats, forming broad habitat corridors throughout the Scheme. The above measures will greatly enhance the diversity of hedgerows present as well as provide positive management outcomes for existing species-rich hedgerows. This is in line with the expectations within national and local planning policy.	Moderate beneficial effect – Significant
Terrestrial Invertebrates	Grassland will be created within the Solar and Energy Storage Park adjacent to and beneath the solar photovoltaic	Minor beneficial – not significant

	(PV) arrays, including in larger open fields, to increase the diversity of flora in comparison to existing intensive agriculture and provide new habitat niches to encourage fauna such as invertebrates. This is in line with the expectations within national and local planning policy.	
Reptiles and amphibians	Grassland will be created within the Solar and Energy Storage Park adjacent to and beneath the solar photovoltaic (PV) arrays, including in larger open fields, to increase the diversity of flora in comparison to existing intensive agriculture and provide new habitat niches to encourage fauna such as invertebrates, which in turn will be of benefit to reptiles and amphibians. This is in line with the expectations within national and local planning policy.	Minor beneficial – not significant
Wintering birds	Planting of gaps in hedgerows and creation of new hedgerows, cover crops, tree planting and conversion of arable land to grassland habitats (to increase the flora and invertebrates) will be of benefit to wintering birds, providing increased foraging opportunities. This is in line with the expectations within national and local planning policy.	Minor beneficial – not significant
Breeding birds – general breeding bird assemblage	Planting of gaps in hedgerows and creation of new hedgerows, tree planting and conversion of arable land to grassland habitats (to increase the flora and invertebrates) will be of benefit to breeding birds, providing increased foraging and nesting opportunities. These areas have been set aside within the Scheme design for creation of biodiverse habitats, as set out within the Outline LEMP [EN010131/APP/7.10] . The management of such areas will maintain these for ground-nesting bird species, such as Lapwing <i>Vanellus vanellus</i> (and other ground-nesting birds such as Grey Partridge <i>Perdix perdix</i>) and, appropriately, will aim to maintain a sward height of 1 to 5 cm and include areas of bare ground. This is in line with the expectations within national and local planning policy.	Moderate beneficial - significant
Bats	Planting of gaps in hedgerows and creation of new hedgerows, tree planting and conversion of arable land to grassland habitats (to increase the flora and invertebrates) will be of benefit to commuting, foraging and roosting bats. This is in line with the expectations within national and local planning policy.	Minor beneficial – not significant
Badger	Planting of gaps in hedgerows and creation of new hedgerows, tree planting and conversion of arable land to grassland habitats (to increase the flora and invertebrates) will be of benefit to Badger. This is in line with the expectations within national and local planning policy.	Minor beneficial – not significant
Other mammals (including Brown Hare and Hedgehog)	Planting of gaps in hedgerows and creation of new hedgerows, tree planting and conversion of arable land to grassland habitats (to increase the flora and invertebrates) will be of benefit to other mammals. This is in line with the expectations within national and local planning policy.	Minor beneficial – not significant

8.11.17 The Scheme will deliver significant enhancements for biodiversity in line with national (e.g. the NPPF (Ref 8-22)) and local (e.g. the Central Lincolnshire Local Plan (Ref 8-24)) policies and their biodiversity priorities to deliver a net

gain in biodiversity. A robust monitoring programme is also provided in the **Outline LEMP [EN010131/APP/7.10]** of this ES, secured through the DCO, to ensure mitigation and enhancement measures are delivered successfully.

8.12 Residual Effects and Conclusions

8.12.1 With the application of the additional mitigation measures set out above, no significant adverse effects have been identified during construction, operation or decommissioning of the Scheme. With consideration of enhancement measures set out above, the Scheme has the potential to result in significant beneficial effects to broad-leaved woodland, including ancient woodland, hedgerows and breeding birds, particularly farmland birds associated with hedgerows and field margins.

8.13 Cumulative Assessment

8.13.1 An assessment of cumulative effects has been made with reference to the method and guidance set out in **Chapter 5: EIA Methodology** of this ES **[EN010131/APP/3.1]** and long list of cumulative plans and projects identified in **ES Volume 3: Appendix 5-A [EN010131/APP/3.3]**.

8.13.2 The Scheme includes sufficient avoidance and retention of ecological features and the creation of extensive areas of new habitat. In combination with other mitigation and enhancement measures (as detailed in Sections 8.9 and 8.11 of this chapter) the impacts and effects on ecological receptors have been minimised or avoided.

Potential Cumulative Effects – Solar and Energy Storage Park

8.13.3 Other plans and projects within 4 km of the Scheme, as identified in **ES Volume 3: Appendix 5-A [EN010131/APP/3.3]** were reviewed for potential overlapping spatial and temporal interactions with the Scheme. Where these potential overlapping interactions of ecological receptors was likely to occur, the relevant ecological receptors were identified and where they were considered to be sensitive, the overlapping development was taken forward for cumulative assessment. There is no potential for cumulative effects where the Scheme has a negligible effect, so this assessment has only considered those minor adverse effects reported in Table 8-13.

8.13.4 Following a review of the shortlist of cumulative schemes, it is considered that the West Burton Solar Project¹ and the Cottam Solar Project² have the potential to result in cumulative effects with the Scheme, where the overall loss of arable farmland has the potential to reduce nesting and foraging habitat for Skylark. The West Burton Solar Project and the Cottam Solar Projects are identified on **ES Volume 2: Figure 16-1 [EN010131/APP/3.2]**. Further details are available in the PEI reports which were submitted to the LHAs for the Cottam and West Burton solar projects in January 2022. Further details are also available on the Planning Inspectorate website.

¹ <https://infrastructure.planninginspectorate.gov.uk/projects/east-midlands/west-burton-solar-project/>

² <https://infrastructure.planninginspectorate.gov.uk/projects/east-midlands/cottam-solar-project/>

- 8.13.5 Both projects identify ground nesting birds, in particular Skylark, as requiring mitigation for the loss of arable farmland for breeding, acknowledging that the West Burton Solar Project and Cottam Solar Project, alongside the Scheme have the potential to act in combination. Whilst the mitigation proposals are not fully described in the PEI Reports for either project, it is acknowledged that this will be resolved and included within the ES for these projects. Therefore, it is assumed that neither project will result in residual adverse effects and that there will be no significant cumulative effect arising from the three projects on Skylark populations from loss of arable farmland.
- 8.13.6 All of the other plans and projects identified in **ES Volume 3: Appendix 5-A [EN010131/APP/3.3]**, which were considered to have the potential to interact cumulatively with the Scheme have followed good design principles to minimise and avoid significant effects on ecological receptors and all avoid spatial and temporal interaction with the Scheme. The Scheme will not have a significant adverse effect on ecological receptors in combination (cumulatively) with other plans or projects.

Potential Cumulative Effects – Shared Grid Connection Corridor

- 8.13.7 The Grid Connection Corridor has the potential to be shared with the Cottam and West Burton solar projects as detailed in **ES Volume 1, Chapter 2: The Scheme [EN010131/APP/3.1]**. To better understand the effects on ecological receptors associated with the Grid Connection Corridor for this Scheme, and cumulatively with the Cottam and West Burton solar projects, this chapter assesses the following two scenarios:
- Scenario 1: All three projects' ducts and cables are installed within the same construction programme of 24-36 months. As a worst case, it is assumed all the ducts will be installed at once and launch and reception pits and trenches will be backfilled so the area can then be re-instated. Due to the uncertainty of each project, three lots of separate cable-pulling activities are assumed. The access points, haul routes and compounds will remain in place for a maximum of 24-36 months to enable future cable pull.
 - Scenario 2: The sequential installation of all three projects' ducts and cables over a maximum 5-year period. As a worse case, all projects assume the construction, and subsequent removal of the haul road, and compounds.
- 8.13.8 As identified in Table 8-11 and Table 8-12, designated sites (such as Cow Pasture Lane Drains LWS), areas of priority habitat (such as the Coastal and Floodplain Grazing Marsh) and areas supporting protected and notable species (such as Badger) that are within the Grid Connection Corridor will be avoided and subject to non-intrusive methods for installation. These avoidance areas are presented in **ES Volume 3: Appendix 2-B, Figure 1 [EN010131/APP/3.3]**.
- 8.13.9 In both scenarios, three individual sets of ducts and cables, each requiring a maximum construction working width of between 25 m and 30 m, will be installed within a 100 m corridor. Given, that each project will require its own working corridor with associated trench, it is assumed that regardless of which

scenario is taken forward, that disturbance to, or loss of habitats will be temporary, e.g., species poor hedgerows and dry agricultural drainage ditches, with habitats re-instated once construction is complete. As each project's ducts and cable run will be separate, then any habitat re-instated or planted shouldn't be subsequently disturbed regardless of scenario.

8.13.10 Scenario 2 is likely to result in the potential fragmentation of linear habitats, e.g., hedgerows and drainage, for a greater period of time (up to five years), with the potential for various sections of these features to be lost or disturbed throughout that period. In turn, this has the potential to reduce connectivity for a wide range of wildlife. However, in consideration of the baseline ecological conditions presented in section 8.7, the Grid Connection Corridor has incorporated avoidance zones along the corridor where IEFs have been identified.

8.13.11 Therefore, the areas of greater value to wildlife will be avoided during construction, reducing the risk of habitat fragmentation and loss of connectivity. It is therefore predicted that neither scenario will result in significant cumulative effects arising from the three projects. Where practicable, joint mitigation will be undertaken with Cottam and West Burton solar projects within the Shared Grid Connection Corridor to manage environmental effects. The detailed CEMP(s) will outline all ecological mitigation, which will likely include combined pre-construction surveys, protected species mitigation, translocation (if required), monitoring and post construction reinstatement plans.

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