FENWICK SOLAR FARM

Fenwick Solar Farm
EN010152

Environmental Statement

Volume I Chapter 8: Ecology

Document Reference: EN010152/APP/6.1

Regulation 5(2)(a)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

July 2025
Revision Number: 01

BOOM POWER

BOOM-POWER.CO.UK

Revision History

Revision Number	Date	Details
00	October 2024	DCO application
01	July 2025	Deadline 4

Prepared for:
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8. Ecology

8.1 Introduction

8.1.1 This chapter of the Environmental Statement (ES) presents an assessment of the likely significant effects of the Fenwick Solar Farm (hereafter referred to as the 'Scheme') with respect to ecology and nature conservation (collectively referred to as biodiversity within this chapter). For more details about the Scheme, refer to **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**.

8.1.2 This chapter:

a. Identifies and proposes measures to address the potential impacts and likely significant effects of the Scheme on biodiversity, during the construction, operation and maintenance, and decommissioning phases;

b. Provides an evaluation of relevant important ecological features (including nature conservation designations, priority habitats, protected species and invasive non-native species (INNS)) associated with the Scheme, with each being assigned a nature conservation value (sensitivity value);

c. Identifies the Scheme's potential direct and indirect impacts and effects on important ecological features and their conservation status, inter-relationships, and their contribution to local (and if appropriate county, regional and national) biodiversity;

d. Takes into account impact avoidance design measures and management activities, identifies and describes the significance of likely effects: and

e. Identifies and describes the requirement for any additional mitigation and monitoring measures, with these considered in the assessment of residual effects.

8.1.3 Effects on biodiversity from infrastructure projects can arise from direct and indirect impacts upon designated sites, habitats and, or species, and be of a temporary or permanent nature. Indirect effects can occur for example through pollution of air and water and via changes in lighting, noise or hydrology. This chapter is therefore supported by information contained within the following chapters within **ES Volume I [EN010152/APP/6.1]**:

a. **Chapter 6: Climate Change**;

b. **Chapter 9: Water Environment** (which includes hydrology and water pollution);

c. **Chapter 10: Landscape and Visual Amenity** (which includes lighting);

d. **Chapter 11: Noise and Vibration**; and

e. **Chapter 14: Other Environmental Topics** (including air quality).

8.1.4 This chapter should also be read in conjunction with **ES Volume I Chapter 1** to **5 [EN010152/APP/6.1]**, which include a description of the Scheme (**ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**), Alternatives and

Design Evolution (**ES Volume I Chapter 3: Alternatives and Design Evolution [EN010152/APP/6.1]**) and the Environmental Impact Assessment Methodology (**ES Volume I Chapter 5: Environmental Impact Assessment Methodology [EN010152/APP/6.1]**).

8.1.5 This chapter is supported by the following technical appendices (**ES Volume III [EN010152/APP/6.3]**) which provide details of specific legislation, policy, guidance, methods used to characterise each feature's baseline and the results of the desk and field-based assessment:

a. **Appendix 8-1: Legislation, Policy and Guidance (Ecology)**;

b. **Appendix 8-2: Reptile Survey Report**;

c. **Appendix 8-3: Bat Survey Report**;

d. **Appendix 8-4: Badger Report**;

e. **Appendix 8-5: Hedgerow Report**;

f. **Appendix 8-6: Aquatic Ecology Report**;

g. **Appendix 8-7: Breeding Bird Report**;

h. **Appendix 8-8: Non-Breeding Bird Report**;

i. **Appendix 8-9: Riparian Mammal Report**;

8.1.6 The baseline report for Badger *Meles meles* is not publicly available within this ES, owing to the sensitivities of detailing information on the location of Badger setts and risk of illegal persecution. Therefore, **ES Volume III Appendix 8-4: Badger Report [EN010152/APP/6.3]** includes a confidential annex (**ES Volume III Appendix 8-4: Badger Report (Annex A) (Confidential)**) which will be provided confidentially to key stakeholders, including the Planning Inspectorate. In addition, **ES Volume III Appendix 8-7: Breeding Bird Report**, contains a confidential annex which provided details of sensitive breeding species. These are reported separately (**ES Volume III Appendix 8-7: Breeding Bird Report (Annex A) (Confidential)**) and will be provided to key stakeholders only.

8.1.7 This chapter is also supported by the following figures (**ES Volume II [EN010152/APP/6.2]**) which present locations of relevant sites statutorily and non-statutorily designated for nature conservation (**ES Volume II Figure 8-1: Sites Statutorily Designated for their Biodiversity Value at an International and National Level [EN010152/APP/6.2]** and **ES Volume II Figure 8-2: Sites Non-Statutorily Designated for their Biodiversity Value [EN010152/APP/6.2]**) and broad habitats (including priority habitats) recorded during the UKHab habitat survey (**ES Volume II Figure 8-3: UKHab Plan [EN010152/APP/6.2]**).

8.1.8 As part of the ES for the DCO application, a **Framework Construction Environmental Management Plan (CEMP) [EN010152/APP/7.7]**, **Framework Operational Environmental Management Plan (OEMP) [EN010152/APP/7.8]** and a **Framework Decommissioning Environmental Management Plan (DEMP) [EN010152/APP/7.9]** have been prepared to describe management of environmental effects of the Scheme and to demonstrate compliance with environmental legislation.

8.1.9 A **Framework Landscape and Ecological Management Plan (LEMP) [EN010152/APP/7.14]** has also been prepared and submitted as part of the DCO application, the purpose of which is to set out the key measures required to avoid, mitigate, and compensate for effects to biodiversity and landscape from the construction and operation and maintenance of the Scheme. The **Framework LEMP [EN010152/APP/7.14]** provides management prescriptions aimed at ensuring the Scheme delivers a net gain for biodiversity over the long term and includes targeted landscape and biodiversity mitigation that has been incorporated into the Scheme design.

8.2 Legislation, Policy and Guidance

8.2.1 A summary of applicable legislation, planning policy and other guidance documents relating to biodiversity and relevant to the Scheme is provided below.

8.2.2 Full details of the legislation, policy, and guidance of relevance to the assessment of significant effects of the Scheme to important ecological features is provided in full in **ES Volume III Appendix 8-1: Legislation, Policy and Guidance (Ecology) [EN010152/APP/6.3]**.

Legislation

8.2.3 The following legislation is applicable in order to inform the biodiversity assessment:

a. The Wildlife and Countryside Act 1981 (as amended) (WCA) (Ref. 8-1);

b. Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats and Species Directive) (Ref. 8-2);

c. Directive 2009/147/EC on the conservation of wild birds (the codified version of Council Directive 79/409/EEC as amended) (Birds Directive) (Ref. 8-3);

d. Regulation (EU) 1143/2014 (2014) on the prevention and management of the introduction and spread of invasive alien species (the IAS Regulation) (Ref. 8-4);

e. The Ramsar Convention 1971 (Ref. 8-5);

f. The Environment Act 2021 (Ref. 8-6);

g. The Conservation of Habitats and Species Regulations 2017 (as amended) (Ref. 8-7);

h. The Countryside and Rights of Way Act 2000 (Ref. 8-8);

i. The Natural Environment and Rural Communities Act 2006 (NERC) (Ref. 8-9);

j. The Protection of Badgers Act 1992 (Ref. 8-10);

k. The Hedgerows Regulations 1997 (Ref. 8-11);

l. The Invasive Alien Species (Enforcement and Permitting) Order 2019 (as amended) (Ref. 8-12);

m. Animal Welfare Act 2006 (Ref. 8-13);

n. Salmon and Freshwater Fisheries Act 1975 (Ref. 8-14);

o. Eels (England and Wales) Regulations 2009 (Ref. 8-15); and

p. The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref. 8-16).

8.2.4 As part of the Habitats Regulations Assessment of the Scheme, it is necessary to determine whether the Scheme is likely to have a significant effect on areas that have been internationally designated for nature conservation purposes such as Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites, as well as proposed or potential sites (hereafter, European sites). This is separate to the EIA process and Likely Significant Effects (LSE), with relation to European sites, are considered further in the **No Significant Effects Report [EN010152/APP/7.12]** which confirms that there are no LSE from the Scheme alone or in combination on any European site.

National Planning Policy

8.2.5 This chapter considers relevant National Policy Statements (NPS) for energy, including relevant sections for solar and biodiversity. These NPS's set out national policy for energy infrastructure and provide guidance and the legal framework for planning decisions. They comprise the government's objectives for the development of nationally significant infrastructure and take account of government policy relating to the mitigation of, and adaptation to, climate change. Therefore, the following NPS's, which were released in November 2023 and which came into force on 17 January 2024, have been reviewed and are relevant to the Scheme and biodiversity:

a. Overarching National Policy Statement for Energy (EN-1) (November 2023) (Ref. 8-17);

b. NPS for Renewable Energy Infrastructure (EN-3) (November 2023) (Ref. 8-18); and

c. NPS for Electricity Networks Infrastructure (EN-5) (November 2023) (Ref. 8-19).

8.2.6 The National Planning Policy Framework (NPPF) (December 2023) (Ref. 8-20) sets out the Government's planning policies for England and how these are expected to be applied. While the NPPF does contain specific policies for Nationally Significant Infrastructure Projects (NSIPs) like those in the above NPS's, it remains a relevant matter for consideration as to the Government's general directions in respect of planning. The NPPF with particular reference to Section 15 (conserving and enhancing the natural environment) states 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.

8.2.7 The NPPF (Ref. 8-20) 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.

8.2.8 The NPPF (Ref. 8-20) also specifies the obligations that the Local Authorities and the UK Government have regarding sites statutorily designated for their biodiversity value and otherwise protected or notable habitats and protected

species under UK and international legislation and how this is to be delivered in the planning system.

8.2.9 Protected or notable habitats and species are of material consideration in planning decisions and may therefore make some sites unsuitable for particular types of development, or if development is permitted and significant harm to biodiversity cannot be avoided, then adequate mitigation measures (or as a last resort, compensation) will be required to avoid or minimise impacts on certain habitats and species.

Local Planning Policy

8.2.10 Applicable local planning policies that are relevant to inform the biodiversity assessment for the Scheme are:

a. Doncaster Local Plan 2015-2035 (adopted September 2021) (Ref. 8-21); and

b. The Doncaster Green Infrastructure Strategy 2014-2028 (adoption version April 2014) (Ref. 8-22).

8.2.11 Policies in Chapter 10 (Green Infrastructure) of The Doncaster Local Plan (Ref. 8-21) seek to maintain, protect, enhance and extend all assets in the green infrastructure network in Doncaster. Development proposals will be supported which contribute to an attractive and connected environment including creating and enhancing green corridors that link urban areas to countryside. The policies provide the detail on how Doncaster's green infrastructure visions and objectives will be achieved through the planning system by providing a network of well-connected habitats and an attractive, healthier, safer and more active place to live and work.

8.2.12 The Doncaster Green Infrastructure Strategy (Ref. 8-22) sets out an overall approach for delivering an integrated network of high-quality green spaces, habitats and landscapes across the borough.

Other Guidance Documents

8.2.13 Other guidance documents that have informed the assessment of the impacts of the Scheme on biodiversity includes:

a. Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Costal and Marine (Ref. 8-23); and

b. The Environmental Improvement Plan 2023 (Ref. 8-24);

c. Natural England (NE) and Department for Environment, Food and Rural Affairs (Defra) Standing Advice (protected species) (Ref. 8-25);

d. The United Kingdom (UK) Biodiversity Action Plan (BAP) list of priority habitats and species (Ref. 8-26), succeeded by the UK Post-2010 Biodiversity Framework (Ref. 8-27);

e. Doncaster Biodiversity Action Plan (Doncaster BAP) (Ref. 8-28);

f. The International Union for Conservation of Nature (IUCN) Red List of Threatened Species (Ref. 8-29);

g. Mitigating biodiversity impacts associated with solar and wind energy development: Guidelines for project developers (Ref. 8-30);

h. Natural England's evidence review of the impacts of solar farms on birds, bats and general ecology (Ref. 8-31);

i. Natural England Technical Information Note TIN101 Solar parks: Maximising Environmental Benefits (Ref. 8-32).

8.3 Scoping Opinion and Additional Consultation

Scoping Opinion

8.3.1 A scoping exercise was undertaken in spring 2023 to establish the content of the assessment and the approach and methods to be followed. The scoping exercise outcomes were presented in the Scoping Report (**ES Volume III Appendix 1-1: EIA Scoping Report [EN010152/APP/6.3]**) which was submitted to the Planning Inspectorate on 1 June 2023. The Scoping Report records the findings of the scoping exercise and details the technical guidance, standards, good practice, and criteria to be applied in the assessment to identify and evaluate the likely significant effects of the Scheme on biodiversity.

8.3.2 A Scoping Opinion was received from the Planning Inspectorate on 11 July 2023 (**ES Volume III Appendix 1-2: EIA Scoping Opinion [EN010152/APP/6.3]**).

8.3.3 A full review of all comments raised in the Scoping Opinion is provided in **ES Volume III Appendix 1-3: EIA Scoping Opinion Responses [EN010152/APP/6.3]**. This also outlines how and where the Scoping Opinion comments have been addressed within this ES.

Statutory Consultation

8.3.4 Further consultation in response to formal pre-application engagement was undertaken through the Preliminary Environmental Information Report (PEIR), issued in Spring 2024. Reponses to this statutory consultation are presented in the **Consultation Report [EN010152/APP/5.1]**.

8.3.5 Statutory consultation responses relating to Ecology are presented in **Appendix O** of the **Consultation Report [EN010152/APP/5.1]**.

Additional Consultation

8.3.6 Additional consultation has been undertaken to steer the development of the Scheme and ensure matters raised were addressed by the Applicant. This includes consultation with Natural England through their Discretionary Advice Service (DAS) to determine the methodology for non-breeding bird surveys, upon which it was determined that two seasons of data were required, as detailed within **ES Volume III Appendix 8-8: Non-Breeding Bird Report [EN010152/APP/6.3]**.

8.3.7 Additional meetings were held with Natural England including a meeting in October 2024 to discuss the Scheme and the effects upon international designated sites. Feedback from Natural England included clarifications as to the foraging distances for certain bird species used in the assessment and the scope of the in-combination impacts upon designated sites to be

considered. Feedback was taken into consideration and incorporated into the production of the **No Significant Effects Report [EN010152/APP/7.12].**

8.3.8 Natural England also provided comments regarding the bat activity survey methodology, biodiversity net gain (BNG) and consideration of breeding barn owls. These comments were acknowledged and are addressed within this ES and within **ES Volume III Appendix 8-3: Bat Report [EN010152/APP/6.3].**

8.3.9 Meetings were also held with City of Doncaster Council, including a meeting in October 2024 to discuss the Scheme. City of Doncaster Council were largely satisfied with the Scheme. Previous responses had focussed on nesting and foraging habitat provision for skylarks and ecological improvements along the River Went, which have been incorporated into the Scheme design and are discussed within Section 8.13.

8.4 Assessment Methodology

8.4.1 This section sets out the scope and methodology for the assessment of the potential impacts of the Scheme on biodiversity.

Establishment of the Baseline Conditions

8.4.2 Establishment of the baseline environment, within the Study Area, Survey Areas and resulting Zone of Influence (ZoI), involved reference to existing data sources and field surveys, which are presented below.

The Order Limits and Study Area

8.4.3 The Order limits is the collective term for the Solar PV Site, Grid Connection Corridor and Existing National Grid Thorpe Marsh Substation (as defined in **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**). Where ecological features are identified relevant to an individual element of the Scheme (such as the Solar PV Site or Grid Connection Corridor), then this is referred to specifically.

8.4.4 The Study Area was defined to include ecological features likely to be at risk from direct and indirect impacts that might arise from the Scheme and is the initial basis for determining the ZoI. The Chartered Institute of Ecology and Environmental Management (CIEEM) (Ref. 8-23) defines a ZoI as: *"…the area over which biodiversity features may be affected by biophysical changes as a result of the proposed project and associated activities"*.

8.4.5 The ZoI is based on:

a. The nature of the Scheme, activities, and the potential for effects at the construction, operation and maintenance, and decommissioning phases;

b. The nature of the land use (minimum 60% arable) and habitats in the vicinity (majority being arable), the number of water courses and water bodies, their connectivity within and outside of the Order Limits and how they may be used by different species or species groups;

c. The presence of ecological features in the wider area, based on the location of the Order limits and desk study data; and

d. The habits, behaviours and preferences of different species or species groups and whether these could be affected both spatially and temporally.

8.4.6 The Study Area captured all designated sites, sensitive habitats, and protected and notable species that occur within the ZoI of the Scheme. The boundaries and zones for the Study Area reflect standard good practice and were informed by published guidance and professional judgement. This then enabled the identification of specific areas which required ecological survey (Survey Areas) (see Table 8-1) which are specific to a given species, group of species, or habitat. The Study Area and Survey Areas defined are the maximum distances that statutory consultees would typically expect to be considered, and these were presented within the EIA Scoping Report (**ES Volume III Appendix 1-1: EIA Scoping Report [EN010152/APP/6.3]**), with no scoping responses received in any disagreement of this.

8.4.7 In defining individual Study Areas, consideration was given to the geographic location, nature and scale of the Scheme (refer to **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**). For this Scheme, the Study Area, for which data were searched and collated through a desk study, is within the Order limits and up to:

a. 10 km from the Order limits for European sites, including hydrological connections, extended to 30 km for SAC that are designated for bats, or where bats are listed as a qualifying feature;

b. 2 km from the Order limits for sites statutorily designated for their biodiversity value at a National level (e.g. Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs);

c. 2 km from the Order limits for sites non-statutorily designated for their biodiversity value (e.g. Local Wildlife Sites (LWS), Sites of Importance for Nature Conservation (SINC));

d. 2 km from the Order limits for Ancient Woodland and Priority habitats;

e. 2 km from the Order limits for records (from the preceding ten years) of protected and notable species (including granted European Protected Species Licences), habitats and scheduled INNS;

f. 2 km from the Order limits for aquatic species. However, where relevant records of notable aquatic species were available from connected water bodies, a wider search area was utilised to consider connectivity for migratory species (e.g. fish); and

g. Any agri-environment schemes within the Order limits, e.g. Countryside Management Schemes, which may indicate how land is already managed for the benefit of biodiversity and influence the habitats and species present.

8.4.8 Furthermore, the Study Area included a 2 km search from the Order limits for the status of water bodies subject to the Water Framework Directive (WFD) (Ref. 8-16) which are assessed in **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]** and informed by the assessment of aquatic ecology receptors presented here. As impacts may propagate

downstream in hydrologically linked surface water bodies, the Study Area was extended beyond 2 km where data were not available within that zone.

Sources of Information

8.4.9 The Study Areas applied to different ecological features are defined in Paragraph 8.4.7.

8.4.10 Doncaster Local Records Centre (DLRC) was contacted in February 2023 and again in November 2023 following Scheme changes, to obtain information on the location of non-statutorily designated sites and for records of protected and notable habitats, species, and INNS from the preceding ten years.

8.4.11 Protected and notable habitats and species are considered to be those listed under:

a. Schedules 1, 5 and 8 of the WCA (Ref. 8-1);

b. Schedules 2, 4 and 5 of the Conservation of Habitats and Species Regulations 2017 (Ref. 8-7); or

c. Section 41 (S41) of the NERC Act (Ref. 8-9) which lists species and habitats of principal importance (Species of Principal Importance (SPI) or Habitats of Principal Importance (HaPI)) for nature conservation in England.

8.4.12 Other habitats and species, such as those included in national, regional or local Red Data Books and Lists but not protected by legislation (this is consistent with the requirements of relevant planning policy) were also considered and have been assessed on a case-by-case basis.

8.4.13 South Yorkshire Badger Group (SYBG) were contacted in March 2023 (and again in November 2023) to request records of Badgers (including Badger setts) within and up to 100 metres (m) from the Order limits. However, records were not provided owing to concerns from SYBG that the information would not be treated as confidential and could result in harm to Badgers. Irrespective of this, the Applicant has undertaken detailed surveys for Badgers within the Order limits and up to 50 m (see Table 8-1), as presented in **ES Volume III Appendix 8-4: Badger Report [EN010152/APP/6.3]** and **ES Volume III Appendix 8-4: Badger Report (Annex A) (Confidential) [EN010152/APP/6.3]** and summarised in this ES chapter.

8.4.14 Online data resources that were reviewed include:

a. The Ramsar Sites Information Service (RSIS) website (Ref. 8-33) for site information and designation details of any Ramsar's identified within the relevant Study Area (refer to Paragraph 8.4.7);

b. The Natural England website (Ref. 8-35) for information on sites statutorily designated for their biodiversity value and to confirm reasons for designation and their condition;

c. Joint Nature Conservation Committee (JNCC) website (Ref. 8-36), for site information and designation details of SAC and SPA (including potential SPA (pSPA) and possible SAC (pSAC)) identified within the relevant Study Areas;

d. The Multi-Agency Geographic Information for the Countryside (MAGIC) website (Ref. 8-37) to identify the location (and details) of statutorily designated sites, ancient woodland, priority habitats and for any granted European Protected Species Licence applications within the Study Area;

e. Natural England's Ancient Woodland (England) inventory (Ref. 8-38) for the location of Ancient Woodland within the Study Area;

f. Woodland Trust's ancient tree inventory (Ref. 8-39), for details of ancient, veteran or notable trees within the Study Area;

g. National Biodiversity Network (NBN) Atlas (Ref. 8-40) for open-source details on any protected and, or notable species recorded within the Study Area;

h. Environment Agency Ecology and Fish Data for species records of fish, macroinvertebrate and macrophytes species (Ref. 8-41);

i. Environment Agency Catchment Data Explorer for data on WFD water bodies and catchments (Ref. 8-42); and

j. Doncaster BAP (Ref. 8-28).

8.4.15 Records of INNS, as listed under Schedule 9 of the WCA, 1981 (as amended) (Ref. 8-1) and the Invasive Alien Species (Enforcement and Permitting) Order 2019 (Ref. 8-12) have been considered when assessing the likely significant ecological effects of the Scheme. The presence of such species is generally detrimental for ecology and there is legislation in place to control the spread of such species. Hence, it is important to consider the potential for the spread of any such invasive species and the likely significant effects resulting from this, and any mitigation that may be required to prevent it. The removal of such species may be desirable and beneficial for ecology. Likewise, measures should be taken to ensure that such invasive species are not inadvertently brought onto the Order limits. Therefore, while the species concerned are not relevant ecological features for the purposes of Ecological Impact Assessment (EcIA), there is still a need to consider them in terms of their potential relevance to delivery of legislative compliance (see Section 8.2 and **ES Volume III Appendix 8-1: Legislation, Policy and Guidance (Ecology) [EN010152/APP/6.3]**), for their potential to contribute to the amplification of any adverse effects arising from the Scheme, or their potential to conflict with biodiversity mitigation and enhancement proposals.

Field Surveys

8.4.16 The requirement for ecological field surveys was determined following a Preliminary Ecological Appraisal (PEA), the results of which are reported within this chapter. The PEA consisted of three components: a desktop study data review, a UKHab survey and a scoping survey for protected species and other species of conservation concern.

8.4.17 The UKHab survey followed the standard UKHab method (Ref. 8-45) which, in summary, comprises a walkover to record the broad habitat types within the Order limits and up to 50 m from the Order limits, where these areas were accessible or viewable from within the Order limits.

8.4.18 A scoping survey to inform the likelihood of the habitats within the Order limits supporting protected species was carried out in conjunction with the

habitat survey. This survey, also informed by the desk study, led to the recommendation of field surveys for certain protected or notable species and notable habitats, as presented in Table 8-1.

8.4.19 Aquatic scoping (walkover) surveys were completed to assess the quality of targeted aquatic habitats (watercourses and ditches) within the Order limits. Where potential impacts were considered likely, these surveys were used to assess the potential for water bodies to support protected or notable species and inform further survey work.

8.4.20 Details of the Survey Areas, methods, survey periods and guidance used for each survey are presented in Table 8-1. It is important to note that the extent of the Survey Area varies according to the ecological feature in question and with regards to the precautionary principle i.e. if there is doubt as to whether an area should be surveyed, it is included in the Survey Area. Accordingly, the Survey Areas used in this assessment ensured sufficient data were gathered to meet any design iterations which may change the likely ZoI used to undertake the impact assessment.

8.4.21 On receipt of consent for the Scheme, the scheme will apply for a GCN DLL. The Applicant has been engaging with Natural England and is currently awaiting an IACPC, which will be submitted into examination at the earliest opportunity. Proceeding with the DLL route negates the requirement to undertake full GCN presence likely absence and population size surveys on all relevant waterbodies within a suitable ZoI of the Scheme. Natural England undertake an impact assessment, the outcome of which is documented in the IACPC. The IACPC provides detail including information on the Scheme's impact on GCN and the appropriate compensation required. As such, significant effects on GCN populations as a result of the Scheme will be avoided. Therefore, GCN are not considered further in this chapter.

8.4.22 Ecological surveys undertaken have noted the presence of Brown Hare within the Order limits, but no species-specific surveys for any mammals listed in accordance with S41 of the NERC Act (Ref. 8-9) (e.g. Brown Hare, Hedgehog, Polecat and Harvest Mouse *Micromys minutus*) have been undertaken as part of the assessment. Instead, where the Order limits are within the known geographical range for these species, there are desk study records of any such species occurring within 2 km of the Order limits, and/or there is suitable habitat within the Order limits to support them, then they are assumed to be present. Consideration for any embedded mitigation required for relevant SPI is included in Section 8.10. The landscape design for the Scheme will be largely beneficial for these species.

8.4.23 Ponds and ditches located within and nearby to the Order limits may support common and widespread amphibian species (e.g. Common Frog *Rana temporaria*, Common Toad *Bufo bufo* and Smooth Newt *Lissotriton vulgaris*) and the Order limits also offer suitable terrestrial habitats for these species in the form of hedgerows, scrub, semi-improved grassland and woodland. These species receive limited legislative protection, although Common Toad is a SPI and mitigation included in Section 8.10 has considered their presence, or potential presence. On this basis, no specific surveys were undertaken for these species, but observations of these species have been recorded during other ecological surveys.

8.4.24 Ecological field surveys to characterise the ecological baseline within the relevant Survey Areas commenced in February 2023 and were completed in October 2024.

8.4.25 Table 8-1 presents details of the coverage, methods and survey periods within the relevant Survey Areas.

Table 8-1: Ecological Surveys that have been undertaken to Characterise the Baseline Conditions

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Supporting Notes
UKHab Habitat Survey and habitat condition assessment to inform **BNG Assessment [EN010152/APP/7.11]**. Invasive non-native plant species were also recorded where observed. Presented in **Volume II Figure 8-3: UKHab Plan [EN010152/APP/6.2]** and **BNG Assessment [EN010152/APP/7.11].**	Walkover survey recording the habitat types and boundary features present following the standard UKHab method (Ref. 8-43). The survey was supplemented by condition assessments in accordance with Defra's Statutory Biodiversity Metric.	Between February 2023 and August 2024.	The Order limits and to a maximum of 50m from the Order limits, where viewable or access is permitted. Habitat condition assessments were undertaken within the Order limits only.	The Order limits, plus a maximum 50m buffer is standard and an appropriate survey area, acknowledging that habitats that are likely to be impacted by the Scheme are within the Order limits.
Hedgerows. Presented in **ES Volume III Appendix 8-5: Hedgerow Report [EN010152/APP/6.3]**.	Hedgerows have been surveyed in accordance with the methodology as outlined in Defra's Hedgerow Survey Handbook (Ref. 8-46), to assess their 'importance' against the Wildlife and Landscape Criteria, detailed in the Hedgerows Regulations (Ref. 8-11)	Surveys were undertaken been July and August 2024	Hedgerows coinciding with the Order limits.	Using professional judgement, surveying hedgerows coinciding with the Order limits is appropriate, acknowledging that those hedgerows that are likely to be impacted by the Scheme are within the Order limits itself. Hedgerows outside the Order limits will remain intact and

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Supporting Notes
				unaffected by the Scheme.
Aquatic habitat walkover (scoping) survey. Fish, macroinvertebrate and macrophyte surveys, including aquatic and riparian INNS. Presented in **ES Volume III Appendix 8-6: Aquatic Ecology Report [EN010152/APP/6.3]**.	During the habitat appraisals, where habitat was deemed suitable and potential impacts were envisaged, surveys for macrophytes and macroinvertebrates were undertaken using Environment Agency standardised methodologies (Ref. 8-47 and Ref. 8-48). Selected watercourses that had potential to be crossed using open cut techniques were also surveyed for fish.	Spring to Autumn 2024	Water bodies identified during the aquatic scoping survey and desk study for further survey within the scheme, based on likely impacts to ordinary watercourses and ditches. Main rivers were scoped out due to the commitment to cross these watercourses by non-intrusive techniques. This includes the River Went which is on the northern boundary of the order limits of the scheme.	Targeted waterbodies within the order limits that are potentially subject to open cut crossings or other potential impacts – temporary or permanent watercourse crossings, culverting, impacts to the riparian zone, water quality impacts during construction, etc.
Terrestrial Invertebrates	A walkover survey to identify areas of likely greater importance to terrestrial invertebrates, e.g. hedgerows, semi-natural grasslands.	Undertaken during initial PEA	All habitats within the Order limits that may be permanently impacted.	Using professional judgement, surveying habitat within the Order limits only is appropriate, acknowledging that habitats that have the potential to be permanently impacted

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Supporting Notes
				(i.e. lost) by the Scheme and potentially supporting notable terrestrial invertebrates or assemblages are within this area. The surveys identified any areas likely to be important for terrestrial invertebrates and inform any required avoidance, mitigation or enhancement. No specific further invertebrate surveys were undertaken other than those within the initial UKHab walkover. No surveys were undertaken for terrestrial invertebrates within the Grid Connection Corridor as the temporary nature of the construction of the Grid Connection Cables will not significantly impact upon any terrestrial

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Supporting Notes
				invertebrates, or their habitats, in these areas.
Reptiles and amphibians Presented in **ES Volume III Appendix 8-2: Reptile Report [EN010152/APP/6.3]**.	Surveys of terrestrial habitats for reptiles to record species presence (or absence) using artificial refugia and observations of species in accordance with Froglife's Advice Sheet 10 (Ref. 8-53) and Natural England's Standing Advice Sheet for reptiles (Ref. 8-54).	Presence/likely absence surveys were undertaken between May and September 2023.	Suitable habitat for reptiles and amphibians (such as grassland or margins) within the Order limits that are potentially directly impacted by the Scheme.	With reference to published guidance, the Survey Area provides sufficient information on reptile and amphibian presence within the Order limits, acknowledging that habitats that have the potential to be permanently impacted (i.e. lost) by the Scheme and potentially supporting reptiles are within this area. Surveys have not been undertaken along the cable route as suitable habitat for reptiles is limited and there will be no permanent loss of habitat or displacement of populations.
Breeding birds	Surveys for breeding birds are based on a standard method for	Between March and July 2023, with supplementary surveys	For the general breeding bird assemblage, the Survey Area is defined	Standardised survey buffers for assessing the impacts of development

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Supporting Notes
Presented in **ES Volume III Appendix 8-7: Breeding Bird Report [EN010152/APP/6.3]**.	surveying breeding birds as detailed in 'Bird Monitoring Methods' (Ref. 8-55) and 'Bird Census Techniques' (Ref. 8-56); and were adapted where necessary to include species-specific methods (as detailed in 'Bird Monitoring Methods' (Ref. 8-55)) for other species, as required.	to previously inaccessible areas between April and July 2024.	as the land within the Order limits and to a maximum of 50 m from the Order limits. For species of greater conservation value and/or higher sensitivity, e.g. those listed on Schedule 1 of the WCA (Ref. 8-1) and sensitive to potential noise or visual disturbance, where any such species were recorded, the survey area was extended up to 200 m from the Order limits e.g. Hobby (*Falco Subbuteo)* and Barn Owl.	on bird populations do not exist, however, the Survey Area provides information on the breeding birds within the area immediately surrounding the Order limits and includes areas contiguous with the Order limits, 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 (for example those listed on Schedule 1 of the WCA) and therefore where any such species are recorded beyond the 50 m survey buffer (up to 200 m from the Order limits), these have also been recorded. However, the 50 m survey buffer is sufficient to determine the likely

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Supporting Notes
				impacts of the Scheme on breeding bird species occurring or likely to occur in the area.
Non-breeding (Wintering and Passage) Birds Presented in **ES Volume III Appendix 8-8: Non-breeding Bird Report [EN010152/APP/6.3]**.	Diurnal and nocturnal non-breeding bird surveys, using an adapted walkover survey method including frequent stopping points to view and observe bird behaviour, as detailed in 'Bird Monitoring Methods' (Ref. 8-55) and 'Bird Census Techniques' (Ref. 8-56).	Diurnal surveys - January 2023 to February 2023, September 2023 to March 2024 and August 2024. Nocturnal surveys – November 2023 to March 2024.	The land within the Order limits and to a maximum of 500 m from the Order limits.	Whilst standardised survey zones for assessing the impacts of development on bird populations do not exist, the Survey Area provides information on the non-breeding bird population within the area immediately surrounding and contiguous with the Order limits, where birds may potentially be adversely affected, either directly or indirectly. Therefore, the Survey Area is sufficient to determine the likely impacts of the Scheme on non-breeding bird species occurring or likely to occur in the area.

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Supporting Notes
Bats – Daytime Bat Walkover (DBW) Survey and Ground Level Tree Assessment (GLTA). Presented in **ES Volume III Appendix 8-3: Bat Survey Report [EN010152/APP/6.3]**.	Trees to be impacted or subject to disturbance (above existing levels) were subject to daytime bat walkover assessment, followed by a ground level tree assessment (GLTA) where impacted in accordance with The Bat Conservation Trust guidance (Ref. 8-57).	October 2023	Relevant features (i.e. trees) within the Order limits, where accessible and likely to be impacted by the Scheme.	Information collated on the location of trees that are suitable for roosting bats informed design and offset buffers to avoid direct effects upon potential roost sites (and avoidance of trees and woodland with higher ecological value irrespective of bats which will be avoided). Furthermore, the information formed the basis of the scope for roost surveys (as detailed below).
Bats – Foraging/Commuting Presented in **ES Volume III Appendix 8-3: Bat Survey Report [EN010152/APP/6.3]**.	Six targeted walked transect routes, to cover suitable areas of affected habitats within the Solar PV Site and Grid Connection Corridor; each transect surveyed three times in spring, summer and autumn. The survey methodology is based upon published	Spring, Summer and Autumn 2024.	Six transects sampling representative habitats within the Solar PV Site and Grid Connection Corridor.	The habitats within the Order Limits are predominantly arable and low value improved/semi-improved grassland, offering low suitability for foraging/commuting bats, with the majority of higher value boundary habitats (hedgerows, watercourses,

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Supporting Notes
	guidance available in Spring 2023 (Ref. 8-58), tailored as necessary to suit the Solar PV Site. The surveys have been supplemented by the deployment of static bat detectors, one per transect.			woodland) being retained.
Riparian mammals (Water Vole *Arvicola amphibius*, Otter *Lutra lutra* and Mink *Mustela vison*) Presented in **ES Volume III Appendix 8-9: Riparian Mammal Report [EN010152/APP/6.3]**.	A Habitat Suitability Assessment (HSA) was undertaken to determine the suitability of each watercourse or water body for riparian mammals. Watercourses and water bodies, deemed suitable for riparian mammals were then surveyed for evidence of Water Vole and Otter activity, following methods as described in the 'Water Vole Conservation Handbook' (Ref. 8-59) and 'The Water Vole Mitigation Handbook' (Ref. 8-60), guidance in	Spring and late Summer 2024.	The HSA was undertaken on all watercourses and water bodies within the Order limits (and up to 250 m upstream and downstream of the River Went, owing to the presence of Otter), with only those watercourses and water bodies identified as being suitable to support riparian mammals subject to detailed surveys. This resulted in eight watercourse being subject to further survey. Additional surveys of woodland in the vicinity	With reference to published guidance and using professional judgement, surveying riparian habitats up to 10 m is sufficient for the majority of watercourses to determine presence or absence of riparian mammals within, or adjacent to, watercourses as it covers the 10 m distance of avoidance around Water Vole burrows. The Survey Area around the River Went is extended to include disturbance distances

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Supporting Notes
	the 'New Rivers and Wildlife Handbook' (Ref. 8-61); the 'Fifth Otter Survey of England 2009-2010' (Ref. 8-62) and the 'Ecology of European Otter' (Ref. 8-63). Any evidence of Mink was also recorded, using these survey methods.		of water courses were checked for Otter holts.	for any potential Otter holts.
Badger Presented in **ES Volume III Appendix 8-4: Badger Report (Confidential) [EN010152/APP/6.3]**.	A walkover survey, searching for signs of Badger activity (such as setts and latrines), as described in the Mammal Society publication 'Surveying Badgers' (Ref. 8-64) and with reference to 'Surveying for Badgers: Good Practice Guidelines' (Ref. 8-65).	February and March 2023 with an update visit September 2024	Within the Order limits and to a maximum of 50 m from the Order limits, where viewable from within the Order limits or where access was permitted.	With reference to published guidance and applying professional judgement, 50 m beyond the Order limits is an appropriate Survey Area as it covers the 30 m distance of avoidance around setts at which direct or indirect effects on Badger setts could occur.
INNS	INNS species observations were recorded when noted during other ecological surveys including notes	N/A	Observations of any INNS species recorded throughout surveys within the Order limits.	INNS recorded to avoid and reduce the spread of any INNS species.

Survey (and relevant technical appendix)	Survey Method	Survey Period	Survey Area	Supporting Notes
	on precise location and stand size.			

Biodiversity Net Gain

8.4.26 Surveys to inform the **BNG Assessment [EN010152/APP/7.11]** were undertaken as appropriate to record the area (or length) of each habitat measured alongside a habitat condition assessment in line with UKHab (Ref. 8-45) and guidance for river and ditch condition assessment (Ref. 8-66, Ref. 8-67). Biodiversity metrics provide a measure of overall biodiversity value based on habitat type, area, condition, strategic significance and distinctiveness. The current approved metric is the statutory biodiversity metric tool (Ref. 8-68) that allows a value to be measured, in this case biodiversity, which is calculated pre- and post-development for three habitat components: habitats, watercourses, (rivers and streams, and wet ditches) 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.

8.4.27 Schedule 15 of the Environment Act, 2021 (Ref. 8-6) makes provision for BNG in relation to development consent for NSIPs. Although the requirement for a minimum 10% gain in biodiversity for NSIPs will not become mandatory until a future date (anticipated to be November 2025), the Scheme is committed to deliver BNG in accordance with the **Draft DCO [EN010152/APP/3.1]**. Based on current plans, the Scheme is predicted to result in a net gain of +36.46% for area-based habitat units, +62.75% for hedgerow units, and +24.97%% for watercourse units.

8.4.28 NPS EN-1 (Ref. 8-17) also sets out how BNG should be addressed for Energy NSIP proposals and how proposals should seek opportunities to contribute to and enhance the natural environment by providing net gains for biodiversity, where practicable; and that BNG should be applied after compliance with the mitigation hierarchy (above) and does not change or replace existing environmental obligations.

8.4.29 In addition, the NPPF (Ref. 8-20) requires that the Scheme considers and engages a mitigation hierarchy, requiring the highest level to be applied, where practicable. The mitigation hierarchy is also fundamental to BNG and there are four sequential steps that must be taken throughout the lifecycle of a project, where there is potential for impacts on relevant ecological features:

a. 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);

b. 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);

c. Restoration or rehabilitation – actions taken to repair environmental degradation or damage following unavoidable impacts caused by development; and

d. 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).

8.4.30 CIEEM's Biodiversity Net Gain: Good Practice Principles for Development (Ref. 8-69) defines BNG as "*development that leaves biodiversity in a better state than before"* and involves *"an approach where developers work with local governments, wildlife groups, landowners and other stakeholders in order to support their priorities for nature conservation*". BNG is achieved when measurable improvements for biodiversity are delivered in association with a development through the creation of new habitats or enhancement and management of existing habitats. Whilst BNG allows for these measures to be provided within the Order limits, outside of this, or in combination, the Scheme will deliver BNG within the Solar PV Site, through the implementation of measures such as field boundary enhancements and planting appropriate grassland seed mixes.

8.4.31 The BNG assessment has been completed for submission with this DCO application and can be found within the **BNG Assessment [EN010152/APP/7.11]**. Prescriptions for the establishment, long term management and monitoring of habitat creation measures are detailed within the **Framework LEMP [EN010152/APP/7.14]**

8.4.32 The **BNG Assessment [EN010152/APP/7.11]** identifies the opportunities of the Scheme, contributing to BNG, in line with the requirements of the Environment Act 2021 (Ref. 8-6), NPS EN-1 (Ref. 8-17), the NPPF (Ref. 8-20), CIEEMs Good Practice Guidance (Ref. 8-69) and local planning policy (see Paragraph 8.2.10).

8.5 Impact Assessment Methodology

8.5.1 The assessment, detailed in this ES chapter, has been carried out in accordance with good practice guidance for EcIA, issued by CIEEM (the CIEEM Guidelines) entitled '*Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Costal and Marine'* (Ref. 8-23) as summarised below.

8.5.2 The aims of the assessment are to:

a. Identify important ecological features (IEFs), such as designated sites, protected habitats and species which may be impacted by the Scheme;

b. Provide a scientifically rigorous and transparent assessment of the likely ecological impacts and resultant likely significant effects of the Scheme. Impacts and effects may be positive or negative;

c. Facilitate scientifically rigorous and transparent determination of the consequences of the Scheme in terms of national, regional and local policies relevant to nature conservation and biodiversity, where the level of detail provided is proportionate to the scale of the development and the complexity of its potential impacts; and

d. Set out what steps will be taken to adhere to legal requirements relating to the relevant ecological features concerned.

8.5.3 The principal steps involved in the CIEEM approach can be summarised as determining:

a. 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;

b. The importance of the identified ecological features is evaluated, placing their relative nature conservation importance into geographic context, which is then used to define the relevant biodiversity features that need to be considered further;

c. 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;

d. The likely effects (positive or negative) on relevant ecological features are then assessed and, where possible, quantified;

e. 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 nature conservation importance are also included; and

f. Any residual effects of the Scheme following additional mitigation are identified; and

g. Scope for ecological enhancement is considered.

8.5.4 It is not necessary in the assessment to address all habitats and species with potential to occur in the relevant Study Areas 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. This does not mean that efforts should not be made to safeguard wider biodiversity and requirements for this have been considered, where appropriate.

Determining Importance

8.5.5 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. The value of each relevant ecological feature has been defined with reference to the geographical level at which it matters, informed through relevant planning policy and legislation (see **ES Volume III Appendix 8-1: Legislation, Policy and Guidance (Ecology) [EN010152/APP/6.3]**) which 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. 8-23).

8.5.6 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 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.

8.5.7 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.

8.5.8 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 nature conservation concern which are particularly associated with them.

8.5.9 Due regard will also be 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.

8.5.10 For the purposes of the assessment within this ES chapter, only ecological features of at least Local importance are considered as IEFS that require assessment for potential significant effects. Whilst consideration of impacts at all geographic scales is important, features of less than Local importance (i.e. of Site importance) are common and widespread (therefore of no local value) and are not legally protected or included within local planning policy. The CIEEM guidelines (Ref. 8-23) make it 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*".

8.5.11 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 developments or land use changes, as explained in the 'Future Baseline' (no development) section.

8.5.12 A summary of the value (importance) of ecological features and the geographical frames of reference used for this assessment, based on Section 4.7 in the CIEEM guidelines (Ref. 8-23), is presented in Table 8-2.

Table 8-2: Summary of Sensitivity of Ecological Features, According to Geographic Context

Sensitivity (Value)	Geographic Frame of Reference	Examples
Very High	International	Statutorily designated sites, such as Ramsar

Sensitivity (Value)	Geographic Frame of Reference	Examples
		Sites, SACs (including candidate SACs), SPAs, normally within the geographic area of Europe. Species occurring in numbers approaching that of international importance (i.e. >1% of a biogeographic population). Qualifying species connected to an SPA, SAC or Ramsar site (such as bats associated with an SAC).
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)	Statutorily designated sites, such as a SSSI or NNR. HaPI (Ref. 8-9), considering factors such as its size, distribution and the extent of the habitat which would be affected. SPI (Ref. 8-9) occurring in numbers approaching that of national importance (i.e. >1% of the UK population).
Medium/High	Regional (Yorkshire and the Humber)	Species, including SPI (Ref. 8-9) occurring in numbers of greater geographical importance than within the county of South Yorkshire but does not reach the threshold to be of National importance.
Medium	County (South Yorkshire) and/or District (Doncaster)	Non-statutorily designated sites, such as LWS. HaPI (Ref. 8-9) not representing a nationally

Sensitivity (Value)	Geographic Frame of Reference	Examples
		important habitat, but recognised as a Local BAP habitat which would or may fulfil the criteria for selection as a LWS. Species occurring in numbers approaching that of county or district importance (i.e. >1% of the county or district (if known) population).
Low	Local	Species of conservation interest e.g. SPI/Doncaster BAP species that contribute to the local biodiversity i.e. species are of conservation value but are still common and widespread. Areas of habitat that do not meet criteria for selection as LWS in South Yorkshire but are considered to enrich the local area.
Negligible	Site	Species that are common and widespread and are not legally protected or included within local planning policy (e.g. Field Vole *Microtus agrestis*). Areas of habitat that are widespread and of no local value (such as a fence-line or hard-standing).

Characterising Ecological Features

8.5.13 In accordance with Section 1.21 in the CIEEM guidelines (Ref. 8-23), 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:

a. Impact – actions resulting in changes to an ecological feature. For example, construction activities of a development removing a hedgerow; and

b. 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.

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

a. Positive or negative – i.e. is the change likely to be in accordance with nature conservation objectives and policy and is that change:

   i. 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

   ii. Negative – a change that reduces the quality of the environment e.g. destruction of habitat.

b. Spatial extent – the spatial or geographical area or distance over which the impact or effect may occur under a suitably representative range of conditions;

c. Magnitude – the ‘size’, ‘amount’ or ‘intensity’ and ‘volume’ of an impact – this is described on a quantitative basis, where possible;

d. 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;

e. Timing and frequency – i.e. consideration of the point at which the impact occurs in relation to critical life-stages or seasons; and

f. Reversibility – A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation, whereas an irreversible effect is one from which recovery is not possible within a reasonable timescale i.e. within the 40-year lifespan of the Scheme (in the context of the feature being assessed), or there is no reasonable chance of action being taken to reverse it.

g. Temporary or permanent – determining if the impact is temporary or permanent. A temporary impact is one that occurs for a limited duration or that will alter a condition for a short period of time, as opposed to a permanent impact, which is one that persists over time and does not easily revert to its original state.

8.5.15 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	Examples
High	Changes to the ecological feature pre-development (baseline) condition that almost always have an effect (positively or negatively) on its integrity or conservation status. Such changes may be long-term, permanent and/or irreversible.
Medium	Changes to the ecological feature baseline condition that in some circumstance may affect (positively or negatively) its integrity or conservation status. Although such changes may be long-term, they are potentially reversible.
Low	Changes on an ecological feature that do not usually affect the baseline condition and are often short-term and/or reversible.
Very low	There is no noticeable change to the ecological feature baseline condition.

Significance Criteria

8.5.16 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:

a. Not significant – no effect on structure and function, or conservation status; and

b. Significant – structure and function, or conservation status is affected.

8.5.17 Sections 5.24 to 5.28 in the CIEEM guidelines (Ref. 8-23) 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 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)*".

8.5.18 Using this information and professional 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.

8.5.19 There are a number of approaches for determining the significance of effects on ecological features. Whilst the CIEEM guidelines (Ref. 8-23) 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 ES, the terminology used in the CIEEM guidelines for impact assessment have been translated into the classification of effects scale, as outlined in Table 8-4, but still remain consistent with the CIEEM guidelines. As a rule, major and moderate effects are considered to be significant, whilst minor and neutral/negligible effects are considered to be not significant. However, professional judgement has been applied, including taking account of whether the effect is permanent or temporary, its duration and frequency, whether it is reversible, and/or its likelihood of occurrence.

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.

Effect Classification Terminology	Equivalent CIEEM Terminology
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.

8.6 Assumptions, Limitations and Uncertainties

8.6.1 The assessment includes consideration of the construction, operation and maintenance, and decommissioning phases of the Scheme and is based upon the maximum parameters of design for the Scheme (refer to **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**) presented in **ES Volume II Figure 2-3: Indicative Site Layout [EN010152/APP/6.2]**).

8.6.2 As noted in **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**, subject to being granted consent and following a final investment decision, the earliest construction could start is 2028. Construction would require an estimated 18 to 24 months, with the Grid Connection Corridor anticipated to require a 12-month construction phase and the Solar PV Site an estimated 24 months. Should the construction programme be extended, this will not change the results of the EIA with respect to flora, as the impact is not affected by the duration of activity but rather the change or loss of any habitats. The impact on fauna is likely to be similar if the construction phase is extended, with respect to any habitat loss. The assessment is also considered to represent a worst case in terms of impacts to species. For example, although it is acknowledged that a longer construction phase could result in prolonged disturbance, this is unlikely to occur for the majority of the Order limits due to the sequential nature of the construction programme.

8.6.3 The Order limits also include a section of highway at the junction of the A19 and Station Road in the town of Askern to allow for abnormal indivisible load (AIL) vehicle access and escort. As the works will be limited to temporary traffic signal and banksman control for the period of AIL delivery, no impacts on important ecological features are anticipated, and this area is not assessed further.

8.6.4 Owing to the levels of traffic expected to be generated by the Scheme being below relevant criteria, as set out in **ES Volume I Chapter 14: Other Environmental Topics [EN010152/APP/6.1]**, a detailed dispersion modelling exercise was not undertaken for the Scheme and the effect can be considered to be not significant. Therefore, this chapter does not consider potential effects on ecological features (habitats, sites and species) as a

result of changes in air quality due to construction and decommissioning traffic, as no significant effects are anticipated at this stage.

8.6.5 Similarly, as described in **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**, there would be no normal requirement for Heavy Goods Vehicles (HGV) movements during the operation and maintenance of the Scheme (it is anticipated that any deliveries (including the removal of wastes from site) would be via Light Goods Vehicles (LGV) or cars and would not be frequent) and, therefore, no impacts to ecological features due to changes in air quality are anticipated during operation and maintenance of the Scheme due to vehicle emissions (see also **ES Volume I Chapter 14: Other Environmental Topics [EN010152/APP/6.1]**) which has scoped out assessment of the operation and maintenance effects of the Scheme on air quality due to the low level of traffic generated resulting in no significant effects being predicted.

8.6.6 It has been assumed that decommissioning impacts will be similar to those occurring during construction, with the above-ground infrastructure, including sub-stations, removed and the Order limits returned to landowners, including the established habitats. It is reasonable to assume that any impacts to important ecological features present at the time of decommissioning will be mitigated fully in line with relevant legislative and policy requirements. Enhancement and mitigation measures may be left in-situ as they could support protected species, however the majority of the Solar PV Site would be available to be returned to its original use after decommissioning. It is anticipated that the existing protected species legislation would remain in place, or that any replacement legislation will offer the same level of protection. The mode of decommissioning for the buried cables within the Solar PV site and Grid Connection Corridor will be dependent upon government policy and good practice at that time. Currently, the most environmentally acceptable option is considered to be leaving the Grid Connection Cables in situ, as this avoids disturbance to overlying land and habitats and to neighbouring communities. Alternatively, the Grid Connection Cables can be removed by opening up the ground at regular intervals and pulling the Grid Connection Cables through to the extraction point, avoiding the need to open up the entire length of the Grid Connection Cables.

8.7 Baseline Conditions

8.7.1 This section describes the existing and future baseline conditions for the ecology assessment.

Existing Baseline

Sites Statutorily Designated for their Biodiversity Value

8.7.2 There are three sites statutorily designated for their biodiversity value at an International level and within the 10 km Study Area of the Order limits. These are:

a. Thorne Moor SAC;

b. Thorne and Hatfield Moors SPA; and

c. Hatfield Moor SAC.

8.7.3 There are no SAC sites that list bats as a qualifying feature within 30 km of the Order limits.

8.7.4 Beyond the 10 km Study Area, the River Went and minor watercourses connected to it are linked to the Humber Estuary SAC/Ramsar site approximately 16 km downstream of the Solar PV Site via the River Don and Dutch River. The Humber Estuary SAC/Ramsar site is in part designated for two migratory fish species (River Lamprey and Sea Lamprey), which have the potential to be present in the River Went and connected watercourses. A NSE Report (see **No Significant Effects Report [EN010152/APP/7.14]**) accompanies the ES for the DCO application.

8.7.5 There is one site statutorily designated for its biodiversity value at a national level within the 2 km Study Area, this being Shirley Pool SSSI which is located approximately 900 m to the south of the Order limits (this being the section of highway at the junction of the A19 and Station Road in the town of Askern). Shirley Pool SSSI is approximately 3.2 km west of the Grid Connection Corridor and approximately 3.3 km southwest of the Solar PV Site. As set out in **ES Volume I Chapter 14: Other Environmental Topics [EN010152/APP/6.1]** and **ES Volume I Chapter 13: Transport and Access [EN010152/APP/6.1]** the levels of construction phase road traffic will not increase significantly above current levels. Equally, construction phase road traffic across the modelled road links, do not coincide with any statutorily designated within 200m of these road links, so no further consideration is given to statutorily designated sites beyond 2 km of the Order limits.

8.7.6 Designation details of all statutorily designated sites within the relevant Study Areas are summarised below in Table 8-5 in ascending order, with those closest to the Order limits listed first. The locations of these statutorily designated sites, relevant to the Scheme, are presented in **ES Volume II Figure 8-1: Statutorily Designated for their Biodiversity Value at an International and National Level [EN010152/APP/6.2]**.

Table 8-5: Sites Statutorily Designated for their Biodiversity Value Within 10 km (International) and 2 km (National) of the Order limits

Statutory Site Name	Statutory Site Description	Approximate Distance (m/km) and Direction from Closest Point of the Order limits	Value
Shirley Pool SSSI	The site contains excellent examples of wetland habitats including open water, reed swamp, tall fen, wet neutral grassland and carr which grades into Birch-oak woodland on drier ground. It is the most natural wetland of this type in South Yorkshire. The pools and drains support a representative aquatic flora and as a result it is also of high entomological value, the assemblages of insects associated with sedges and carrland being particularly diverse. A number of species recorded within the SSSI are close to the northern edge of their range in Britain.	Approximately 900 m south of the Order limits (this being the section of highway at the junction of the A19 and Station Road in the town of Askern) and 3.0 km west of the Grid Connection Corridor.	National
Thorne Moor SAC	The Annex I habitat that is a primary reason for selection of this site is degraded raised bogs still capable of natural regeneration.	Approximately 8.0 km east of the Solar PV Site and 9.8km east of the Grid Connection Corridor.	International
Thorne and Hatfield Moors SPA	This SPA is designated for breeding Nightjar.	Approximately 8.0 km east of the Solar PV Site and 9.8km east of the Grid Connection Corridor.	International
Hatfield Moor SAC	Similar to Thorne Moors, Hatfield Moors is a remnant of the once-extensive bog and fen peatlands within the Humberhead Levels and is still the second-largest area of extant lowland raised bog peat in England. Moraines of sand occur beneath the peat, the largest of which forms Lindholme Island, in the centre of the bog. Little, if any, original bog surface has survived the massive extraction of peat over the last	Approximately 11km km southeast of the Solar PV Site and 8.5km east of Grid Connection Corridor.	International

Statutory Site Name	Statutory Site Description	Approximate Distance (m/km) and Direction from Closest Point of the Order limits	Value
	few decades. Peat-cutting has now ceased, and the bog is being restored over its remaining minimum average depth of 0.5 m of peat.		
Humber Estuary SAC	The second largest coastal plain Estuary in the UK, and the largest coastal plain estuary on the east coast of Britain. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. The range of salinity, substrate and exposure to wave action influences the estuarine habitats and the range of species that utilise them; these include a breeding bird assemblage, winter and passage waterfowl, river and sea lamprey, grey seals, vascular plants and invertebrates. Annex I habitats include: a. Estuaries; Mudflats and sandflats not covered by seawater at low tide. b. Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: c. Atlantic salt meadows *Glauco-Puccinellietalia maritimae*; d. Coastal lagoons; e. Dunes with *Hippophae rhamnoides*; f. Embryonic shifting dunes; g. Fixed dunes with herbaceous vegetation (`grey dunes`); h. *Salicornia* and other annuals colonising mud and sand; i. Sandbanks which are slightly covered by sea water all the time; and j. Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes').	Approximately 14.2km northeast of the Solar PV Site.	International

Statutory Site Name	Statutory Site Description	Approximate Distance (m/km) and Direction from Closest Point of the Order limits	Value
Humber Estuary Ramsar site	The Ramsar site is designated for: **Ramsar Criterion 1:** The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar Criterion 3:** The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most northeasterly breeding site in Great Britain of the natterjack toad *Bufo calamita.* **Ramsar Criterion 5:** Assemblages of international importance – non-breeding season. **Ramsar Criterion 6:** Species/populations occurring at levels of international importance: k. Golden plover (passage and wintering); l. Knot (passage and wintering); m. Dunlin (passage and wintering); n. Black-tailed godwit (passage); o. Redshank (passage and wintering); p. Shelduck (wintering); and q. Bar-tailed godwit (wintering).	Approximately 14.2km northeast of the Solar PV Site.	International

Statutory Site Name	Statutory Site Description	Approximate Distance (m/km) and Direction from Closest Point of the Order limits	Value
	Ramsar Criterion 8: The Humber Estuary acts as an important migration route for both river and sea lamprey between coastal waters and their spawning areas.		

Sites Non-Statutorily Designated for their Biodiversity Value

8.7.7 There are 46 non-statutory sites designated for their biodiversity value identified within 2 km of the Order limits. These sites have all been designated as LWS or Candidate Local Wildlife Sites (cLWS) for their biodiversity value at a county level and are known to have supporting value to a wide variety of protected or notable species and/or habitats. Whilst cLWS have not yet been designated, they are included within this chapter as they are being considered for designation and may become so within the lifetime of the Scheme.

8.7.8 Non-statutorily designated sites are summarised below in Table 8-6 and are presented in ascending order, with those closest to the Order limits listed first. The locations of these non-statutorily designated sites, relevant to the Scheme, are presented in **ES Volume II Figure 8-2: Sites Non-Statutorily Designated for their Biodiversity Value [EN010152/APP/6.2]**.

Table 8-6: Non-Statutorily Designated Sites Within 2 km of the Order limits

Non-Statutory Site Name	Non-Statutory Site Description	Approximate Distance (m/km) and Direction from Closest Point of the Order limits
Went Valley (Part) LWS	This site comprises a series of semi-improved and grazed neutral grasslands which are located immediately south of the River Went.	Within the northern part of the Solar PV Site (adjacent to and south of the River Went).
Wrancarr Drain and Braithwaite Delves LWS	The site comprises two drains. The Ash Carr Drain runs along the western side of a disused railway embankment. There is an overgrown abandoned farm access track that ran north-south along the former route of the railway line, but tall ruderal vegetation is now interspersed by dense scrub in this area. GCN have been recorded here.	A section of this LWS sits within the Grid Connection Corridor.
Trumfleet Pit LWS	A linear wetland site comprising a water filled drain with an east sloping bank with many mature Alders *Alnus glutinosa*, occasional Crack Willow *Salix fragilis* and Pedunculate Oak *Quercus robur*. Skylark *Alauda* arvensis, Gadwall *Anas strepera* and Meadow Pipit *Anthus pratensis* have been recorded at this site.	A section of this LWS sits within the Grid Connection Corridor.
Trumfleet Pond LWS	This is a small wetland, comprising a small linear pond, with some *Salix* species, surrounded by a horse pasture.	Within the Grid Connection Corridor.
Fox Covert LWS	The site comprises deciduous scrub woodland and a drain. The adjacent land use is silage, arable and wetland. Lesser Spotted Woodpecker *Dendrocopos minor* have been recorded at this site.	This LWS is immediately adjacent to the Grid Connection Corridor.
Marsh Lane LWS	The site comprises a long lane and its hedgerows and some woodland edge, the adjacent land use is woodland and agricultural land. The bridleway of the lane and its edges support an assemblage of plants typical of bare and disturbed ground including Annual Meadow Grass *Poa annua*, Pineapple Mayweed *Matricaria discoidea*, Hawkweeds *Hieracea*, Toad Rush *Juncus bufonius*, Hedge Mustard *Sisymbrium officinale* and Fat Hen *Chenopodium album*.	This LWS is immediately adjacent to the Grid Connection Corridor.

Non-Statutory Site Name	Non-Statutory Site Description	Approximate Distance (m/km) and Direction from Closest Point of the Order limits
Fenwick Churchyard LWS	This site comprises a small graveyard and contains an area of mildly calcareous to neutral unimproved grassland with scattered planted trees mainly in a line opposite to the site entrance.	Located immediately west of Fenwick Common Lane, which comprises part of the Solar PV Site.
Bunfold Shaw LWS	This small, irregularly shaped site is predominantly Pedunculate Oak dominated woodland in the eastern and central sectors, while the western and southwestern edge is an open clearing, which supports mainly tall ruderal vegetation, with one or two scattered Oaks and several young, planted Scot's Pine *Pinus sylvestris*. This area of woodland is also listed as 'Ancient and semi-natural woodland'.	Located approximately 10 m from the Solar PV Site, within the central area excluded from the Order limits.
Thorpe in Balne/Kirk Bramwith Area LWS	A large area situated between the River Don and the canal. There are cattle-grazed flood banks alongside the river, which are species poor apart from a small banking. The continuation of Northfield Lane is species-rich in hedgerow terms, with a mix of ground flora. The northwest facing canal banking is floristically good in some parts, but lack of cutting/grazing is resulting in dominant grasses taking over.	Approximately 20 m from the Grid Connection Corridor.
Fenwick Hall Moat LWS	The moat edges support some very large mature trees including Ash *Fraxinus excelsior* and White Willow *Salix alba*. The deepest area of standing open water is located at the northeastern corner of the moat where the pond has been deepened in recent years. The wet mud of the moat supports a dense stand of Reed Sweet-grass *Glyceria maxima* with Great Willowherb *Epilobium hirsutum*, Plicate Sweet-grass *Glyceria notata*, Marsh Bedstraw *Galium palustre* and Hard Rush *Juncus inflexus*.	Approximately 25 m from the Solar PV Site, within the central area excluded from the Order limits.
Bentley Tilts and Course of Old Ea Beck LWS	A long linear site, approximately 3.5 km in length. Running along the centre of the site is the straightened and embanked course of the Ea Beck. The site contains two ponds, created by the Environment Agency in the mid-1990s, and South of the Ea Beck flood bank is a series of waterbodies, ditches and wet borrow pits. The site has historically attracted large numbers of Snipe *Gallinago gallinago*.	Approximately 35 m west of the Grid Connection Corridor, next to the Existing National Grid Thorpe Marsh Substation.

Non-Statutory Site Name	Non-Statutory Site Description	Approximate Distance (m/km) and Direction from Closest Point of the Order limits
Warren House Park cLWS	Woodland, hedgerows and wildflower meadow with local wildlife interest including Grass Snake *Natrix helvetica* and birds such as Linnet *Linaria cannabina*, Redwing *Turdus iliacus*, Fieldfare *Turdus pilaris* and Barn Owl.	Approximately 40 m southwest of the Order limits (the section of highway at the junction of the A19 and Station Road in the town of Askern), 3.4km west-southwest of the Solar PV Site, and 3.4km west of the Grid Connection Corridor).
Barnby Dun Old Don Oxbow LWS	Site is split into two, with the northern part being used as a fishery and the southern part being used for agriculture and grazing. The site is part of the course of the Old River Don and consists of standing water with a high flood embankment on the southeast side.	The closest point of the LWS is approximately 75 m east of the Grid Connection Corridor.
Broad Ings Oxbow LWS	Broad Ings Oxbow is the original line of the River Don and is a treeless site with pasture flood banks grazed by cattle. The area between Broad Ings Oxbow and the straightened River Don is also grazed and has shallow pools after seasonal flooding.	Approximately 90 m east of the Grid Connection Corridor, on the opposite side of the River Don to the Scheme.
Moss Brick Pond LWS	Disused claypit, surrounded by dense scrub. Now used as a fishing lake, the open water area contains locally abundant Curly Pondweed *Lagarosiphon major*. Both Southern Marsh *Dactylorhiza praetermissa* and Common Spotted Orchid *Dactylorhiza fuchsia* are present.	Approximately 110 m southwest of Fenwick Common Lane, which comprises part of the Solar PV Site.
Riddings Farm Pond cLWS	This is a small pond and wetland feature containing small populations of Fine-leaved Water Dropwort *Oenanthe aquatica* (which is locally scarce) and good numbers of submerged plant species.	Approximately 130 m from the Solar PV Site, within the central area excluded from the Order limits.

Non-Statutory Site Name	Non-Statutory Site Description	Approximate Distance (m/km) and Direction from Closest Point of the Order limits
Pilkington's Burgy Banks LWS	The Burgy Banks have been created over many years by the nearby Pilkington's Glass factory which was located on the opposite side of the River Don and the Dun Navigation. The banks have been created by the gradual settling out of a liquid waste (burgy) which was pumped through a pipe over the river and canal. This process, which began sometime in the 1920's, has resulted in a considerable area of steeply banked 'lagoons', all of which have dried out and solidified.	Approximately 145 m south of the Grid Connection Corridor.
Barnby Dun Borrow Pits LWS	This site is a flooded linear 'borrow pit' created during the building of the flood banks of the adjacent River Don Flood Drain. The water depth ranges from 10 cm at the edges to well over a metre in the centre of the pond. There are two subsites; one is located on the eastern side of the river and the other is on the western side. The high flood banks are semi-improved grassland and are grazed by sheep.	The closest point of the LWS is approximately 150 m east of the Grid Connection Corridor.
Old Ings and Chequer Lane LWS	Historic records of Otter and GCN here, this site is large and comprises a series of drains, arable land, improved grassland, woodland, scrub and hedgerows. The adjacent land use is mainly arable.	Approximately 250 m east of the Grid Connection Corridor.
Thorpe Marsh Area LWS	This site comprises Thorpe Marsh Nature Reserve, a reserve of 60 ha managed by the Yorkshire Wildlife Trust. It consists of ancient ridge-and-furrow pastures, a disused railway line, ponds and a lake excavated in the late 1970s.	Approximately 405 m west of the Grid Connection Corridor, next to the Existing National Grid Thorpe Marsh Substation and Bentley Tilts and Course of Old Ea Beck LWS.
Copley Spring Wood LWS	A mixed deciduous woodland bounded by a continuous hedgerow and containing abundant Pedunculate Oak and some Hybrid Oak *Quercus* x *rosacea*.	Approximately 420 m south of the Solar PV Site.
Northfield Pond LWS	A constant wet pond area with typical wet zone trees and ditch running south from the Northfield Pond. Adjacent land use is arable and a canal runs along the northwestern boundary.	Approximately 450 m east of the Grid Connection Corridor.

Non-Statutory Site Name	Non-Statutory Site Description	Approximate Distance (m/km) and Direction from Closest Point of the Order limits
Bentley Bank LWS	This site comprises a long linear marsh, grazed grassy floodbank, scrub, ponds and drains. The adjacent land use is arable and the mounds of waste from the Pilkington's Glass Factory (known locally as Burgy Banks). The site is bisected by Arksey Common Lane.	Approximately 465 m south of the Grid Connection Corridor.
Old River Don Oxbow LWS	This site is located on alluvium in the flood plain of the River Don. During the 1930 s the River Don was straightened out near Waite House. All that remains today of the old course is shallow grassy depression which periodically holds water. The site, within the flood banks of the Flood Drain is inundated at times when the river is high. To the south of the old river course is a large pond created by the Environment Agency. To the north and west there is a mixture of arable and pasture. To the east are the River Don Flood Drain and the Dun Navigation.	Approximately 495 m south of the Grid Connection Corridor.
Croft Ings LWS	This site comprises a series of three 'triangular' borrow pits created to provide material to construct the adjacent canal embankment. A water-filled drain links the ponds. The canal bank rises steeply up from the lower lying agricultural land. This bank is vegetated by tall ruderals, False Oat Grass *Arrhenatherum elatius*, Bramble *Rubus fruticosus* and Common Nettle *Urtica dioica*. Water Vole have been recorded at this site.	Approximately 610 m southeast of the Grid Connection Corridor.
Went Valley (near Sykehouse) LWS	This site supports a mosaic of habitats spread over a series of fields. The site is bounded to the north by a small young plantation and the River Went. The southern and eastern boundary is formed by a grassy embankment and established hedge lines.	Approximately 635 m east of the Solar PV Site.
Shirley Pool and Rushy Moor Area LWS	This site contains excellent examples of wetland habitats including open water, reed swamp, tall fen, wet neutral grassland and carr which grades into Birch-oak woodland on drier ground. Shirley Pool SSSI is also located within this site (a smaller extent than the LWS).	Approximately 700 m south of the Order limits (the section of highway at the junction of the A19 and Station Road in the town of Askern), 3.0km

Non-Statutory Site Name	Non-Statutory Site Description	Approximate Distance (m/km) and Direction from Closest Point of the Order limits
		southwest of the Solar PV Site and 3.0 km west of the Grid Connection Corridor.
Long Sandall Ings LWS	This site is an area of flat, low-lying land situated on alluvium in the flood plain of the River Don, a meander of which formally passed through the area. This was removed when the river was straightened during the first part of the 20 th Century and little trace of it can be found today.	Approximately 820 m south of the Grid Connection Corridor.
Bramwith Lock Woods LWS	This site comprises an extensive area of dense Hawthorn *Crataegus monogyna* scrub, tall ruderal vegetation and grassland.	Approximately 820 m east of the Grid Connection Corridor.
Campsall Country Park LWS	This LWS includes woodland, meadows, ponds and wildflower areas.	Approximately 870 m west of the Order limits (the section of highway at the junction of the A19 and Station Road in the town of Askern), 4.3 km west-southwest of the Solar PV Site, and 4.4 km west-northwest of the Grid Connection Corridor.
Ruskholme LWS	This LWS is located on the east side of the New Junction Canal and on the north bank of the River Don, on the alluvial floodplain. This site is associated with a number of other nearby Local Wildlife Sites and subsites, including: Old Ings, Chequer Lane No. Thorpe in Balne/Kirk Bramwith Area and Bramwith Lock Woods.	Approximately 930 m east of the Grid Connection Corridor.
Bramwith Lane Wood cLWS	This site is a very small, scrappy copse of widely spaced coniferous trees, European Larch *Larix decidua*, Scots Pine and Corsican pine *Pinus nigra*, together with occasional Oak and Sycamore *Acer pseudoplatanus*.	Approximately 970 m southeast of the Grid Connection Corridor.

Non-Statutory Site Name	Non-Statutory Site Description	Approximate Distance (m/km) and Direction from Closest Point of the Order limits
The Grove, Kirk Sandall LWS	This site comprises a narrow section of scattered trees and shrubs running parallel to Moor Lane, which widens out at the western end into secondary broadleaved woodland. Yellowhammer *Emberiza citrinella*, Reed Bunting *Emberiza schoeniclus* and Mistle Thrush *Turdus viscivorus* have been observed here.	Approximately 1.0 km southeast of the Grid Connection Corridor.
Kirk Sandall Gorse cLWS	The site formerly had many more open areas; however, the lack of management has allowed tall gorse to spread into most parts of the site. This scrub does, however, provide shelter for birds and the berry-bearing scrub also provides a good source of food in autumn.	Approximately 1.30 km southeast of the Grid Connection Corridor.
Went Valley (Eskholme) LWS	The riverbank supports an abundance of Reed Sweet-grass, Fool's-watercress *Apium nodiflorum*, Amphibious Bistort *Persicaria amphibia*, Reed Canary Grass *Phalaris arundinacea*, Branched Bur-reed *Sparganium erectum*, Greater Bulrush *Typha latifolia* and locally-frequent Pink Water Speedwell *Veronica catenata*.	Approximately 1.44 km northeast of the Solar PV Site.
River Went Oxbow cLWS	The old course of the River Went now forms a loop south of the present canalised river. Between one-third to almost a half of this old course is now a dry, or only seasonally wet, depression choked by tall ruderal and scattered wetland vegetation and is shaded throughout much of this western half by dense to scattered scrub and tree cover.	Approximately 1.47 km west of the Solar PV Site.
Barnby Dun Station Wood LWS	This site comprises quite a large area of woodland to the south of the active railway line at Barnby Dun. The canopy is dominated by oak, Silver Birch *Betula pendula* and Downy Birch *Betula pubescens* with an under storey of Elder *Sambucus nigra*, hawthorn and scattered Rowan *Sorbus aucuparia*. A small open glade, beside the railway has areas of bare sand, re-vegetating with Cup Lichen *Cladonia* sp. And mosses *Polytrichum commune*.	Approximately 1.54 km southeast of the Grid Connection Corridor.
Joan Croft Pond cLWS	A small wetland site, which has become increasingly surrounded by dense scrub and very widespread and extensive tall ruderal vegetation.	Approximately 1.57 km west of the Grid Connection Corridor.

Non-Statutory Site Name	Non-Statutory Site Description	Approximate Distance (m/km) and Direction from Closest Point of the Order limits
Bramwith Hall LWS	This large field supports improved pasture with poor sward structure however the site is of good value being a wooded pasture. Many of the trees are unfenced however some newer planted chestnut species are protected.	Approximately 1.71 km east of the Grid Connection Corridor.
Clay Bridge Field LWS	The site is a small damp meadow enclosed by dense hedgerows on all sides except the south, which has a slightly raised bank along a dry ditch, supporting an old defunct hedgerow comprising a line of mature Pedunculate and Turkey Oaks *Quercus cerris*. A deep water-filled drain runs along the northern side of the site.	Approximately 1.79 km east of the Solar PV Site. New Junction Canal separates the Solar PV Site and the LWS. There is no direct habitat connectivity.
Arksey Ings LWS	No site description provided.	Approximately 1.80 km southwest of the Grid Connection Corridor.
Westfield Ings LWS	The site is formerly a marsh within which ponds had been dug and trees planted. The southern part has recently been cleared of scrub and the ponds filled in, but the area still contains marsh plants and could, with suitable management, redevelop as a marsh habitat.	Approximately 1.83 km southeast of the Solar PV Site.
Campsmount Park cLWS	Predominantly parkland area.	Approximately 1.84 km west of the Order limits (the section of highway at the junction of the A19 and Station Road in the town of Askern), 5.35km west-southwest of the Solar PV Site, and 5.9km west-north-west of the Grid Connection Corridor.
Bradley's Well cLWS	No site description available.	Approximately 1.86 km north of the Order limits (the section of

Non-Statutory Site Name	Non-Statutory Site Description	Approximate Distance (m/km) and Direction from Closest Point of the Order limits
		highway at the junction of the A19 and Station Road in the town of Askern), 2.4 km west of the Solar PV site, and 2.8 km northwest of the Grid Connection Corridor.
Brecks Plantation cLWS	Plantation woodland.	Approximately 2.0 km south of the Grid Connection Corridor.
Hobbledehoy Wood LWS	Woodland, not ancient woodland.	Approximately 2.0 km southeast of the Grid Connection Corridor.

8.7.9 There are two areas of Ancient Woodland within the Study Area, these being Bunfold Shaw (approximately 10 m from the Solar PV Site) and Parkshaw Wood (approximately 1 km northwest of the Solar PV Site). Bunfold Shaw LWS is a deciduous broadleaved woodland located less than 10 m outside the Solar PV Site. As identified on the Ancient Woodland inventory (Ref. 8-38), it is an ancient woodland, dominated by Pedunculate Oak. The woodland also contains Hawthorn, Ash, Silver Birch, overtopping Hazel *Corylus avellana*, Alder, Aspen *Populus tremula* and some scattered conifer species *Pinus sp.*

Habitats

8.7.10 The habitats present within the Order limits include other neutral grassland, coastal and floodplain grazing marsh, ruderal/ephemeral habitat, modified grassland, ancient lowland mixed deciduous woodland, plantation broadleaved woodland, plantation mixed woodland, scattered trees, ancient/veteran trees, lines of trees, native hedgerows (including species-rich hedgerows and hedgerows associated with trees and ditches, bramble scrub, hawthorn scrub, mixed scrub, cereal crops, developed land, buildings, bare ground, possible Open Mosaic Habitat on Previously Developed Land (OMH), introduced shrub, ponds, rivers and ditches. The surrounding habitat is mainly arable, with small pockets of mature broad-leaved woodland (plantation and semi-natural). There are individual and clusters of residential properties located adjacent to the Order limits.

8.7.11 A review of the MAGIC website (Ref. 8-37) identified areas of priority habitats under S41 of the NERC Act 2006 (Ref. 8-9) as being present or likely to be present within the Solar PV Site or within the 50 m Survey Area:

a. Coastal and floodplain grazing marsh (within the Solar PV Site);

b. Rivers (the River Went forms the northern boundary of the Solar PV Site and Fleet Drain is also an Environment Agency (EA) main river and WFD water body);

c. Traditional Orchard (outside of the Solar PV Site, but a hedgerow directly links this habitat to the Solar PV Site); and

d. Reedbeds (outside of the Solar PV Site).

8.7.12 Habitats within the Order limits were subject to field surveys undertaken in March, April and October 2023, and in August 2024. These surveys assisted with corroborating the accuracy of the desktop review, with habitats present within the Order limits identified and mapped against the UKHab Habitat survey criteria. The habitat types found within the Order limits and are presented in Table 8-7, alongside area calculations that are taken from digitised maps of the UKHab Habitats. The locations of these habitats are presented in **ES Volume II Figure 8-3: UKHab Plan [EN010152/APP/6.2]** and further information is included within this chapter.

8.7.13 Hedgerow Surveys identified the presence of 18 Important hedgerows under the Hedgerow Regulations 1997 (Ref. 8-11)).

8.7.14 Habitat and condition assessment data has also been used in the BNG assessment (see **BNG Assessment [EN010152/APP/7.11]**).

Table 8-7: Habitat Within the Order limits and their Biodiversity Importance

Habitat	Summary Description	Area (hectares)/length (kilometres)	Conservation Status	Biodiversity Importance	Supporting notes
g3c – Other neutral grassland	Approximately 24% of the Solar PV Site is other neutral grassland, used for livestock grazing. Some of these areas are dominated by Red Fescue *Festuca rubra*, with abundant Perennial Ryegrass *Lolium perenne*. Other species include Yorkshire Fog *Holcus lanatus*, Cock's-foot *Dactylis glomerata*, Reed Canary Grass and Bent species *Agrostis* sp. Some of the grasslands in the northeast of the Solar PV Site have Brassica crop which have spread from the arable fields. These areas are also likely to be subject to some periodic inundation due to the proximity to the River Went and this was supported by the presence of occasional reed and rush species.	109.97 ha	Neutral and Wet Grassland is a Doncaster BAP habitat (Ref. 8-28).	District	Neutral and wet grassland is a Doncaster BAP habitat (Ref. 8-28).
g3c – Other neutral grassland Secondary code 19: Coastal and	An area of the above grassland was assessed as Coastal Floodplain Grazing Marsh (CFGM). This habitat, within the	8.19 ha	Coastal and Floodplain Grazing Marsh is a HaPI.	County	HaPI.

Habitat	Summary Description	Area (hectares)/length (kilometres)	Conservation Status	Biodiversity Importance	Supporting notes
floodplain grazing marsh	northern Solar PV Site (adjacent to the River Went) consists of swards that are dominated by Common Reed *Phragmites australis* with Soft Rush *Juncus effusus*, scattered Pond Sedge *Carex sp*. and Greater Bullrush *Typha latifolia*. Some of this habitat is associated with the River Went (Part) LWS, however there are some areas which sit outside of this.				
g3c – Other neutral grassland Secondary code 81: Ruderal/ephemeral	There are two areas of ruderal vegetation within the Solar PV Site, species including Curled Dock *Rumex crispus*, Common Nettle, Willowherb species *Epilobium* sp. Cleavers *Galium aparine*, Bramble, Hogweed *Heracleum sphondylium* and Dog Rose. There are also two areas of ephemeral vegetation within disturbed ground/set-aside within arable fields in the southern part of the Solar PV Site with no signs of recent cultivation. Species	6.54 ha	No	Site	Not a HaPI.

Habitat	Summary Description	Area (hectares)/length (kilometres)	Conservation Status	Biodiversity Importance	Supporting notes
	present here include Common Nettle, Umbellifer species Daucus sp. Mayweed species and Cleavers.				
g4 – Modified grassland	Fields in the southeast of the Solar PV Site dominated by Perennial Ryegrass.	16.36 ha	No	Site	Not a HaPI.
w1f – Lowland mixed deciduous woodland	Small areas of deciduous woodland are located within the Solar PV Site and Grid Connection Corridor. This includes an area of unmanaged willow and hawthorn woodland.	0.74 ha	Habitat of principal importance (HaPI) – Lowland Mixed Deciduous Woodland	Up to County	Areas of lowland mixed deciduous woodland qualify as HaPI. There are no Ancient Woodlands within the Order limits, with the nearest Ancient Woodland being Bunfold Shaw, approximately 10 m from the Solar PV Site. The only other Ancient Woodland within the Study Area is Parkshaw Wood, approximately 1 km northwest of the Solar PV Site.
w1g – Other woodland; broadleaved. Secondary code 29: Plantation	Three areas of broadleaved plantation woodland are located within the Solar PV Site, with species recorded including Oak, Sycamore, Whitebeam *Sorbus aria*, Hazel, Willow, Silver Birch,	2.77 ha	No	Site	Not a HaPI.

Habitat	Summary Description	Area (hectares)/length (kilometres)	Conservation Status	Biodiversity Importance	Supporting notes
	Hawthorn and Dog Rose *Rosa canina*.				
w1h – Other woodland; mixed. Secondary code 29: Plantation	There are small areas of mixed plantation woodland which contain deciduous and coniferous trees.	0.68 ha	No	Site	Not a HaPI.
w1 – Broadleaved and mixed woodland Secondary codes 32: Scattered trees 204: Veteran tree 205: Ancient tree	1,211 individual scattered trees were recorded within the Order limits. A description of all trees can be found within the **ES Volume III Appendix 10-7: Arboricultural Impact Assessment (AIA) [EN010152/APP/6.3]**.	-	117 veteran trees and 22 ancient trees were identified during fieldwork, which are classed as irreplaceable habitats within the DEFRA Statutory Metric.	County	Individual trees are not a HaPI. However, veteran or ancient trees are of greater value. Individual trees can also provide suitable habitat for protected and notable species, including bats and Barn Owl.
w1 - Broadleaved and mixed woodland Secondary code 33: Line of trees	There are remnants of previous hedges in several locations on the Solar PV Site that have been left unmanaged and as a result now form lines of scattered trees, rather than hedges. They delineate some of the field boundaries.	2.21 ha	No	Site	Not a HaPI

Habitat	Summary Description	Area (hectares)/length (kilometres)	Conservation Status	Biodiversity Importance	Supporting notes
h2a - Native hedgerow Secondary codes: 11: Hedgerow with trees 50: Ditch h2a5 – Species-rich native hedgerow 11: Hedgerow with trees 50: Ditch	There are a total of 136 hedgerows on site, as described within **ES Volume III Appendix 8-5: Hedgerow Report [EN010152/APP/6.3]**. These comprise native hedgerows and species-rich native hedgerows, associated with ditches, and with trees.	36.38 km	All hedges are a HaPI. Ancient and species-rich hedgerows are a Doncaster BAP habitat (Ref. 8-28). 18 of the hedgerows are classified as 'Important' under the Hedgerow Regulations (Ref. 8-11)	Up to County	HaPI, legally protected under the Hedgerow Regulations (Ref. 8-11). Hedgerows are listed as a Doncaster BAP habitat (Ref. 8-28).
h3d – Bramble scrub	Small areas of bramble scrub are present throughout the Solar PV Site.	0.04 ha	No	Site	Not a HaPI
h3h – Hawthorn scrub	An area of hawthorn scrub is present within the eastern aspect of the solar PV Site.	0.28 ha	No	Site	Not a HaPI
h3h – Mixed scrub	Small areas of scrub are found throughout the Solar PV Site. Hawthorn is dominant, with Dog Rose and Willow species also present	0.61 ha	No	Site	Not a HaPI.

Habitat	Summary Description	Area (hectares)/length (kilometres)	Conservation Status	Biodiversity Importance	Supporting notes
c1c – Cereal crops	Over 60% of the Solar PV Site is cultivated and used for the production of arable crops, including Brassica sp. and wheat. There are arable margins adjacent to the fields in the north of the Solar PV site, with flora recorded here including Shepherd's Purse *Capsella bursa-pastoris*, Red Dead Nettle *Lamium purpureum*, Yarrow *Achillea millefolium*, Colt's Foot *Tussilago farfara*, Common Chickweed *Stellaria media*, Speedwell species *Veronica* sp. and Bittercress species *Cardamine* sp.	324.97 ha	No	Site	Intensively managed arable farmland is of negligible value. Margins are noted for their biodiversity and offer value for commuting fauna, but are not classed as a HaPI as they were not clearly managed for wildlife.
u1b – Developed land; sealed surface	Developed land around buildings and roads.	14.78 ha	None	Site	Not a HaPI.
u1b5 - Buildings	A single agricultural building is present within the Solar PV Site.	0.06 ha	None	Site	Not a HaPI.
u1c – Artificial unvegetated, unsealed surface	A small area mainly along tracks/paths	0.42 ha	None	Site	Not a HaPI.

Habitat	Summary Description	Area (hectares)/length (kilometres)	Conservation Status	Biodiversity Importance	Supporting notes
Secondary code 510: Bare ground					
u1f – Sparsely vegetated urban land Secondary code 80: Open Mosaic Habitat on Previously Developed Land	Within the south of the Grid Connection Corridor there is an area of sparsely vegetated former industrial land to the north of the Existing National Grid Thorpe Marsh Substation that was not accessible to survey. However, this is assumed to possibly be Open Mosaic Habitat (OMH) within Previously Developed Land, based on the proximity to another OMH area to the west of the Order limits as shown on MAGIC.	19.45 ha	HaPI	County	Open Mosaic Habitat within Previously Developed Land is a HaPI. The land to the north of the Existing Thorpe March Substation consists of a former power station site, including footprints of cooling towers, which appears to now consist of a mosaic of habitats at different successional stages. Given the areas former industrial use, and in the absence of field survey, it has been assumed that this area of land or certainly parts of it may possibly meet the criteria for OMH.
U1 – Built-up areas and gardens Secondary code 847: Introduced shrub	A small area of introduced shrub is located within the Grid Connection Corridor.	0.14 ha	No	Negligible	Not a HaPI

Habitat	Summary Description	Area (hectares)/length (kilometres)	Conservation Status	Biodiversity Importance	Supporting notes
r1g – Other standing water Secondary codes: 41: Ponds (non-priority)	Six ponds are present within the south of the Order limits in the Grid Connection Corridor.	0.79 ha	Not a HaPI	Site	Not a HaPI
r2b – Other rivers and streams Secondary code 50: Ditches	The River Went runs along the northern boundary of the Solar PV Site, flowing from west to east. The river channel is approximately 7 m wide and the banks are less than 1 m high and vegetated with Common Nettle and Common Reed *Phragmites australis*. The Fleet Drain and Fenwick Common Drain are two watercourses that run through the Solar PV Site and are connected to (fed by) the network of field drains. The Fleet Drain is connected to the River Went, and to Fenwick Common Drain. Banks are steep, and approximately 2 to 3 m high, and 2 to 3 m wide. Flora adjacent to the drains includes Common Nettle, Lesser	Rivers:1.99 km Ditches: 29.38 km	Rivers and Streams are a HaPI and the River Went is noted for presence of LWS designation and connectivity to the Humber Estuary SAC.	River Went – County All other watercourses /ditches - Local	The River Went is likely to qualify as a HaPI and therefore, of county importance. All other watercourses, including ditches are not HaPI, but may support fish species, invertebrates and riparian mammals.

Habitat	Summary Description	Area (hectares)/length (kilometres)	Conservation Status	Biodiversity Importance	Supporting notes
	Celandine *Ficaria verna* and Cow Parsley *Anthriscus sylvestris*. There are further ordinary watercourses and ditches throughout the Order limits that are not classed as riverine habitats.				

Protected and Notable Species and INNS

8.7.15 The desk study obtained data from DLRC of protected and notable species within the 2 km Study Area and from the preceding ten years.

8.7.16 Himalayan balsam *Impatiens glandulifera* was recorded along Thorpe Marsh Drain and evidence of Mink was recorded along the D15 North watercourse, within the Solar PV Site. Both are, listed under Schedule 9 of the WCA, 1981 (as amended) (Ref. 8-1).

8.7.17 Table 8-8 presents a summary of protected, notable and INNS animal and plant species that have been identified during the desk study and ecological surveys, within the Order limits and relevant Survey Areas (see Table 8-1) alongside an assessment of each feature's importance/value (sensitivity). Where the biodiversity importance of a feature is specific to a particular area of the Order limits (e.g. occurring within the Solar PV Site 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, Notable and Invasive Non-Native Species Alongside Assessment of Biodiversity Importance of Ecological Features

Ecological Feature and Technical Appendix	Baseline Detail	IEFs	Assessment of Biodiversity Importance	Supporting Notes
Aquatic macro-invertebrates (as presented in **ES Volume III Appendix 8-6: Aquatic Ecology Report [EN010152/APP/6.3]**)	**Desk Study**: There are no recent records of notable or protected aquatic macroinvertebrates, including White-clawed crayfish *Austropotamobius pallipes* within the Study Area. However, the species audit as part of the Doncaster BAP mentions two aquatic beetles for potential inclusion. One of which was *Hydroporus rufifrons* (conservation score of 10 Ref. 8-87) which can be found in temporary marshes and old ox bow systems. There were records for Thorne Moor and Epworth areas. The second beetle species was *Laccophilus obsoletus*, (conservation score 9 Ref. 8-87) which is a beetle typical of marshes near the sea, though not restricted to brackish waters. It was noted in the audit that this species could benefit from ditch management. The species audit also listed two species of mollusc which had historic records (most recent was 1986). These were the mud snail *Lymnaea glabra* (now known as *Omphiscola glabra*, conservation score 9 Ref. 8-87) and the shining rams-horn snail *Segmentina nitida* (conservation score 10).	Common and widespread species, only.	Local	No recent records of notable or protected aquatic macroinvertebrates species were identified during the desk study or field survey. However, the species audit as part of the Doncaster BAP mentions two aquatic beetles for potential inclusion that are of high conservation value but their location is unspecified; their habitat preference is slow-flowing ditch habitat, and therefore there is suitable habitat to support them on the site (although neither species was recorded during surveys).

Ecological Feature and Technical Appendix	Baseline Detail	IEFs	Assessment of Biodiversity Importance	Supporting Notes
	There are no statutory designations associated with these species. **Field Survey**: The field surveys recorded locally notable snail *Aplexa hypnorum* (conservation score five) and the beetle *Ilybius quadriguttatus* (conservation score five) in spring. The autumn surveys recorded the beetles *Rhantus suturalis* (conservation score five) and *Hygrotus parallelogrammus* (conservation score seven-notable but not red data book status). There are no statutory designations associated with these species.			
Aquatic macrophytes (as presented in **ES Volume III Appendix 8-6: Aquatic Ecology Report [EN010152/APP/6.3]**)	**Desk Study**: The desk study highlighted records of the previously protected aquatic macrophyte *Callitriche obtusangula* in 2016 on the River Don, 1 km west of the Order Limits) and 2023 (on Mill Dike, 1.5 km upstream of the Order Limits, although Mill Dike is also within the Grid Connection Corridor). However, this species is now listed as of 'least concern' on the JNCCs conservation designations for UK taxa 2023 which means it is neither threatened or near threatened Furthermore, there were no records of protected macrophyte species listed in the	Common and widespread species, only.	Site	No recent records of notable or protected aquatic macrophytes species were identified during the desk study or field surveys.

Ecological Feature and Technical Appendix	Baseline Detail	IEFs	Assessment of Biodiversity Importance	Supporting Notes
	Species Audit of Doncaster Borough in support of the Doncaster BAP (Ref. 8-28). **Field Survey**: No notable or protected species were recorded during macrophyte field surveys in summer 2024.			
Fish (as presented in **ES Volume III Appendix 8-6: Aquatic Ecology Report [EN010152/APP/6.3]**)	**Desk Study**: The desk study highlighted records of bullhead in the River Went, 20 km upstream of the Scheme as well as European eel in the River Don, 2 km downstream of its confluence with Thorpe Marsh Drain. There are also historical records at unconfirmed locations mentioned in the species audit for the Doncaster BAP. These were Atlantic salmon, brown trout and sea lamprey. Bullhead, Atlantic salmon and sea lamprey are listed under Annex II of the European Commission Habitats and Species Directive (Ref. 8-2) whilst brown trout are listed under Section 41 of the Natural Environment and Rural Communities Act 2006. European eel is afforded protection under the Eels (England and Wales) Regulations 2009 (Ref. 8-15.), which places a requirement upon developers and abstracters to ensure continued eel passage and to prevent eel entrainment.	European Eel potentially present in all water bodies within the Order limits, due to their connectivity. European Bullhead, Brown/Sea Trout. Potential for Lamprey spp. to be present due to connectivity to Humber Estuary SAC, for which river and sea lamprey are designated features.	County	Desk study data has identified the potential for European eel, protected under the Eels (England and Wales) Regulations (Ref. 8-15), to be present in the River Don which is hydrologically connected to waterbodies within the Order Limits. Furthermore, European bullhead is an Annex II (Ref. 8-2) and UK BAP species (Ref. 8-26), however it is common and widespread. Brown trout is a SPI. River Lamprey and Sea Lamprey (Annex II) are a primary reason for selection of the Humber Estuary SSSI and are

Ecological Feature and Technical Appendix	Baseline Detail	IEFs	Assessment of Biodiversity Importance	Supporting Notes
	Field Survey: No notable species were recorded during fish surveys completed in summer 2024.			present as a qualifying feature (but not a primary reason) for the Humber Estuary SAC. The Humber Estuary is an important migration route for both lamprey species and low numbers are thought to be present all year round.
Terrestrial invertebrates	**Desk Study**: The desk study returned over 750 records of notable terrestrial invertebrates from within the Study Area, mainly butterflies (334 records), moths (83 records), beetles (29 records), dragonflies (310 records) and orthoptera (one record). Of these, no butterfly or moth records were species known to be rare or threatened with all species being common and widespread. **Field Survey**: Habitat surveys identified the presence of semi-natural grassland areas (other neutral grasslands) within the Order limits which contained the larval foodplants for a variety of invertebrate species including red fescue, Yorkshire fog and tufted hair-grass. These areas of grassland are subject to heavy grazing and regular cutting, reducing	Common and widespread invertebrate species, with areas of hedgerows, broadleaved woodland and riparian habitats likely to support notable species.	General terrestrial invertebrate assemblage – Local Brown Hairstreak - County	The majority of habitats present, such as arable farmland and modified grassland have limited value for terrestrial invertebrates and species present are likely to be common and widespread. Some of the boundary habitats, such as hedgerows, broadleaved woodland and riparian habitats within the Order limits have the potential to support some notable species. No evidence of

Ecological Feature and Technical Appendix	Baseline Detail	IEFs	Assessment of Biodiversity Importance	Supporting Notes
	the diversity of forbs present and the likelihood of egg and larval survival. As such, there is limited opportunity for notable or important invertebrate species or populations to occur. The areas of marshy grassland, broadleaved woodland, tall ruderal, hedgerows, trees and ditches present within the Order limits also provide value for invertebrate species and populations. These areas of higher quality habitat have the potential to support notable species. The area of post-industrial land within the Order limits to the north of the Existing National Grid Thorpe Marsh Substation, possibly qualifies as Open Mosaic Habitats on Previously Developed Land and as such, may support notable terrestrial invertebrate assemblages and species. Adult Brown Hairstreak *Thecla betulae* were incidentally recorded during other ecological surveys utilising Blackthorn hedgerows within the norther section of the Solar PV Site.			legally protected species present, or likely to occur. The area of possible OMH to the north of the Existing National Grid Thorpe Marsh Substation may support notable (including SPI) terrestrial invertebrate assemblages and species associated with this habitat. Brown Hairstreak are a are SPI under S41 of the NERC Act (2006) (Ref. 8-9) and the species is likely to be at the northern limit of its range in the UK within the Order limits.
Reptiles (see **ES Volume III Appendix 8-2: Reptile Survey Report [EN010152/APP/6.3]**)	**Desk Study**: The data search returned records of Grass Snake occurring within the Study Area. **Field Survey**: Low population of Grass Snake recorded in September 2023 from the	Grass Snake	Local	Reptiles are protected from intentional injuring or killing under the WCA (Ref. 8-1) and are SPI under S41 of the NERC

Ecological Feature and Technical Appendix	Baseline Detail	IEFs	Assessment of Biodiversity Importance	Supporting Notes
	three survey areas within the Solar PV Site, with a peak of 9 animals on a single date, which included a single juvenile.			Act (2006) (Ref. 8-9). Grass Snake is also included in the species Audit of City of Doncaster Council, produced for the Doncaster BAP (Ref. 8-28). However, only a low population of a single species; Grass Snake (a common and widespread species) is present within the Solar PV Site.
Birds (**ES Volume III Appendix 8-7: Breeding Birds [EN010152/APP/6.3]** and **ES Volume III Appendix 8-8 Non-Breeding Bird Report [EN010152/APP/6.3]**)	**Desk Study**: The desk study identified records of over 128 species of bird, including specially protected species (such as Barn Owl) and notable bird species (such as Yellowhammer) **Field Survey**: Surveys of breeding birds undertaken recorded 77 birds using the Solar PV Site and a breeding assemblage of 54 species, including 25 species that meet at least one of a range of criteria relating to conservation importance. Eleven species are listed as a priority species in the UK Biodiversity Action Plan (Ref. 8-26) and as species of principal importance under the NERC Act (Ref. 8-9), and nine species are	A diverse assemblage of breeding bird species, in particular containing notable farmland species.	Overall breeding assemblage -up County Breeding farmland bird assemblage - District	All nesting birds are protected under the WCA (Ref. 8-1). Habitats within the Order limits support nesting birds. The Solar PV Site supports notable species during the breeding season however the majority of these populations were relatively low and did not represent significant proportions of individual species county or

Ecological Feature and Technical Appendix	Baseline Detail	IEFs	Assessment of Biodiversity Importance	Supporting Notes
	listed as Birds of Conservation Concern (BoCC) Red list. Confidential information regarding the abundance of and distribution of any sensitive breeding species recorded are reported separately (**ES Volume III Appendix 8-7: Breeding Bird Report (Annex A) (Confidential))** and will be provided to key stakeholders only. Surveys of non-breeding birds recorded 98 species within the Survey Area. The assemblage of non-breeding birds recorded within the Solar PV Site, includes SPI (Ref. 8-9) (such as Grey Partridge, Skylark, Linnet and Yellowhammer), infrequent observations of Annex 1 species (Ref. 8-2), such as Golden Plover *Pluvialis apricaria,* Merlin *Falco columbarius* and Kingfisher *Alcedo atthis* and a range of waterbirds associated with the River Went (both within and outside the Order limits).			national populations. Collectively though, the overall diversity of the assemblage is of greater value.
		Assemblage of non-breeding waterbirds, including Shoveler, Mallard, Teal and Wigeon and gulls.	District	Regular occurrence of waterbirds at levels likely to represent significant proportion of populations in Doncaster.
		Assemblage of non-breeding farmland birds, including Grey Partridge, Skylark, Linnet and Yellowhammer.	District	SPI and Birds of Conservation Concern (BoCC) Red list species recorded at levels likely to represent significant proportion of populations in Doncaster, including meeting criteria for LWS value.
Bats – roosts (see **ES Volume III Appendix 8-3: Bat Survey Report [EN010152/APP/6.3]**)	**Desk Study**: The desk study identified sixteen records of bats within the Study Area in the last ten years, including two roosts. Species comprise Common Pipistrelle *Pipistrellus pipistrellus*, Soprano Pipistrelle *Pipistrellus pygmaeus*, Pipistrelle species	Potential for roosts of widespread, rarer or species with restricted distribution within and adjacent to the	Up to County	All bat species and their roosts are legally protected in the UK under the WCA, 1981 (as amended) (Ref. 8-1) and Habitats and Species

Ecological Feature and Technical Appendix	Baseline Detail	IEFs	Assessment of Biodiversity Importance	Supporting Notes
	Pipistrellus sp. a Brown Long-eared bat *Plecotus auritus* and Noctule *Nyctalus noctula*. Two roosts were identified in the desk study within the Order limits. A review of MAGIC (Ref. 8-37) identified that three Natural England licences were granted within the Study Area, the closest of which covered destruction of a resting place for Common Pipistrelle and Soprano Pipistrelle. **Field Survey**: The daytime bat walkover has identified 154 trees within the Solar PV Site as having bat roost suitability and requiring further assessment, and 92 trees as having features that were potentially suitable for roosting bats. One building is present within the Order limits, but will be retained and adequately buffered, so was not subject to survey.	Order limits. However, all trees with bat roost potential and the single building are to be retained.		Regulations (Ref. 8-7), which implement the EC Directive 92/43/EEC (Ref. 8-2). Seven bat species are also included as Priority Species under S41 of the NERC Act (Ref. 8-9). The Order limits is unlikely to support significant roost sites, for example maternity or hibernation roosts for rarer species due to the lack of habitats such as buildings and underground sites and geographical location. All trees that offer potential roosting features are to be retained within the proposals.
Bats – commuting and foraging habitat (see **ES Volume III Appendix 8-3: Bat Survey Report [EN010152/APP/6.3]**)	**Desk Study**: The desk study returned seven bat records within the 2 km Study Area (dated within the last ten years, up to 2022), none of these are within the Order limits. These included one pipistrelle species, one Common Pipistrelle record, three Soprano	Foraging/commuting activity of widespread and rarer bat species within and adjacent to the Order limits.	District	All bat species and their roosts are legally protected in the UK under the WCA, 1981 (as amended) (Ref. 8-1) and Conservation of Habitats

Ecological Feature and Technical Appendix	Baseline Detail	IEFs	Assessment of Biodiversity Importance	Supporting Notes
	Pipistrelle records and two Brown Long-eared bat. The closest record is approximately 1.7 km northwest of the Order limits. **Field Survey**: Species recorded during the 2023 and 2024 bat surveys included Common Pipistrelle, Soprano Pipistrelle, Pipistrelle species, Brown Long-eared bat, Noctule, Daubenton's bat *Myotis daubentonii* and *Myotis* species (Daubenton's and/or other unknown *Myotis* species), and Leisler's bat *Nyctalus leislerii*. Static bat detector results included additional Nathusius' pipistrelle *Pipistrellus nathusii* and barbastelle *Barbastella barbastellus* calls. The majority of the calls recorded were from common pipistrelle bats. Following the completion of the bat activity surveys, the Order limits was assessed as offering district value foraging and commuting habitat. The areas with highest activity were located along linear features such as hedgerows, tree lines and woodland edges with little foraging and commuting observed over open fields or crops. Small pockets of woodland across the Order limits form a relatively limited resource for foraging bats. Hedgerows and wider field margins provide habitat connectivity within and outside of the Scheme boundary.	Features important for foraging and commuting bats included the hedgerows woodland, ditches and tree lines and woodland edges.		and Species Regulations (as amended) (Ref. 8-7), which implement the EC Directive 92/43/EEC (Ref. 8-2). Seven bat species are also included as Priority Species under Section 41 of the NERC Act (Ref. 8-9). The biodiversity importance of commuting and foraging habitat for bats is based on species rarity, habitat types/features habitat reliance and roost types.

Ecological Feature and Technical Appendix	Baseline Detail	IEFs	Assessment of Biodiversity Importance	Supporting Notes
Riparian mammals (summarised in **ES Volume III Appendix 8-9: Riparian Mammal Report [EN010152/APP/6.3]**)	**Desk Study**: The data search returned records of Water Vole occurring within the Study Area, but none identified from within the Order limits. No recent (i.e. within the preceding ten years) records of Otter were returned. **Field Survey**: The River Went, ponds and the ditches associated within and surrounding the Order limits were assessed as having the potential to support water voles. Evidence of Otter including the presence of a holt was recorded on the River Went along the northern boundary of the Order limits. No definitive evidence of water voles was identified on site, however Engine Dike and Thorpe Marsh Drain had suitable habitat and feeding stations present. Evidence of Mink was recorded along the D15 North watercourse, within the Solar PV Site (also see INNS grouping below).	Presence of Otter along the River Went.	Local	Otter is protected under Habitats and Species Regulations (Ref. 8-7) and Schedule 5 of the WCA (Ref. 8-1). Water Vole and Otter are also included in the species Audit of City of Doncaster Council, produced for the Doncaster BAP (Ref. 8-28). Otters have an estimated British population of 11,000, are increasing in population size and range (Ref. 8-71) and are of International Union for the Conservation of Nature (IUCN) Least Concern status in England (Ref. 8-72).
Badger (see **ES Volume III Appendix 8-4: Badger Report [EN010152/APP/6.3]** and **ES Volume III Appendix 8-4:**	**Desk Study**: The data search did not return any recent records of Badger within the Study Area and within the preceding ten years. **Field Survey**: Badger presence was recorded within the Order limits. The Solar PV	Presence of this species within the Order limits.	Local	Protected under The Protection of Badgers Act 1992 (Ref. 8-10) and also included in the species Audit of City of Doncaster Council,

Ecological Feature and Technical Appendix	Baseline Detail	IEFs	Assessment of Biodiversity Importance	Supporting Notes
Badger Report (Annex A) (Confidential) [EN010152/APP/6.3])	Site supports areas of woodland, grassland, scrub, hedgerows, and ponds which provide suitable commuting, foraging and watering habitat for Badger.			produced for the Doncaster BAP (Ref. 8-28). However, they remain common and widespread.
Brown Hare	**Desk Study**: The data search returned records of Brown Hare within the Study Area and occurring within the preceding ten years. **Field Survey**: This species has been incidentally recorded within the Solar PV Site during ecological surveys and is therefore assumed to occur within the Grid Connection Corridor.	Presence of this species confirmed within the Order limits.	Local	SPI in England (Ref. 8-9) and also included in the species Audit of City of Doncaster Council, produced for the Doncaster BAP (Ref. 8-28). Brown Hare was recorded in arable land within the Solar PV Site during ecological surveys.
Hedgehog	**Desk Study**: The data search returned records of Hedgehog within the Study Area and occurring within the preceding ten years. **Field Survey**: This species has not been recorded within the Order limits during ecological surveys, although hedgerows, woodland and scrub habitat could support this species.	Assumed presence within the Order limits	Local	SPI in England (Ref. 8-9). Not recorded during ecological surveys, but based on scrub, woodland and hedgerow habitats within the Order limits, geographical range of this species, alongside presumed abundance within the county, an assumption

Ecological Feature and Technical Appendix	Baseline Detail	IEFs	Assessment of Biodiversity Importance	Supporting Notes
				has been made this species is likely to be present within the Order limits.
Other mammals, listed on S41 of the NERC Act (such as Polecat, Harvest Mouse)	**Desk Study**: The data search returned records of Harvest Mouse within the Study Area and occurring within the preceding ten years. There were no records of Polecat or other S41 species identified within the Study Area and within the last ten years. **Field Survey**: Although neither Harvest Mouse or Polecat was recorded during surveys, the Order limits contain habitats in arable farmland, ditches, hedgerows and woodland, which could support both species.	Assumed presence of Harvest Mouse within the Order limits	Local	Polecat and Harvest Mouse are SPI (Ref. 8-9) with Harvest Mouse also included in the species Audit of City of Doncaster Council, produced for the Doncaster BAP (Ref. 8-28). The Order limits does offer suitable habitat for Harvest Mouse, which can be found in tall grassland, farmland and hedgerows. Polecat is a rare species outside of its known distribution range but has been shown to be spreading eastwards away from strongholds in Wales. However, the paucity of records of Polecat within the Study

Ecological Feature and Technical Appendix	Baseline Detail	IEFs	Assessment of Biodiversity Importance	Supporting Notes
				Area and this species' rarity within the eastern part of England, means Polecat is likely to be absent from the Order limits.
INNS	**Desk Study**: Several aquatic non-native species were identified as occurring within the Order limits during the desk study, including the New Zealand Mud Snail *Potamopyrgus antipodarum*, Nuttall's Waterweed *Elodea nuttallii* and Curly Waterweed *Lagarosiphon major*. No terrestrial INNS plant species were recorded as part of the desk study. **Field Surveys**: The field surveys recorded two non-native but now considered naturalised species: New Zealand mud snail (*P. antipodarum*) was present in Minor ditch 9, minor ditch 12, fenwick common drain and Wrancarr Drain. The crustacean 'shrimp' (*Crangonyx sp.*) which was present in Minor ditch 12, Fenwick Common Drain, Ellwood and Fenwick Grange Drain, Hawkhouse Green Drain, Main Dike and Wrancarr Drain. Whilst neither of these species is listed in UK legislation, best practice bio-security	Not applicable	Not applicable	Mitigation including biosecurity measures will need to be implemented during construction in areas where these species are present to prevent their spread, which would constitute an offence under the associated legislation (e.g. for INNS plants Curly Waterweed, Canadian pondweed, and Nuttall's Waterweed). Precautionary methods during construction would minimise risk of trapping INNS faunal species.

Ecological Feature and Technical Appendix	Baseline Detail	IEFs	Assessment of Biodiversity Importance	Supporting Notes
	measures are recommended to prevent their spread. The macrophyte Canadian waterweed (*Elodea canadensis*) was recorded on Wrancarr Drain, a Schedule 9 invasive non-native species which makes it an offence to plant, or otherwise cause to grow (including allowing to spread), listed plant species in the wild. If transported off-site, there is a duty of care with regards to the disposal of any part of the plant that may facilitate establishment in the wild and cause environmental harm (as per the Environmental Protection Act 1990). The legislation also makes in an offense to release, or allow to escape, listed species (or species not ordinarily resident in and is not a regular visitor to Great Britain in a wild state) into the wild. Himalayan balsam was recorded on Thorpe Marsh Drain. Muntjac deer were recorded on site during field surveys which are an INNS faunal species. Evidence of Mink was recorded along the D15 North watercourse, within the Solar PV Site.			

Future Baseline

8.7.18 The future baseline (i.e. no development) scenarios are set out in **ES Volume I Chapter 5: Environmental Impact Assessment Methodology [EN010152/APP/6.1]**. However, this section considers those changes to the ecological 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.

No Development

8.7.19 In the short to medium term, in the absence of the Scheme, habitats within the Order limits (such as arable fields (cropped on rotation), grazed grassland, mature trees, hedgerows, ponds and woodland) have and will continue to provide a number of species with potential habitat for foraging and reproduction, such as agricultural fields for ground-nesting breeding birds. In the long term, in the absence of the Scheme, habitats within the Solar PV Site will be under agricultural management and therefore the low biodiversity of this landscape and the damaged soil, poor water quality and artificially low water tables will remain, making recovery of these ecosystems harder to achieve. The distribution of some species will change in response to changes in crop type/livestock management, whilst the species assemblages are likely to remain broadly the same. Any changes to the baseline between now and the future scenario have been taken into account in this assessment and when determining likely mitigation measures.

8.7.20 Irrespective of whether the Scheme were to proceed or not, the current national, regional and local trend is for an overall decline in species diversity and abundance e.g. farmland birds. These declines are likely to continue in the landscape surrounding the Scheme throughout its duration.

Construction

8.7.21 Based on current trends, in the absence of the Scheme, species abundance and diversity are likely to remain similar to the existing baseline conditions during the construction phase, 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 2028 (the anticipated start of the construction phase).

Operation and Maintenance

8.7.23 Based on current projections, the long-term i.e. the 40-year anticipated operational lifetime of the Scheme, will see extreme weather conditions due to climate change (see **ES Volume I Chapter 6: Climate Change [EN010152/APP/6.1]**) to which the agricultural landscape has low resilience.

For example, heavy and prolonged rainfall would exacerbate loss of soil and sedimentation of ditches, drains and rivers. There would be a continued decline in biodiversity, including species associated with the baseline conditions present within the Order limits.

8.7.24 National and local planning policy targeted at halting and reversing these declines is presented in **ES Volume III Appendix 8-1: Legislation, Policy and Guidance (Ecology) [EN010152/APP/6.3]**.

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 within the Order limits between the beginning of operation in 2030 and decommissioning in 2070 (based on an estimated 40-year operation). 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

8.7.26 The future baseline conditions at decommissioning (anticipated to be in 2070) are currently unknown and more difficult to predict given the time period that would need to lapse between now and then. Habitats such as plantation woodland would have matured, 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 if climate change continues at its current pace. Effects could include changes in species habitats and compositions and consequently changes in species assemblages and distribution

8.8 Summary of Important Ecological Features

8.8.1 Table 8-9 summarises the IEFs that are relevant to the Scheme, based on desk study and survey data collected between February 2023 and October 2024. Based on CIEEM guidelines (Ref. 8-32) and using professional judgement, features of Site importance i.e. less than Local importance, are not considered further in the assessment process, unless legislation requires their consideration. Therefore, in recognition of the protected status of species occurring at a local level (e.g. Badger), the Scheme will embed appropriate mitigation (see Section 8.10) to minimise or avoid impacts in line with the relevant legislation.

Table 8-9: Summary of Important Ecological Features

IEFs	Geographic importance	Reason for valuation of IEFs
Thorne Moor SAC	International	Statutory site of nature conservation value at an international level and therefore qualifies as **Very High** Importance.

IEFs	Geographic importance	Reason for valuation of IEFs
Thorne and Hatfield Moors SPA	International	Statutory site of nature conservation value at an international level and therefore qualifies as **Very High** Importance.
Hatfield Moor SAC	International	Statutory site of nature conservation value at an international level and therefore qualifies as **Very High** Importance.
Humber Estuary SAC	International	Statutory site of nature conservation value at an international level and therefore qualifies as **Very High** Importance. The only features of relevance are migratory fish potentially occurring in connecting watercourses.
Humber Estuary Ramsar site	International	Statutory site of nature conservation value at an international level and therefore qualifies as **Very High** Importance. The only features of relevance are migratory fish potentially occurring in connecting watercourses.
Shirley Pool SSSI	National	Statutory site of nature conservation value and therefore qualifies as **High** Importance.
46 sites of county importance (LWSs or cLWSs – see Table 8-7)	County	Non-statutory sites designated for biodiversity importance, qualifying as **Medium** Importance.
Habitat – Neutral grassland including areas of Coastal and Floodplain Grazing Marsh	Up to County	Neutral and Wet Grassland is a Doncaster BAP habitat, whilst Coastal and Floodplain Grazing Marsh is a habitat of ecological importance included as a HaPI. This habitat qualifies as being of **Medium** Importance.
Habitat – Lowland mixed deciduous woodland	Up to County	Habitat of ecological importance, supporting a wide range of fauna and included as

IEFs	Geographic importance	Reason for valuation of IEFs
		a HaPI. Therefore, this habitat qualifies as being of up to **Medium** Importance.
Habitat – Scattered trees including veteran/ancient trees	Up to County	Ancient and veteran trees are notable for their potential biodiversity value. Therefore, this habitat qualifies as being of **Medium** Importance.
Habitat - Hedgerows	Up to County	Habitat of Principal Importance and Doncaster BAP habitat. 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.
Habitat – Open Mosaic Habitat on Previously Developed Land (OMH)	County	OMH is as a habitat of ecological importance within the order limits included as a HaPI. This habitat qualifies as being of up to **Medium** Importance.
Habitat – Rivers and streams)	Up to County	Small ditches are of local importance whereas the River Went has connectivity to a statutory site of nature conservation value and therefore qualifies as **Medium** Importance.
Aquatic macroinvertebrates	Local	Aquatic macroinvertebrate communities within the Order limits are common in a local and national context and therefore unusual or rare assemblages of aquatic macroinvertebrates are not present. This feature has been assessed as being of **Low** Importance.
Aquatic macrophytes	Site	Aquatic macrophyte communities inside the Order limits are common in a local and national context and therefore unusual or rare assemblages of aquatic macrophytes are not present. This feature has been assessed as being of **Low** Importance.

IEFs	Geographic importance	Reason for valuation of IEFs
Fish	County	The Humber Estuary SAC and SSSI are approximately 16 km downstream of the Solar PV Site via the River Don and Dutch River. River and sea lamprey are qualifying species for this SAC. There is potential connectivity between the Order limits and the Humber Estuary via the River Went and connected drains. There are also records of European eel in the River Went and bullhead in the River Don, which is connected to waterbodies within the Order limits. This feature has been assessed as being of **Medium/high** Importance.
Terrestrial invertebrates	General assemblage – Local Brown Hairstreak - County	No legally protected terrestrial invertebrate species recorded. The majority of suitable habitat for terrestrial invertebrates within the Order limits is restricted to boundary features, such as hedgerows, woodlands and riparian habitats and corridors and these habitats are likely to support a range of common and widespread terrestrial invertebrates including occasional SPI. However, the majority of the Order limits consists of arable farmland which is of low value to terrestrial invertebrates. The general invertebrate assemblage present within the Order limits is of **Low** Importance, however, it is acknowledged that areas of higher value habitats may support notable species, for example Brown Hairstreak, and these are of **Medium** Importance.

IEFs	Geographic importance	Reason for valuation of IEFs
Reptiles – Grass Snake	Local	Presence of a low population of one reptile species within the Solar PV Site. Therefore, qualifies as being of **Low** Importance.
Breeding Birds (General breeding bird assemblage)	Overall breeding assemblage of up to County importance, with a breeding farmland bird assemblage of District importance.	A diverse assemblage of breeding bird species, in particular containing notable farmland species. This feature has been assessed as being of **Medium** Importance.
Non-breeding birds - Assemblage of non-breeding waterbirds	District	Regular occurrence of waterbirds at levels likely to represent significant proportion of populations in Doncaster. This feature has been assessed as being of **Medium** Importance.
Non-breeding birds - Assemblage of non-breeding farmland birds	District	SPI and BoCC Red list species recorded at levels likely to represent significant proportion of populations in Doncaster, including meeting criteria for LWS value. This feature has been assessed as being of **Medium** Importance.
Bats – roosts	Up to County	Potential for bat roosts within and close to the Order limits, including those identified in the desk and possible other rarer species would qualify as being of **Low** to **Medium** Importance (depending on the species), however these are to be retained.
Bats – commuting/foraging habitat	District	The biodiversity importance of commuting and foraging habitat for bats is based on species rarity, habitat types/features habitat reliance and roost types. Based on this assessment the commuting/foraging habitat

IEFs	Geographic importance	Reason for valuation of IEFs
		would qualify as being of **Medium** Importance.
Water Vole	Local	Potential presence and highly suitable habitat on Engine Dike and Thorpe Marsh Drain qualifies the species as **Low importance.**
Otter	District	Presence of Otter on the River Went qualifies as being of **Medium** Importance as they are a European Protected Species.
Badger	Local	Badgers occurring within the Order limits are of **Low** importance.
Other mammals (Brown Hare, Hedgehog and Harvest Mouse)	Local	Species of Principal Importance. Presence of Brown Hare confirmed within the Solar PV Site and presence likely across the Order limits for Hedgehog and Harvest Mouse, with all species qualifying as being of **Low** Importance.
INNS	Not applicable	There are statutory constraints regarding the potential spread of INNS, as presented in **ES Volume III Appendix 8-1: Legislation, Policy and Guidance (Ecology) [EN010152/APP/6.3]**.

8.9 Potential Impacts

8.9.1 Prior to the implementation of any mitigation, the Scheme has the potential to affect biodiversity (positively or negatively) during construction, operation and maintenance, and decommissioning in the following ways.

Construction

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

a. Habitat loss or gain – direct impacts associated with changes in land use resulting from the Scheme. For example, short-term temporary changes in land use associated with the installation of the Grid Connection Cables, long-term temporary changes in land use (e.g. conversion from arable land to grassland and construction of Field Stations and access tracks) within the Solar PV Site, and permanent change in land use

owing to the conversion of agricultural land into areas of woodland habitat or screening within the Solar PV Site (assuming this would be retained past the end of the operation and maintenance phase);

b. 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 (e.g. culverts) to the movement of species, with a consequent impairment of ecological function;

c. Disturbance – indirect impacts resulting from a change in normal conditions (e.g. light, noise, vibration and human activity) that result in individuals or populations of species changing behaviour or range;

d. Habitat degradation – direct or indirect impacts resulting in the reduction in the condition of a habitat and its suitability for some or all of the species it supports, for example changes in chemical water quality, increased sedimentation and dust deposition, or changes in surface flow or groundwater;

e. Species mortality – direct impacts on species populations associated with mortalities due to construction activities, for example site clearance; and

f. Introduction and/or spread of invasive species due to the movement of personnel, equipment and plant machinery, potentially facilitating the introduction of invasive species.

Operation and Maintenance

8.9.3 Impacts on biodiversity features during operation and maintenance of the Scheme are likely to include.

Negative impacts:

a. Potential avoidance of species using the Order limits, such as bats and birds, due to the presence of the Solar PV Panels or operational lighting;

b. Disturbance of sensitive species during operation and maintenance activities such as operatives undertaking cleaning and replacement of panels

c. Fragmentation of habitats causing a barrier effect e.g. due to fencing;

d. Disturbance and displacement of aquatic fauna, especially fish, from Electromagnetic Fields (EMF) from cables beneath watercourses;

e. Shading from the Solar PV Panels reducing quality of grassland; and

f. Potential impacts to foraging bats due to presence of the Solar PV Panels.

Beneficial impacts:

a. Increases in permanent habitat of greater floristic diversity than arable farmland, increasing invertebrate assemblages and abundance;

b. Increased connectivity through planting of trees and hedgerows;

c. Undeveloped fields and margins providing enhanced nesting and foraging habitats for farmland birds, small mammals, amphibians and reptiles;

d. Potential attraction and increases in species foraging around the Order limits, such as bats and birds, from increases in prey items (i.e. flying insects);

e. 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

f. 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

8.9.4 Impacts on ecological features during decommissioning of the Scheme are likely to be similar to those during the construction phase. 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, avoided and/or mitigated. Upon decommissioning the above- ground physical infrastructure will be removed and the Order limits returned to landowners, including the established habitats. Any impacts to important ecological features present at the time of decommissioning will be mitigated fully in line with relevant legislative and policy requirements.

8.10 Embedded Design Mitigation

8.10.1 Where practicable, mitigation measures have been incorporated into the Scheme design and/or how it shall be constructed. Through iterative assessment, potential impacts have been predicted and opportunities to mitigate them identified with the aim of preventing or reducing impacts as much as possible.

8.10.2 This section contains the avoidance and embedded mitigation measures relevant to biodiversity that are already incorporated into the Scheme design, as described in **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**.

8.10.3 Embedded avoidance and mitigation measures are incorporated into the Scheme, in line with national and local planning policy (as presented in **ES Volume III Appendix 8-1: Legislation, Policy and Guidance (Ecology) [EN010152/APP/6.3]**). As a first principle, the Scheme has sought to avoid IEFs and, where this has not been practicable, embedded mitigation measures have been added to form an integral, committed and deliverable part of the Scheme design that does not comprise standard construction practices. These are formalised in the **Framework CEMP [EN010152/APP/7.7]**, **Framework OEMP [EN010152/APP/7.8]** and **Framework DEMP [EN010152/APP/7.9]** secured through the DCO and are therefore factored into the determination of significant effects.

8.10.4 A summary of the avoidance and mitigation measures embedded into the Scheme to minimise construction impacts on biodiversity are presented below.

Design and Construction

Scheme Design

8.10.5 The Scheme design (as presented in **ES Volume II Figure 2-3: Indicative Site Layout Plan [EN010152/APP/6.2]**) avoids all sites statutorily designated for their biodiversity value and avoids or seeks to minimise impacts on sites that are non-statutorily designated for their biodiversity value. With the retention of LWS within the Order limits the Scheme also offers the opportunity for enhancement. Measures embedded within the Scheme design ensure that designated sites are not adversely impacted during construction, operation and maintenance, or decommissioning e.g. through siting construction routes away from designated sites, incorporating suitable buffer zones and erection of temporary construction fencing to avoid incursion into exclusion zones.

Habitat Avoidance Measures

8.10.6 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, with practicable:

a. All woodland – at least 15 m;

b. All trees within hedgerows, lines of trees and individual trees – protected by clearly defined root protection areas, concordant with the requirements for each individual tree, in line with British Standard BS 5837: Trees in relation to design, demolition and construction – Recommendations (Ref. 8-71) and detailed in **ES Volume III Appendix 10-7: AIA [EN010152/APP/6.3]**;

c. Watercourses (where practicable and open trenching is not required during construction) – at least 10 m from the bank-top of the watercourse to protect riparian habitats and to mitigate for potential hazards such as chemical and soils spills into watercourses and avoid potential direct impacts to watercourses and any protected species that may use them. This will be achieved using Horizontal Directional Drilling (HDD);

d. Standing water – at least 20 m; and

e. Hedgerows (without trees) – where practicable, at least 5 m.

8.10.7 Measures to ensure the sustainable management of the soil resources which are disturbed by the Scheme (and their associated seedbanks) and which support the habitats within the Order limits will be based upon standard industry good practice measures such as those in Defra's Code of Practice (Ref. 8-74) ensuring that stored soils retain their quality and function. Additionally soils of different types or supporting different habitats will be stored separately and replaced in the area they were taken from so that the incorporated seedbank is not lost. These measures are set out in the **Framework Soil Management Plan (SMP) [EN010152/APP/7.10]**.

Framework Construction Environmental Management Plan

8.10.8 The **Framework CEMP [EN010152/APP/7.7]**, includes measures to manage the environmental effects during construction and to demonstrate compliance with environmental legislation. Accordingly, the **Framework CEMP [EN010152/APP/7.7]** details the measures required to mitigate any construction related effects on biodiversity, including those associated with dust deposition, air pollution, pollution incidents, water quality, light, noise and vibration. Implementation of the measures set out in the Framework CEMP are secured by Requirement of the DCO, which requires that the detailed CEMP be prepared in substantial accordance with the Framework CEMP.

8.10.9 The **Framework OEMP [EN010152/APP/7.8]** and **Framework DEMP [EN010152/APP/7.9]**, include measures to manage the environmental effects of the Scheme and to demonstrate compliance with environmental legislation. Accordingly, the **Framework OEMP [EN010152/APP/7.8]** details the measures required to mitigate any operation and maintenance phase related effects on biodiversity and the **Framework DEMP [EN010152/APP/7.9]** details the measures required to mitigate any decommissioning phase related effects on biodiversity. These effects include those associated with dust deposition, air pollution, pollution incidents, water quality, light, noise and vibration. Implementation of the measures set out in the Framework OEMP and Framework DEMP are secured by Requirement of the DCO, which requires that the detailed OEMP and DEMP be prepared in substantial accordance with the Framework plans.

Vegetation Clearance

8.10.10 Vegetation clearance will be undertaken in advance of construction and at an appropriate time of year (dependant on habitat) to avoid the nesting bird period (March-August inclusive) and incidental injuring or killing of animals, such as Brown Hare, hedgehogs or reptiles.

8.10.11 Post-construction, any temporary habitat loss across the Order limits (i.e. where there are temporary construction compounds) will be restored, where required. Where vegetation clearance cannot avoid the inactive season and is proposed within the nesting bird period, these will be checked for the presence of any nests by a suitably experienced 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 with the potential to support reptiles will be cut in a phased approach, firstly cutting to 30 centimetres (cm), then, following a period of no less than 24 hours, to 15 cm and then to ground level, after another 24 hours. Any habitat features within such areas which may conceal sheltering reptiles and amphibians (e.g. log piles rubble mound bunds, any other debris) will not be dismantled during their inactive season (i.e. November to February inclusive).

8.10.12 Checks for nesting birds listed under Schedule 1 of the WCA 1981 (as amended) (Ref. 8-1), especially barn owl will be undertaken prior to construction (including the appropriate season prior to for monitoring purposes, and immediately prior to for vegetation clearance) and will be carried out where the Order limits intersects or passes close to suitable

breeding habitats or known breeding locations for these species. If nesting Schedule 1 birds are found, a suitably qualified ornithologist will be consulted to advise whether a temporary no disturbance buffer around the nest is required to avoid disturbance to Schedule 1 breeding species, the size of which will be determined by the species, stage of nesting and construction activity proposed.

Security Perimeter Fencing

8.10.13 A permanent perimeter fence will be implemented early in the construction phase to secure the Solar PV Site and prevent construction activity in proximity to peripheral habitats and retained habitats within the Order limits. The fence design will include gaps or suitable gates to allow mammals that may use woodland or scrub habitats, including Badger, Brown Hare, and Hedgehog, to pass underneath at strategic locations and this fence will be maintained during operation and maintenance of the Scheme. 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.

8.10.14 Temporary heras-style fencing (which does not impede the movement of small mammals) will be used to demarcate the working width of the Grid Connection Corridor. This fencing will also prevent construction activity in proximity to retained vegetation, in particular HaPI and designated sites (e.g. LWS) within and adjacent to the Order limits.

Construction Lighting

8.10.15 During construction, works will be restricted to daylight hours wherever practicable to remove the need for artificial lighting, with focussed task specific lighting provided where this is not possible e.g. HDD drilling operations, unless directed by authorities or areas requiring road closures. Within construction compounds and at welfare areas, Passive Infra-Red (PIR) controlled lights (motion sensors) will be used outside of core working hours. Task specific and fixed general lighting may be required in winter periods due to reduced daylight hours (early mornings and up to 19:00 for general workforce) to meet safety requirements. Additionally, lighting would be used by the security teams during their regular checks and emergency visits if an alert is triggered. Outside of core working hours PIR controlled lights (motion sensors) will be used at construction compounds and at welfare areas. The CCTV will also use Infrared (IR) lighting to provide night vision functionality meaning that no visible lighting will be needed for the security system. Further details on lighting design are found in **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**.

8.10.16 Where lighting is required, it will conform to good practice guidelines (Ref. 8-75) with respect to minimising light spill into adjacent habitats and prevent disturbance to bats, fish, and other species, in so far as it is reasonably practicable. With reference to **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**, the following such measures will be taken:

a. Lights installed will be of the minimum brightness and/or power rating capable of performing the desired function;

b. Light fittings will be used that reduce the amount of light emitted above the horizontal (reduce upward lighting);

c. Light fittings will be positioned correctly, inward facing and directed downwards;

d. Direction of lights will seek to avoid spillage onto neighbouring properties, habitats, highway, or waterway; and

e. PIR controlled lights (motion sensors) will be used except where temporary focussed task specific lighting is required.

Works Adjacent to Watercourses and Watercourse Crossing

8.10.17 During the construction of the Grid Connection Cables, Moss Road and London Hill Drain, Moss Little Common Drain, Hawkhouse Green Dike, Mill Dike, Wrancarr Drain, Engine Dike and Thorpe Marsh Drain will be crossed using underground trenchless crossing (e.g. HDD) techniques that would not disturb the watercourses. All cables will be installed a minimum of 1.5 m below the bed of watercourses, except for Thorpe Marsh Drain, Engine Dike, Wrancarr Drain, and Mill Dike due to connectivity to the River Don where the minimum installation depth would be 5.0 m below the riverbed within the Grid Connection Corridor.

8.10.18 Where watercourses/ditches are crossed by cabling works and open cut techniques are required, habitats that are temporarily lost will be reinstated after installation.

8.10.19 The installation of new culverts will be avoided. Where small watercourses/ditches (not Main Rivers) are crossed for access (either temporarily during construction or permanently during operation and maintenance), new crossings will be clear-span and wide enough to avoid the loss of in-channel habitats.

8.10.20 No works will be undertaken within at least 10 m of the bank top of watercourses, which is considered sufficient to avoid potential hazards such as chemical and soil spills into watercourses and avoid potential direct impacts to the river and species using them. The **Framework CEMP [EN010152/APP/7.7]** specifies requirements for the safe storage of chemicals/other hazardous materials (e.g. fuel) to prevent them reaching watercourses during flood events during construction.

8.10.21 A full list of detailed crossing methods and an explanation of these techniques is provided in **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**

Drainage Strategy

8.10.22 **ES Volume III Appendix 9-4: Framework Drainage Strategy** 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. The Framework Drainage Strategy only considers the land within the Solar PV Site and relates to handling surface water generated by new impermeable areas within this part of the Order limits (the BESS Area and On-Site Substation). The proposed attenuation strategy for the BESS Area consists of gravel-filled attenuation basins that

discharge into a swale. The swale discharges into a local watercourse. The proposed attenuation strategy for the On-Site Substation consists of a filter drain that connects to an attenuation basin. The attenuation basin then discharges to a local drain via a pipe network.

8.10.23 There are strict obligations under the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 Ref. 8-76)) and the Environmental Permitting (England and Wales) Regulations 2016 (Ref. 8-77)), to prevent the pollution of watercourses. Construction site runoff is minimised through a range of measures secured in the **Framework CEMP [EN010152/APP/7.7]**. Furthermore, temporary SuDS measures will be deployed to reduce runoff rates. The SuDS measures will protect the water environment from pollution impacts, there is a statutory obligation for construction projects to consider water quality impacts.

Wildlife Legislation Compliance

8.10.24 To comply with relevant wildlife legislation, pre-construction surveys, such as updated UKHab and badger walkovers, and bat roost assessments of trees to be lost, 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. 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 measures are incorporated within the **Framework CEMP [EN010152/APP/7.7]**. In the event that any future infestations of INNS 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.

8.10.25 There is currently no requirement for any protected species licenses (other than the DLL previously discussed), as the Scheme has committed to avoiding all features known to support protected species. However, if species distributions within the Order limits change, and impacts are unavoidable, then the appropriate licenses from Natural England will be applied for and obtained in preparation of construction.

8.10.26 During construction and operation and maintenance, Reasonable Avoidance Measures (RAMs), including appropriate buffers (up to 30 m) around any identified active badger setts, or retained trees with bat roost suitability (buffer of 15m) throughout the Order limits will be implemented.

8.10.27 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 from becoming trapped in excavations.

8.10.28 Details of how the Scheme design’s embedded avoidance and mitigation measures interact with important ecological features are presented in Table 8-11.

Table 8-10: Embedded Avoidance and Mitigation Measures

Baseline details	Embedded avoidance and mitigation
Designated Sites	
Statutory designated sites (listed in Table 8-6)	**Scheme design:** The Scheme design avoids any direct impacts on all of the statutory designated sites. The closest statutory designated site is Shirley Pool SSSI which is approximately 900 m south of the Order limits (this being the section of highway at the junction of the A19 and Station Road in the town of Askern) and 3.0 km west of the Grid Connection Corridor. The Humber Estuary SAC/Ramsar site is approximately 14.2 km northeast of the Solar PV site, but has potential hydrological connections via the River Went and minor watercourses connecting through the River Don and Dutch River. Therefore, the presence of Sea and River Lamprey in watercourses within the Order limits is possible. The River Went is on the northern boundary of the Order limits and is not subject to any crossing, with the wider river corridor retained within a buffer from the Solar PV Site. As such, direct and indirect impacts to this potential connection are avoided. **Construction:** As set out within the **Framework Construction Traffic Management Plan (CTMP) [EN010152/APP/7.17]**, there are no routes for construction traffic that pass within 200m of the SSSI (or other SSSIs beyond 2 km), thus avoiding any potential degradation to sensitive habitats from vehicle pollutants. In addition, the Scheme will implement standard environmental protection measures during construction, such as dust suppression and pollution prevention, to ensure no indirect impacts occur. These measures are set out in the **Framework CEMP [EN010152/APP/7.7]**, and their implementation is secured by a Requirement of the **Draft DCO [EN010152/APP/3.1]** that the detailed CEMP be prepared in substantial accordance with the **Framework CEMP [EN010152/APP/7.7]** and then the measures contained therein implemented. Accordingly, the **Framework CEMP [EN010152/APP/7.7]** details the measures required to mitigate any construction related effects on this SSSI (and any species using the SSSI), including those associated with dust deposition, air pollution, pollution incidents, water quality, light, noise and vibration. Furthermore, the **Framework CEMP [EN010152/APP/7.7]** specifies requirements for the safe storage of chemicals/other hazardous materials (e.g. fuel), to prevent them reaching standing and running waters through flood events during construction. It will ensure that those involved

Baseline details	Embedded avoidance and mitigation
	with the construction phases are committed to agreed best practice and meet all relevant environmental legislation including the Hazardous Waste (England and Wales) Regulations 2005. 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 **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**. The crossing of Moss Road and London Hill Drain, Moss Little Common Drain, Hawkhouse Green Dike, Mill Dike, Wrancarr Drain, Engine Dike and Thorpe Marsh Drain will be undertaken using HDD methods to lay cabling, therefore avoiding direct impacts to these watercourses and migratory fish species associated with the Humber Estuary SAC/Ramsar site. In addition, the working areas (including construction compounds) will be at least 10 m from the bank tops, which is considered sufficient to mitigate for potential hazards (such as chemical and soils spills into these watercourses). A site-specific hydraulic fracture risk assessment would be developed prior to construction following further investigation of specific ground conditions at the crossing locations, and appropriate mitigation developed in line with best construction practice. This would be secured via the **Framework CEMP [EN010152/APP/7.7]**. This also includes mitigation in the case of bentonite leakage into the watercourse.
Went Valley (Part) LWS	**Scheme design:** The Scheme has been designed to avoid impacts on the LWS, with the LWS retained within the northern part of the Order limits. **Construction:** A security perimeter fence will be implemented early in the construction phase to secure the Order limits and prevent construction activity from intruding into the LWS. The implementation of standard environmental protection measures during construction, such as dust suppression and pollution prevention, will be adopted to ensure no indirect impacts occur and these measures have been set out in the **Framework CEMP [EN010152/APP/7.7]**, and their implementation secured by a Requirement of the **Draft DCO [EN010152/APP/3.1]** that the detailed CEMP be prepared in substantial accordance with the **Framework CEMP [EN010152/APP/7.7]** and then the measures contained therein implemented. Accordingly, the **Framework CEMP [EN010152/APP/7.7]** details the measures required to mitigate any construction related effects on the LWS (and species using them), including those associated with dust deposition, air pollution, pollution incidents, water quality, light, noise and vibration. Furthermore, the **Framework CEMP [EN010152/APP/7.7]** specifies requirements for the safe storage of chemicals/other hazardous materials

Baseline details	Embedded avoidance and mitigation
	(e.g. fuel), to prevent them reaching standing and running waters through flood events during construction (see also **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**). It will ensure that those involved with the construction phases are committed to agreed best practice and meet all relevant environmental legislation including the Hazardous Waste (England and Wales) Regulations 2005.
Wrancarr Drain and Braithwaite Delves LWS, Trumfleet Pit LWS and Trumfleet Pond LWS	**Scheme design:** Wrancarr Drain and Braithwaite Delves LWS, Trumfleet Pit LWS and Trumfleet Pond LWS will be crossed by the Grid Connection Cables. In line with the **Works Plans [EN010152/APP/2.2],** the Scheme has been designed to ensure that these LWS will be retained, and measures taken to avoid direct or indirect impacts. **Construction** (as set out within the **Framework CEMP [EN010152/APP/7.7]**)**:** A security perimeter fence will be implemented early in the construction phase to secure the Order limits and prevent construction activity from intruded into the LWS. Setbacks of at least 10m from watercourses (taken from the bank-top of the watercourse) are included within the Scheme design to protect riparian habitats and to mitigate for potential hazards such as chemical and soils spills into watercourses. This will protect the watercourse and avoid potential direct impacts to watercourses and any protected species using them (see also riparian mammals). Construction methods across Wrancarr Drain which makes up part of Wrancarr Drain and Braithwaite Delves LWS, will utilise trenchless HDD. There is no potential for any direct impacts on these LWS along the Cable Route Corridor (see **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**). Methods such as HDD, boring, micro-tunnelling or impact moling are all trenchless methods that would not directly impact upon running water habitats of these LWS, although the exact route and construction methods to be used are yet to be defined. The implementation of standard environmental protection measures during construction, such as dust suppression and pollution prevention, will be adopted to ensure no indirect impacts occur and these measures have been set out in the **Framework CEMP [EN010152/APP/7.7]**, and their implementation is secured through a Requirement in the **Draft DCO [EN010152/APP/3.1]** that the detailed CEMP be prepared in substantial accordance with the **Framework CEMP [EN010152/APP/7.7]** and then the measures contained therein implemented. Accordingly, the **Framework CEMP [EN010152/APP/7.7]** details the measures required to mitigate any construction related effects on this habitat (and species using them), including those associated with dust deposition, air pollution, pollution incidents, water quality, light, noise and vibration. Furthermore, the **Framework CEMP [EN010152/APP/7.7]** specifies requirements for the safe storage of chemicals/other hazardous materials

Baseline details	Embedded avoidance and mitigation
	(e.g. fuel), to prevent them reaching standing and running waters through flood events during construction (see also **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**). It will ensure that those involved with the construction phases are committed to agreed best practice and meet all relevant environmental legislation including the Hazardous Waste (England and Wales) Regulations 2005. Where lighting is required, it will conform to best practice guidelines with respect to minimising light spill into retained habitats to prevent or reduce the impact on running water habitats and will be minimised to that required for safe site operations and security and directed towards the middle of the Order limits rather than towards the boundaries.
Other LWSs and cLWSs	**Scheme design:** The Scheme design avoids any direct impacts on the remaining 42 non-statutory sites of biodiversity conservation importance present within the 2km Study Area (see Table 8-7). **Construction:** Standard environmental protection measures will be implemented and adopted during construction, formalised through a detailed CEMP (secured through DCO Requirement via the **Framework CEMP [EN010152/APP/7.7]**). These measures will include appropriate pollution prevention.
Habitats	
Woodland (including Priority deciduous woodland, Priority orchard habitat and Ancient Woodland) occurring within, or adjacent to, the Order limits	**Scheme design:** The Scheme location has been selected to avoid Ancient Woodland. There are two areas of Ancient Woodland within the Study Area, these being Bunfold Shaw (approximately 10 m from the Solar PV Site) and Parkshaw Wood, approximately 1.0 km northwest of the Solar PV Site. The Scheme design retains all woodland habitats, but there is some potential incursion to the root protection areas (RPA) of woodland areas due to cabling works. **Construction** (as set out within the **Framework CEMP [EN010152/APP/7.7]**): As detailed in **ES Volume III Appendix 10-7: AIA [EN010152/APP/6.3]**, RPA incursions can be managed so that there will be no detrimental impacts on the health or amenity of retained trees. Retained trees and woodland will be protected, in line with British Standard Recommendations (Ref. 8-73) and undeveloped buffers will be of at least 15 m from the boundary of woodlands and tree lines. Within some of these buffers, natural regeneration of woodland will create additional scrub and woodland habitat.

Baseline details	Embedded avoidance and mitigation
	Other retained trees, outside of woodland habitats and adjacent to construction working areas, will be protected by clearly defined root protection areas, concordant with the requirements for each individual tree, to prevent damage/compaction of roots by plant and other machinery and prevent direct or indirect impacts to trees. 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 and retained habitats within the Order limits. The **Framework CEMP [EN010152/APP/7.7]** includes suitable pollution prevention measures.
Neutral grassland, including Coastal and floodplain grazing marsh Priority habitat	**Scheme design:** The Scheme has been designed to avoid this habitat as far as practicable, which is shown on MAGIC (Ref. 8-40) to be inside the Order limits. However, The UKHab survey recorded the area within Solar PV Site as cereal crops, with a margin of modified grassland, bordered by a species-poor hedgerow with trees and a ditch (dry at the time of the UKHab survey). An area of Priority coastal and floodplain grazing marsh habitat is also shown on the MAGIC website inside the Grid Connection Corridor, adjacent to the River Don along Thorpe Bank. This area was recorded as cereal crops, other neutral grassland and bare ground with ditches and hedgerows within the UKHab survey. Areas mapped on MAGIC as CFGM within the Solar PV Site will be avoided and retained as part of the Scheme design. Although not currently meeting the criteria for this habitat (due to being turned to arable), this area is to be enhanced and managed as neutral grassland (promoting biodiversity characteristics of CFGM) within the Scheme Design. There will be temporary loss/disturbance of a small area of the habitat mapped as CFGM (recorded as grassland and cropland) in the UKHab within the Grid Connection Corridor during the installation of cables. **Construction:** Whilst the Scheme design cannot completely avoid this habitat (along the Grid Connection Corridor), measures to ensure incursion into this habitat outside the working areas 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 [EN010152/APP/7.7]** includes suitable pollution prevention measures.
Hedgerows	**Scheme design:** The Scheme has been designed to ensure hedgerows are outside of the developable areas of the Scheme, with minimum 5m undeveloped stand-off buffers where practicable, increased to 15m where hedgerow trees are present.

Baseline details	Embedded avoidance and mitigation
	Where practicable, the layout of the Scheme will use existing farm tracks and field openings as the preferred routes for construction access, minimising loss of hedgerows (sections of), where practicable. Therefore, the majority of this habitat will be retained, however, some sections of hedgerow will need to be removed to facilitate access and will be temporarily removed to facilitate construction of cable routes. **Construction:** Measures to ensure incursions into this habitat do 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 [EN010152/APP/7.7]** includes suitable pollution prevention measures.
Open Mosaic Habitat on Previously Developed Land Priority Habitat	**Scheme design:** This potential habitat will be impacted during the installation of the cables to the north of the Existing National Grid Thorpe Marsh Substation. The Scheme design has minimised the working area required for the installation of cables (maximum 30m corridor) and once the cables are laid the substrate will be reinstated. **Construction:** Measures to reinstate this habitat are incorporated into the **Framework LEMP [EN010152/APP/7.14].** This includes storing the substrate that is removed appropriately in order to prevent mixing with nutrient-rich soil. The cable trenches will then be infilled with the same substrate. Measures will be taken to protect the surrounding habitat that is not being impacted such as security fencing. The **Framework CEMP [EN010152/APP/7.7]** includes suitable pollution prevention measures.
Running water (including wet ditches)	**Scheme design:** The Scheme incorporates minimum 10m stand-off buffers from watercourses and ditches (10m from the bank top). Some watercourses and ditches will, however, be crossed for cabling and access. **Construction:** 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 **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**. The crossing of Moss Road and London Hill Drain, Moss Little Common Drain, Hawkhouse Green Dike, Mill Dike, Wrancarr Drain, Engine Dike and Thorpe Marsh Drain will be undertaken using HDD methods to lay cabling, therefore avoiding direct impacts to these watercourses. The working areas (including construction compounds)

Baseline details	Embedded avoidance and mitigation
	will be at least 10 m from the bank tops (or further where there are flood defences), which is considered sufficient to mitigate for potential hazards (such as chemical and soils spills into these watercourses) and to avoid potential direct impacts to species which use these watercourses. A site-specific hydraulic fracture risk assessment would be developed prior to construction following further investigation of specific ground conditions at the crossing locations, and appropriate mitigation developed in line with best construction practice. This would be secured via the **Framework CEMP [EN010152/APP/7.7]**. This also includes mitigation in the case of bentonite leakage into the watercourse. The working widths will be kept to a minimum where cables are laid using open cut methods to limit temporary habitat loss. It is assumed that where open-cut crossings are required that water flow would be maintained by damming and over pumping or fluming. Works will be carried out in the drier months where practicable as this would reduce the risk of pollution propagating downstream, particularly in the case of ephemeral watercourses. The watercourses will be reinstated as found and water quality monitoring will be undertaken prior to, during and following on from the construction activity. Monitoring of the vegetation re-establishment of the banks will also be undertaken. A Method Statement would be developed to ensure works within watercourse crossings include suitable measures to allow the continued passage of fish and riparian mammals throughout construction (i.e. during fluctuating water levels). The **Framework CEMP [EN010152/APP/7.7]** specifies requirements for the safe storage of chemicals and other hazardous materials (e.g. fuel) reducing the risk of them reaching watercourses during flood events during construction. A full list of crossing methods and an explanation of these techniques is provided in **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**. It also specifies that the design of the Scheme will comply with industry good practice and environmental protection legislation during both construction (and operation and maintenance), e.g. prevention of surface and ground water pollution, fugitive dust management, noise prevention or amelioration through measures such as watercourse inspections, vehicle wheel washing, use of sediment traps, water quality monitoring, and the prevention of sediment plumes during open-cut crossings. These measures are considered sufficient to mitigate for potential hazards such as chemical and soils spills to avoid potential direct impacts to watercourses and any protected or notable species that use them.

Baseline details	Embedded avoidance and mitigation
Trees, including veteran and ancient trees	**Scheme design:** The Scheme has been designed to ensure that all veteran and ancient trees will be retained. The majority of trees which are not classed as veteran or ancient will be retained and buffered, and measures taken to avoid direct or indirect impacts. As detailed in **ES Volume III Appendix 10-7: AIA [EN010152/APP/6.3]**, two individual trees, four groups of trees and 32 hedgerows have the potential to be removed, or part removed (in the case of hedgerows) to facilitate the Scheme (as shown in **ES Volume III Appendix 10-7: AIA [EN010152/APP/6.3]**). The iterative design process during the development of the Scheme has been undertaken to avoid or minimise impacts to trees where practicable. Where practicable the detailed design (post-consent) will be further developed to avoid or minimise impacts to trees and in practice this is likely to reduce the level of arboricultural impacts reported. The final level of arboricultural impacts will be confirmed as part of an Arboricultural Method Statement as part of the detailed CEMP secured as a requirement of the **Draft DCO [EN010152/APP/3.1]**. This is a commitment in the **Framework CEMP [EN010152/APP/7.7]**. **Construction:** As detailed in **ES Volume III Appendix 10-7: AIA [EN010152/APP/6.3]**, 17 features are subject to an incursion into their Root Protection Area (RPA) or canopy spread. This is generally limited to temporary construction facilitation and access. This includes two veteran trees. In all cases RPA incursions will be managed so that there will be no detrimental impacts on the health or amenity of retained trees. Twenty-seven tree features have been identified as likely to require pruning to facilitate access, working space and visibility requirements. Proposed pruning will not significantly impact on the health or amenity of affected trees and will help to prevent any inadvertent damage during construction and where necessary, provide a framework for future management during operation. The final requirement for pruning will be reviewed and identified at the detailed design stage and will be confirmed in an Arboricultural Method Statement as part of the CEMP secured as a requirement of the **Draft DCO [EN010152/APP/3.1]**. This is a commitment in the **Framework CEMP [EN010152/APP/7.7]**. Tree loss will be mitigated with a robust and high-quality scheme of new tree planting as detailed in the **Framework LEMP [EN010152/APP/7.14].** Measures to protect retained trees and their associated root protection zones will be put in place (e.g. fencing), which will be implemented at an early stage to protect these features from impacts during construction, as detailed in **ES Volume III Appendix 10-7: AIA [EN010152/APP/6.3]**.

Baseline details	Embedded avoidance and mitigation
	The **Framework CEMP [EN010152/APP/7.7]** includes suitable pollution prevention measures.
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, watercourse/ditch margins, scrub and hedgerows within the Solar PV Site. However, some loss (albeit mostly temporary) cannot be avoided. Habitat loss within the Grid Connection Corridor will be temporary. **Construction:** Whilst the Scheme design retains habitats of greater terrestrial invertebrate interest, measures to ensure incursion into retained 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 [EN010152/APP/7.7]** includes suitable pollution prevention measures to protect retained habitat.
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. Where practicable, culverts extensions and any improved structure will be set 150mm (millimetres) below bed level to allow sedimentation and a naturalised bed to form, which will maintain longitudinal connectivity for aquatic fauna. Where a new drainage ditch crossing is required, an open span bridge crossing will be used, with the specific type of crossing selected being determined based on site specific factors and in consultation with the relevant authority (generally the Internal Drainage Board (IDB) or Lead Local Flood Authority (LLFA) for the Solar PV Site). This will also ensure that connectivity is maintained along the watercourses. Where watercourses and ditches are crossed by open-cut techniques, impacts will be minimised by restricting the width of crossing where practicable. Habitats will be reinstated upon completion of the works, and allowed to re-

Baseline details	Embedded avoidance and mitigation
	vegetate naturally after which macroinvertebrates would re-colonise from adjacent habitats within two years. 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. The **Framework CEMP [EN010152/APP/7.7]** specifies requirements for the safe storage of chemicals and other hazardous materials (e.g. fuel) to reduce the potential of them reaching watercourses during flood events during construction. A full list of crossing methods and an explanation of these techniques is provided in **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1].**
Fish	**Scheme design:** Mill Dike, Wrancarr Drain, Engine Dike and Thorpe Marsh Drain will be crossed using non-open cut techniques, such as HDD. **Construction:** A hierarchy of mitigation measures for HDD activities will ensure that where required, HDD activity noise effects (disturbance to species and habitats) will be reduced as far as reasonably practicable. This hierarchy includes (but is not limited to) the potential for the use of lower noise and vibration techniques. The core fish migration season of September to February, and May, will be avoided for HDD beneath the above watercourses, unless the depth of the HDD is confirmed to be of a sufficient minimum distance of approximately 5m below the riverbed to avoid noise and vibration effects. All cables will be installed a minimum of 1.5m below the bed of watercourses. Where watercourses and ditches are culverted, culverts will be designed to allow continued connectivity and fish passage along the watercourse. Where practicable, culverts extensions and any improved structure will be set 150mm below bed level to allow sedimentation and a naturalised bed to form, which will maintain longitudinal connectivity for fish, with no drop inlets or outlets. 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.
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 PV Site. The Scheme design, therefore, ensures that

Baseline details	Embedded avoidance and mitigation
	notable farmland bird species that are reliant on such habitats, including species such as, yellowhammer, linnet, and reed bunting, are not impacted upon by the Scheme. **Construction:** The **Framework CEMP [EN010152/APP/7.7]** 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 development will cease in these areas until the young birds have fledged and/or the nesting attempt has ceased.
Breeding birds – assemblage of breeding birds, including territories of ground-nesting birds, such as skylark, and other farmland bird species, within the Solar PV Site	**Scheme design:** The majority of habitats of value to the breeding farmland bird assemblage (such as scrub, hedgerows and field margins) will be retained and avoided as part of the Scheme design. Within the Solar PV Site, areas of undeveloped land have been included within the Scheme to provide permanent habitat for ground-nesting birds such as skylark. These areas will be managed as grassland to provide permanent habitat for other ground-nesting bird species, such as curlew and lapwing, both of which were recorded within the Solar PV Site during surveys for breeding birds, although curlew wasn't observed to be nesting within the Order limits. **Construction:** The **Framework CEMP [EN010152/APP/7.7]** specifies requirements for pre-commencement surveys to be undertaken to determine the presence of breeding bird species, including 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, particularly to any Schedule 1 breeding species.
Non-breeding birds - Assemblage of non-breeding farmland birds	**Scheme design:** The majority of habitats of value to the non-breeding farmland bird assemblage (such as scrub, hedgerows and field margins) will be retained and avoided as part of the Scheme design. Furthermore, areas of created and enhanced grassland will be of benefit to species reliant on such habitats, such as skylark. Additionally, an area of habitat enhancement in through the central portion of Solar PV Site will be left free of panels and other infrastructure as part of the Scheme design, and will provide permanent grassland and seed rich habitat for birds

Baseline details	Embedded avoidance and mitigation
	that prefer such habitats during the non-breeding season. These areas have been included within the Indicative Landscape Masterplan (as presented in the **Framework LEMP [EN010152/APP/7.14]**). **Construction:** Measures to ensure incursion into retained habitats does not occur, will be put in place at an early stage in the construction phase (e.g. security fencing). The **Framework CEMP [EN010152/APP/7.7]** includes suitable pollution prevention measures.
Non-breeding birds - Assemblage of non-breeding waterbirds	**Scheme design:** Habitats of value to non-breeding waterbirds, i.e. those associated with the River Went will be retained and avoided as part of the Scheme design. Furthermore, the creation of scrapes within the Order limits along the River Went corridor will enhance the habitat currently available, increasing the area of seasonal standing water and habitat diversity. These areas have been included within the Indicative Landscape Masterplan (as presented in the **Framework LEMP [EN010152/APP/7.14]**). In addition, the developable areas, i.e. those proposed for solar PV, are set back from the River Went corridor and screened in the majority of instances, by existing vegetation, i.e. hedgerows and trees. **Construction:** Measures to ensure incursion into retained habitats does not occur, will be put in place at an early stage in the construction phase, (e.g. security fencing). The **Framework CEMP [EN010152/APP/7.7]** includes suitable pollution prevention measures.
Bats	**Scheme design:** The Scheme design retains and avoids the majority of habitats of value to bats, including woodland, scrub, grassland margins and hedgerows. Some tree and hedgerow removal will be required to facilitate construction of the Scheme, as detailed in **ES Volume III Appendix 10-7: AIA [EN010152/APP/6.3]**. Surveys have informed the Scheme's design, along with offset buffers, to avoid direct and indirect effects upon potential roost sites (and avoidance of trees and woodland with higher ecological value irrespective of bats which should be avoided). **Construction:**

Baseline details	Embedded avoidance and mitigation
	Whilst the Scheme design retains the majority of 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 [EN010152/APP/7.7]** specifies requirements for the protection and retention of trees and hedgerows, along with other foraging habitats for bats such as ponds and watercourses. During construction, works will be restricted to daylight hours wherever practicable to remove the need for artificial lighting, with focussed task specific lighting provided where this is not practicable (e.g. HDD drilling operations). Where lighting is required, it will conform to best practice guidelines with respect to minimising light spill into adjacent habitats and prevent disturbance to bats and other species. Trees classified as 'FAR' and 'PRF' have and will continue to be avoided through the Scheme. Where it is not practicable to retain trees with bat roost suitability, further surveys will be completed as necessary, which may identify the need for additional mitigation. Pre-construction bat roost appraisal surveys will be undertaken to support the baseline survey findings where tree removal or reduction/pruning cannot be avoided. The purpose of the pre-construction surveys is to ensure mitigation during the construction phase is based on the latest protected species information. Should additional trees with moderate or high bat roost suitability be identified for removal or reduction, further surveys (i.e. dusk emergence survey and/or tree climb and inspection) will be undertaken as necessary, which may identify the requirement for additional mitigation and/or a Natural England mitigation licence, where impacts to roosting bats cannot be avoided. Where further surveys are necessary, and for the subsequent requirements and mitigation re loss of or disturbance to trees, the relevant guidance at the time would need to be followed where relevant, which may differ from that in place when previous surveys were conducted.
Otter and Water vole	**Scheme design:** The Scheme incorporates minimum 10m stand-off buffers from watercourses/ditches (bank top). Some wet ditches will, however, be crossed for cabling and access purposes. An otter holt was identified on the River Went, which is located c.60m from proposed impacts through construction. **Construction:** Engine Dike and Thorpe Marsh Drain were noted as having suitable habitat for water vole and presence of feeding stations, though no definitive evidence was identified. The crossing of the Moss Road and London Hill Drain, Moss Little Common Drain, Hawkhouse Green Dike, Mill Dike, Wrancarr Drain, Engine Dike and Thorpe

Baseline details	Embedded avoidance and mitigation
	Marsh Drain will be undertaken using HDD methods to avoid direct impacts to these waterbodies, including their associated riparian habitats. Set-backs of a minimum of 10m from the bank tops of these waterbodies is considered sufficient to mitigate for potential hazards, such as chemical and soils spills and direct impacts to water vole. This shall also be undertaken under ECoW to further minimise risks. As detailed in Paragraphs 8.10.15 to 8.10.16 during construction, works will be restricted to daylight hours wherever practicable to remove the need for artificial lighting, with focussed task specific lighting provided where this is not practicable (e.g. HDD drilling operations). Where lighting is required, it will conform to best practice guidelines with respect to minimising light spill into adjacent habitats and prevent disturbance to otter and other species using the watercourses. The **Framework CEMP [EN010152/APP/7.7]** specifies requirements for the safe storage of chemicals and 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 **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**. Where practicable, culverts extensions and any improved structure will be set 150 mm below bed level to allow sedimentation and a naturalised bed to form, which will maintain longitudinal connectivity for aquatic fauna. Where a new drainage ditch crossing is required, an open span bridge crossing will be used, with the specific type of crossing selected being determined based on site specific factors and in consultation with the relevant authority (generally the IDB or LLFA for the Solar PV Site). This will also ensure that connectivity is maintained along the watercourses. 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, mitigation measures (such as non-intrusive crossing for cabling) will be updated accordingly and the relevant Natural England protected species licence application would be applied for if disturbance was unavoidable.
Badger	**Scheme design:** The Scheme can be designed during detailed design stage, to avoid badger setts within the Order limits. All known setts within the Order limits will have an appropriate exclusion zone of up to 30m around the sett to prevent disturbance and accidental damage. The Grid Connection Corridor is sufficiently wide that the final route

Baseline details	Embedded avoidance and mitigation
	for the cable laying can be micro-sited to avoid any Badger setts, including a 30m exclusion zone around setts. Buffers are secured in the **Framework CEMP [EN010152/APP/7.7].** With reference to **ES Volume III Appendix 8-4: Badger Report (Confidential) [EN010152/APP/6.3]** an outlier sett is currently shown as having intrusion of developable parts of the scheme (e.g., security fencing and proposed internal access track) in to the 30m buffer zone, this is due to this outlier sett only being discovered (freshly dug) once the indicative design had been fixed for the submission documentation. However, there is sufficient flexibility in the scheme design to avoid impacts on this outlier sett (should it still be active prior to construction commencing); as there is to avoid impacts on all other known setts, and at detailed design post-consent, all currently known setts shown on Figures 8-4-1 and 8-4-2 (Annex A) will be suitably buffered to avoid impacts. The commitment to avoid impacts on Badger setts are set out in the **Framework CEMP [EN010152/APP/7.7].** Implementation of the measures set out in the Framework CEMP are secured by Requirement of the DCO, which requires that the detailed CEMP be prepared in substantial accordance with the Framework CEMP. **Construction:** 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, mitigation measures will be updated accordingly and a Natural England protected species licence application would be applied for if disturbance was unavoidable. Implementation of measures to avoid animals being injured or killed within construction working areas, through excluding them from such areas and preventing them from becoming trapped in excavations. If excavations are required to be left open overnight, ramps will be provided to allow animals a means of escape.
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 PV Site. **Construction:** Vegetation clearance throughout the Order limits and, in areas of suitable reptile habitat, will be undertaken in advance of construction and at an appropriate time of year to avoid incidental injuring or killing of reptiles, concordant with the requirements for other species, such as nesting birds and brown hare. Works impacting suitable reptile habitat will be undertaken under RAMs and these measures have been formalised into the

Baseline details	Embedded avoidance and mitigation
	Framework CEMP [EN010152/APP/7.7]. RAMs will include ecological watching briefs and staged habitat manipulation. Any habitat features which may conceal hibernating reptiles (e.g. log piles, rubble mound bunds, any other debris) will not be dismantled during winter months (i.e. between November and February) and will be conducted during the reptile 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 reptiles. If reptiles are discovered when habitat features are dismantled during the appropriate time of year they will be moved outside of the working area into suitable habitat by the overseeing ecologist if they are at risk of harm. Whilst the design of the Solar PV Site retains the majority of 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 [EN010152/APP/7.7]** includes suitable pollution prevention measures which will protect retained habitat.
Other mammals (brown hare, harvest mouse, hedgehog) and common amphibians	**Scheme design:** The Scheme design retains and avoids the majority of habitats of value to other mammals and amphibians, including woodland, grassland margins, ponds, ditches, scrub and hedgerows within the Solar PV Site. **Construction:** Vegetation clearance will be undertaken in advance of construction and at an appropriate time of year to avoid incidental injuring or killing of animals, including brown hare and common toad and concordant with the requirements for other species, such as nesting birds and reptiles. The RAMs outlined above that will be applied to avoid incidental injury or killing of reptiles are also suitable to protect common amphibian species and notable mammals which may be present. Implementation of measures to avoid animals being injured or killed within construction working areas, through excluding them from such areas (other mammals) and preventing them from becoming trapped in excavations. If excavations are required to be left open overnight, ramps will be provided to allow animals a means of escape.

Operation and Maintenance

8.10.29 The general principles to be followed during operation and maintenance of the Scheme to minimise impacts are presented below. These are formalised through the **Framework OEMP [EN010152/APP/7.8]** which will be secured through the DCO.

8.10.30 During operation and maintenance of the Scheme, there is no requirement for artificial lighting in areas of solar PV other than during temporary periods of maintenance/repair. All routine maintenance activities, except Solar PV Panel cleaning (expected to be conducted once every two years), will be scheduled for daylight hours as far as is practicable and therefore it is anticipated that focussed task specific lighting should only be required in the event of emergency works/equipment failure requiring night-time working or Solar PV Panel cleaning. The Solar PV Panels would be cleaned at night when they are cool. Solar PV Panel cleaning would be lit by tractor mounted lighting which is similar to night-time arable harvesting which is currently undertaken within the Order limits. It is therefore anticipated that focussed task specific lighting should only be required in the event of emergency works/equipment failure requiring night-time working or Solar PV Panel cleaning. Where lighting is required during operation and maintenance, it will conform to good practice guidelines with respect to minimising light spill into adjacent habitats and prevent disturbance to bats and other species.

8.10.31 Outside of core working hours PIR controlled lights (motion sensors) will be used. Any compounds for the On-Site Substation will have inward facing PIR controlled security lighting installed at each corner of the compound. Field Station Units and the control buildings for the On-Site Substation will likely require some internal lighting (to be manually activated when needed), but light spillage would be minimal (through doorways when open). Further details on lighting design are found in **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1].**

8.10.32 The Scheme's Surface Water Drainage Strategy (as presented in **ES Volume III Appendix 9-4: Framework Drainage Strategy [EN010152/APP/6.3]** includes measures to manage surface water runoff during operation and maintenance 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. A detailed Surface Water Drainage Strategy will be prepared by the contractor post-consent (as secured by DCO Requirement through the Framework Drainage Strategy).

8.10.33 The creation and subsequent management of habitats will seek to maximise floristic diversity, which will require low density and short frequency, sheep grazing (conservation grazing) or an appropriate, sensitive mowing regime. Further details on grazing are found in **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]** and **ES Volume III Appendix 2-1: Grazing Feasibility Study [EN010152/APP/6.3]**.

8.10.34 The security perimeter fence will be set back to the agreed buffer distances from ecological receptors (watercourses, trees, hedgerows etc). There will be a gap at the base of the fencing and the size of the mesh will allow the passage of small mammals. Foxes and badgers typically dig under such

fencing however larger gaps will be created beneath the fence at strategic locations to facilitate access. The perimeter fencing would exclude deer from operational areas, however, they would be able to freely move along the PRoW and areas outside the perimeter fencing.

8.10.35 Any required management of vegetation within the Scheme will be undertaken in accordance with legislative requirements associated with breeding birds e.g. undertaken outside of the bird nesting season (typically March to August inclusive). The management of grassland habitats will be undertaken in a manner that increases biodiversity value, with sensitive management regimes taking into account flora and fauna sensitivities, e.g. nesting birds and the presence of reptiles and amphibians. It is likely that localised management of trees and hedgerows will be required, but again this will be consistent with legislative requirements and the provisions for maximising biodiversity value, and will be undertaken in line with **ES Volume III Appendix 10-7: AIA [EN010152/APP/6.3]** which would feed into the detailed OEMP. This is set out in the **Framework LEMP [EN010152/APP/7.14]**.

8.10.36 A programme of monitoring will be established prior to operation and maintenance to ensure that biodiversity measures are implemented according to plan with necessary remediation.

Decommissioning

8.10.37 The general principles to be followed in the decommissioning of the Scheme will include measures to mitigate likely significant decommissioning related effects on biodiversity. These are formalised through the **Framework DEMP [EN010152/APP/7.9]** and secured through the DCO. Whilst the majority of mitigation measures will be similar to those during construction (as above), monitoring undertaken during the operation and maintenance phase and pre-decommissioning surveys will inform any mitigation and protected species licencing, as required at the time of decommissioning. A detailed DEMP will be prepared and agreed with the relevant authorities at the time of decommissioning, in advance of the commencement of decommissioning works.

8.11 Assessment of Likely Impacts and Effects

8.11.1 The potential for impacts and effects to arise from the construction, operation (including maintenance) and decommissioning phases of the Scheme on the IEFs identified in Table 8-9 are considered in Table 8-12 and Table 8-13. This assessment is based on the parameters set out in the Scheme description, as outlined in **ES Volume I Chapter 3: The Scheme [EN010152/APP/6.1]** and on the embedded mitigation, as described in Section 8.10.

8.11.2 The initial screening for likely impacts and effects, presented in Table 8-11 and Table 8-12 is based on the characterisation of the baseline conditions in the absence of any additional mitigation over and above that which is embedded in the design (see Section 8.10 and Tables 8-10 and 8-11). Table 8-11 and Table 8-12 set out how the Scheme has either already embedded mitigation to remove the potential impact and avoid a potential effect occurring or where a potential impact remains and there is the potential for

an effect to occur. The relevant IEF are then assessed throughout Section 8.12 of this chapter to determine the significance of that effect.

8.11.3 Given, the Scheme has the ability to design, construct, operate and decommission whilst avoiding, retaining and enhancing the majority of habitats within the Order limits of value to biodiversity, this initial screening process is seen as providing a proportionate approach in establishing a focussed assessment, i.e., for the majority of IEFs there are no potential impacts which could result in potential effects and therefore, do not require further assessment.

Sites Statutorily and Non-Statutorily Designated for their Biodiversity Value

8.11.4 The statutory and non-statutory designated sites that have been assessed, based on the baseline data identified during the desk study and field surveys, are presented in Table 8-11. Where there is the potential for an effect to occur on designated sites, this is stated, and the relevant receptor assessed throughout Section8.12 of this chapter to determine the significance of that effect.

Table 8-11: Determination of Potential Impacts and Effects on Important Ecological Features – Designated Sites

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
Thorne Moor SAC (also see the **No Significant Effects Report [EN010152/APP/7.12])**	Very High	**Construction**: This SAC (primary reason for designation being degraded raised bogs, still capable of natural regeneration) is 8 km east of the Solar PV Site and 9.8km east of the Grid Connection Corridor. There are no ecological connections (as there are roads (including the M18) which sever the areas between the Scheme and the SAC) or hydrological links (there are no connecting watercourses, as reviewed from ordnance survey mapping) between this SAC and the Order limits (see also **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**). Natural England in their scoping response agreed that this SAC can be scoped out of the assessment and that there are no direct ecological or hydrological connections. Given the distance between the Order limits and this SAC, there will be no habitat loss within the SAC; no fragmentation of habitats, or of populations of species using habitats and no species mortality of any species associated with Thorne Moor SAC. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of Thorne Moor SAC.	No
		Operation and Maintenance: Given the distance and lack of pathways between the SAC and the Order limits it is not considered there are any impacts arising	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		during operation and maintenance of the Scheme that could affect Thorne Moor SAC.	
		Decommissioning: As with construction, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of Thorne Moor SAC during decommissioning activities.	No
Thorne and Hatfield Moors SPA (also see the **No Significant Effects Report [EN010152/APP/7.12])**	Very High	**Construction**: This SPA (which is designated for breeding Nightjar) is 8 km east of the Solar PV Site and 9.8km east of the Grid Connection Corridor. There are no ecological connections (as there are roads (including the M18) which sever the area between the Scheme and the SPA) or hydrological links (there are no connecting watercourses, as reviewed from ordnance survey mapping) between this SAC and the Order limits (see also **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**). Natural England in their scoping response agreed that this SPA can be scoped out of the assessment and that there are no direct ecological or hydrological connections. Given the distance between the Order limits and this SPA, there will be no direct impacts on habitat within the SPA, no fragmentation of habitats, or of populations of species using habitats and no species mortality of any species associated with Thorne and Hatfield Moors SPA.	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of Thorne and Hatfield Moors SPA.	
		Operation and Maintenance: Given the distance and lack of pathways between Thorne and Hatfield Moors SPA and the Order limits it is not considered that there are any impacts arising during operation and maintenance of the Scheme that could affect Thorne and Hatfield Moors SPA.	No
		Decommissioning: As with construction, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of Thorne and Hatfield Moors SPA during decommissioning activities.	No
Hatfield Moor SAC (also see the **No Significant Effects Report [EN010152/APP/7.12])**	Very High	**Construction**: This SAC (which is designated for its remnant bog and fen peatlands) is 11km southeast of the Solar PV Site 8.5 km east of the Grid Connection Corridor. There are no ecological connections (there are roads (including the M18) and settlements which sever the Scheme and the SAC) or hydrological links (there are no connecting watercourses, as reviewed from ordnance survey mapping) between this SAC and the Order limits (see also **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**). Natural England in its scoping response agreed that this SAC can be scoped out of the assessment and	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		that there are no direct ecological or hydrological connections. Given the distance between the Order limits and this SAC, there will be no direct impacts on habitat within the SAC; no fragmentation of habitats, or of populations of species using habitats and no species mortality of any species associated with Hatfield Moor SAC. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of Hatfield Moor SAC.	
		Operation and Maintenance: Given the distance and lack of pathways between the SAC and the Order limits it is not considered that there are any impacts arising during operation and maintenance of the Scheme that could affect Hatfield Moor SAC.	No
		Decommissioning: As with construction, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of Hatfield Moors SAC during decommissioning activities.	No
Humber Estuary SAC (also see the **No Significant Effects Report [EN010152/APP/7.12])**	Very High	**Construction:** The Humber Estuary SAC is approximately 14.2 km northeast of the Solar PV site but has potential hydrological connections via the River Went and minor watercourses connecting through the River Don and Dutch River. Therefore, the	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		presence of Sea and River Lamprey in watercourses within the Order limits is possible. The River Went is on the northern boundary of the Order limits and is not subject to any crossing, with the wider river corridor retained within a buffer from the Solar PV Site. The main watercourses that have connectivity with the River Don and potential suitably for Lamprey spp. are being crossed by HDD at a minimum 5 m depth. As such, direct and indirect impacts to watercourses with potential to support Lamprey spp. are avoided and therefore, so are any connections to the Humber Estuary SAC. Embedded mitigation measures (see Section 8.10), formalised in the **Framework CEMP [EN010152/APP/7.7]**, will ensure no impact on potentially hydrologically connected watercourses through use of standard environmental protection measures.	
		Operation: Given the distance between the Order Limits and the Humber Estuary SAC there are no direct impacts on the SAC during the operation and maintenance phase. Potential indirect impacts upon qualifying feature species could occur in the form of EMF from buried cables affecting Lamprey spp. in watercourses with potential connectivity to the SAC. However, the 5m buried depth of cables beneath the bed of watercourses with potential to support sensitive fish species, is sufficient to avoid adverse effects. As such no operational impacts are anticipated.	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		Decommissioning: As with construction, there will be no disturbance or direct impact to this SAC, fragmentation of habitats, habitat degradation or species mortality arising from decommissioning activities and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. Measures to remove or reduce impacts during decommissioning are included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO Requirements.	No
Humber Estuary Ramsar site (also see the **No Significant Effects Report [EN010152/APP/7.12])**	Very High	**Construction:** The Humber Estuary Ramsar site is approximately 14.2 km northeast of the Solar PV site, and as such direct impacts upon the site are not deemed likely. There is hydrological connectivity via the River Went and minor watercourses connecting through the River Don and Dutch River. Therefore, the presence of Sea and River Lamprey in watercourses within the Order limits is possible. The River Went is on the northern boundary of the Order limits and is not subject to any crossing, with the wider river corridor retained within a buffer from the Solar PV Site. The main watercourses that have connectivity with the River Don and potential suitably for Lamprey spp. are being crossed by HDD at a minimum 5 m depth. As such, direct and indirect impacts to watercourses with potential to support Lamprey spp. are avoided and therefore, so are any connections to the Humber	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		Estuary Ramsar site. Embedded mitigation measures (see Section 8.10), formalised in the **Framework CEMP [EN010152/APP/7.7].** These mitigation measures will ensure no impact on potentially hydrologically connected watercourses.	
		Operation: Given the distance between the Ramsar site and the Order limits it is not considered that there are any impacts arising during operation and maintenance of the Scheme that could affect Humber Estuary Ramsar site. Potential indirect impacts upon qualifying feature species could occur in the form of EMF from buried cables affecting Lamprey spp. in watercourses with potential connectivity to the Ramsar site. However, the 5m buried depth of cables beneath the bed of watercourses with potential to support sensitive fish species, is sufficient to avoid adverse effects. There are no operational impacts anticipated upon species that have connectivity to the site.	No
		Decommissioning: As with construction, there will be no disturbance or direct impact to this Ramsar site, fragmentation of habitats, habitat degradation or species mortality arising from decommissioning activities and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. Measures to remove or reduce impacts during decommissioning are included within the **Framework**	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		DEMP [EN010152/APP/7.9], secured as part of the DCO Requirements.	
Shirley Pool SSSI	High	**Construction**: At its closest point, Shirley Pool SSSI is approximately 900 m south of the Order limits. This part of the Order limits that is closest to the SSSI (Moss Road, to the east of Askern) is included within the Scheme for temporary works required in the section of highway at Askern to enable access. Shirley Pool SSSI is 3.0 km west of the Grid Connection Corridor and 3.0 km southwest of the Solar PV Site. There are no ecological connections (there are minor roads and settlements between the Scheme and the SSSI) or hydrological links (there are no connecting watercourses, as reviewed from ordnance survey mapping) between this SSSI and any part of the Order limits (see also **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**). As the SSSI is approximately 900 m outside of the Order limits, there will be no direct impacts on habitat within the SSSI; no fragmentation of habitats, or of populations of species using habitats and no species mortality of any species associated with Shirley Pool SSSI. Embedded mitigation measures (see Section 8.10), formalised in the **Framework CEMP [EN010152/APP/7.7]**, will ensure no impact on the integrity or the functioning of Shirley Pool SSSI	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		through use of standard environmental protection measures. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of Shirley Pool SSSI.	
		Operation and Maintenance: Given the distance and lack of pathways between the SSSI and the Order limits it is not considered that there are any impacts arising during operation and maintenance of the Scheme that could affect Shirley Pool SSSI.	No
		Decommissioning: As with construction, there will be no disturbance or direct impact to this SSSI, fragmentation of habitats, habitat degradation or species mortality arising from decommissioning activities and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. Measures to remove or reduce impacts during decommissioning are included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO Requirements.	No
Four non-statutory designated sites within the Order limits	Medium	**Construction**: Four non-statutory designated sites are within the Order limits, these being: Wrancarr Drain and Braithwaite Delves LWS, Trumfleet Pit LWS and Trumfleet Pond LWS, which are all within the Grid Connection Corridor and Went Valley (Part) LWS	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		which is within the Solar PV Site. These LWS are all predominantly designated for their habitats. Went Valley (Part) LWS is within the Solar PV Site (see **ES Volume II Figure 8-2: Sites Non-Statutorily Designated for their Biodiversity Value**), but is avoided and outside of the developable areas of the Scheme and is within the Ecological Mitigation Area, as presented in **ES Volume II Figure 2-3: Indicative Site Layout**. The LWS comprises other neutral grassland and the River Went and will be avoided with a 10m setback between the LWS and the Solar PV Site. Wrancarr Drain and Braithwaite Delves LWS, and Trumfleet Pond LWS are both located within the Grid Connection Corridor. Both of these LWS' comprise watercourses, however, HDD methods are being used to drill beneath and avoid direct impacts upon these sites. There remains a risk of indirect impact through habitat degradation as a result of pollution and dust. In addition, Trumfleet Pit LWS is located adjacent to the Grid Connection Corridor and as such will not be directly impacted but has the potential to be indirectly impacted through dust and noise. Embedded mitigation measures, as presented in Section 8.10, will ensure there is no impact on the integrity or the functioning of LWS (through dust generation, noise or visual disturbance); that no construction related pollution would affect these LWS	

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		and consequently that there will be no species mortality of any species using these LWS. These standard environmental protection measures will be adopted during construction and are formalised in the **Framework CEMP [EN010152/APP/7.7]**.	
		Operation and Maintenance: During operation and maintenance 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 LWS within the Order limits. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of these non-statutory designated sites during operation and maintenance of the Scheme.	No
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. The mode of decommissioning for Grid Connection Cables would be dependent upon government policy and good practice at that time (as presented in **ES Volume I Chapter 2: The Scheme)**. Whilst it is preferred to leave the Grid Connection Cables *in situ*, as this avoids disturbance to overlying land and habitats, the Grid Connection Cables can be removed by opening	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		up the ground at regular intervals and pulling the Grid Connection Cables through to an extraction point, avoiding the need to open up the entire length of the Grid Connection Cables. Therefore, dependent on the decommissioning methods used within the Grid Connection Corridor, it should be possible to avoid siting extraction points within LWSs which will avoid any impact pathways to these sites. Went Valley LWS will be outside of the developed areas of the Solar PV Site, as presented in **ES Volume II Figure 2-3: Indicative Site Layout** and will be avoided with appropriate setbacks and embedded mitigation (e.g. pollution control) to remove pathways to impacts on this LWS. Measures to remove impacts to LWS's during decommissioning are included within the **Framework DEMP [EN010152/APP/7.9]** and secured as part of the DCO. This includes siting extraction points away from LWS's (if cabling is to be removed) and pollution control.	
Ten non-statutory designated sites outside of the Order limits, but within 100 m of the Order limits	Medium	**Construction**: Ten LWS (including cLWS) are outside of the Order limits but within 100 m of the Order limits, these being: Marsh Lane LWS, Fenwick Churchyard LWS, Bunfold Shaw LWS, Thorpe in Balne/Kirk Bramwith Area LWS, Fenwick Hall Moat LWS, Bentley Tilts and Course of Old Ea Beck LWS, Warren House Park cLWS, Barnby Dun Old Don Oxbow LWS and Broad Ings Oxbow LWS. All are predominantly designated for their habitat and there are ecological or	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		hydrological connections between these LWS's and the Order limits. There will be no loss of habitat within these LWS's, nor 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, potentially linking LWS to the Order limits, will be retained. Embedded mitigation measures, as presented in Section 8.10, will ensure there is no impact on the integrity or the functioning of LWS that no construction related pollution would affect these LWS (e.g. through management of surface water and sediment runoff) and consequently that there will be no species mortality of any species using these LWS. These standard environmental protection measures will be adopted during construction and formalised in the **Framework CEMP [EN010152/APP/7.7]**, secured as part of the DCO Requirements. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of these non-statutory designated sites.	
		Operation and Maintenance: During operation and maintenance of the Scheme, there are no pathways (e.g. habitat loss or disturbance to designated site features (such as through noise, water quality, air	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		quality, lighting or visual) which could affect LWS within 100 m of the Order limits. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon these non-statutory sites during operation and maintenance of the Scheme.	
		Decommissioning: Any impacts at the time of decommissioning will be mitigated fully in line with relevant legislative and policy requirements, although there is unlikely to be any disturbance to LWS, habitat degradation or species mortality. Measures to remove or reduce impacts during decommissioning are included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO Requirements.	No
32 non-statutory designated sites outside of the Order limits, and beyond 100 m from the Order limits	Medium	**Construction**: These LWS (including cLWS) are all outside of the Order limits and more than 100 m from the Order limits, with the closest LWS being Moss Brick Pond LWS which is approximately110 m from the Solar PV Site. All are predominantly designated for their habitat. There are no ecological connections (as there are minor roads which sever the area between the Scheme and these LWS's) or hydrological links (there are no connecting watercourses, as reviewed from ordnance survey mapping) links between these LWS and the Order limits.	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		The construction of the Scheme will not directly impact on habitat within these non-statutory designated sites as they are outside of the Order limits and consequently, 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, potentially linking these LWS to the Order limits, will be retained. Embedded mitigation measures, as presented in Section 8.10, will ensure there is no impact on the integrity or the functioning of LWS; that no construction related pollution would affect these LWS (e.g. through management of surface water and sediment runoff) and consequently that there will be no species mortality of any species using these LWS. These standard environmental protection measures will be adopted during construction and formalised in the **Framework CEMP [EN010152/APP/7.7]** secured as part of the DCO Requirements. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of these non-statutory designated sites.	
		Operation and Maintenance: During operation and maintenance of the Scheme, there are no pathways (e.g. habitat loss or disturbance to designated site features (such as through noise, water quality, air	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		quality, lighting or visual) which could affect LWS (or cLWS) greater than 100 m from the Order limits. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of these non-statutory designated sites during operation and maintenance of the Scheme.	
		Decommissioning: Given the distance of these LWS from the Order limits and the lack of pathways, as with construction, there will be no disturbance or direct impact to these LWS (or cLWS), fragmentation of habitats, habitat degradation or species mortality from decommissioning activities and any impacts at the time of decommissioning would be mitigated fully in line with relevant legislative and policy requirements. Measures to ensure impacts do not occur during decommissioning are included within the **Framework DEMP [EN010152/APP/7.9]**, submitted with the ES as part of the DCO application.	No

Habitats and Species

8.11.5 The relevant ecological features that have been assessed, based on the ecological baseline identified during the desk study and field surveys, are presented in Table 8-12. Where there is the potential for an effect to occur on IEFs, then this is stated and the relevant feature assessed further on in this chapter to determine the significance of that effect.

Table 8-12: Determination of Potential Impacts and Effects on Important Ecological Features – Habitats and Species

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
Habitat – Neutral grassland including Coastal and Floodplain Grazing Marsh	Medium	**Construction:** Several areas of neutral grassland were recorded within the Order limits, some of which have been identified during the desk study as being Coastal and Floodplain Grazing Marsh. The Coastal and Floodplain Grazing Marsh is to be avoided by the works and is located within the Ecological Mitigation Area. There will be temporary loss/disturbance of a small area of the habitat mapped as CFGM on MAGIC, but recorded as grassland and cropland in the UKHab within the Grid Connection Corridor during the installation of cables. Given, this area of habitat does not currently conform with the HaPI description and the nature of cable installation will be temporary with current conditions reinstated on completion, no impacts on CFGM are predicted. Embedded mitigation measures (see Section 8.10) which are formalised in the **Framework CEMP [EN010152/APP/7.7]** (and secured as part of the DCO requirements) and include avoidance (where practicable) of priority habitat, protection of retained habitats and pollution prevention will ensure the integrity of retained habitats is not adversely affected. There will be temporary disturbance of areas of other neutral grassland in order to facilitate the works.	Yes - temporary disturbance of neutral grassland (non HaPI)
		Operation and Maintenance: During operation and maintenance of the Scheme, there are no pathways (e.g. habitat loss or disturbance to habitats (such as through noise, water quality or lighting)), that could affect retained grassland habitats. Any management of retained grasslands will be undertaken to	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		increase value and condition. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon retained neutral grassland habitats during operation and maintenance of the Scheme.	
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures are included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO requirements. These measures include retention and avoidance of habitats and pollution (e.g. spillages, noise, light) control.	No
Habitat – Deciduous Woodland, including Ancient Woodland	Medium	**Construction**: Broad-leaved woodland habitat was recorded within the Order limits and will be retained and protected. There is also one area of ancient woodland within 10 m of the Order limits. There will be no direct impacts on woodland habitat; no fragmentation of habitats, or of populations of species using habitats and no species mortality of any species associated with woodland habitats. Embedded mitigation measures (see Section 8.10) which are formalised in the **Framework CEMP [EN010152/APP/7.7]** (secured as part of the DCO Requirements) include the protection of retained habitats and pollution prevention will ensure no impact on the integrity or the functioning of woodland habitats through use of standard environmental protection measures.	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		Therefore, there are no impact pathways, either directly or indirectly, that would impact upon the integrity or functioning of woodland habitats.	
		Operation and Maintenance: During operation and maintenance of the Scheme, there are no pathways (e.g. habitat loss or disturbance to habitats (such as through noise, water quality or lighting)), that could affect retained woodland habitats and maintenance is not expected to be required for retained woodland. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon woodland habitats during operation and maintenance of the Scheme.	No
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures are included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO Requirements. These measures include retention and avoidance of habitats and pollution (e.g. spillages, noise, light) control.	No
Habitat – Scattered trees including veteran/ancient trees	Medium	**Construction**: This habitat was recorded on site and some tree loss will take place within to facilitate the Scheme. All ancient trees will be avoided with a suitable buffer. There are two veteran trees with which an incurrence into the root protection area is not avoidable. Mitigation for this is included within the **ES Volume III Appendix 10-7: AIA [EN010152/APP/6.3].** Embedded mitigation measures (see Section 8.10) which are formalised in the **Framework CEMP [EN010152/APP/7.7]**	Yes

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		(secured as part of the DCO requirements) and including the protection of retained habitats and pollution prevention will ensure no impact on the integrity or the functioning of retained trees through use of standard environmental protection measures.	
		Operation and Maintenance: During operation and maintenance of the Scheme, there are no pathways (e.g. habitat loss or disturbance to habitats (such as through noise, water quality or lighting)), that could affect retained trees and heavy pruning is not expected to be required. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon scattered trees, veteran or ancient trees during operation and maintenance of the Scheme.	No
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures are included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO Requirements. These measures include retention and avoidance of habitats and pollution (e.g. spillages, noise, light) control.	No
Habitat – hedgerows	Medium	**Construction:** Whilst the embedded mitigation includes the retention and avoidance of the majority of hedgerows, there will be the loss of sections of hedgerow during construction, to facilitate the Grid Connection Corridor, new fence lines and access routes. This includes small sections of 'Important' hedgerows including H14, H17, H25 and H71. Hedgerow loss within the Grid Connection	Yes – permanent and temporary loss of hedgerows including important hedgerows

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		Corridor will be restored, post-construction, but there will be a temporary (short-term) adverse effect on this habitat type. Embedded mitigation measures (see Section 8.10) as formalised in the **Framework CEMP [EN010152/APP/7.7]** (secured as part of the DCO requirements) and include avoidance (where practicable) of hedgerows, protection of retained habitats and pollution prevention to ensure the integrity of retained habitats is not adversely affected.	
		Operation and Maintenance: During operation and maintenance of the Scheme, there are no pathways (e.g. habitat loss or disturbance to habitats (such as through noise, water quality or lighting)), that could affect retained habitats. Management of hedgerows will seek to increase their quality and value. This is set out in the **Framework LEMP [EN010152/APP/7.14]**. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon hedgerows during operation and maintenance of the Scheme.	No
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures are included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO requirements. These measures will include retention and avoidance of habitats and pollution (e.g. spillages, noise, light) control.	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
Habitat – Open Mosaic Habitat on Previously Developed Land (OMH)	Medium	**Construction:** This area of potential OMH habitat is in the southern part of the Grid Connection Corridor adjacent to the Existing National Grid Thorpe Marsh Substation. This site has not been accessible during the habitat surveys but it is adjacent to an area categorised as OMH on MAGIC. Using aerial imagery the habitat has been assumed to be OMH. This habitat is a Habitat of Principal Importance. An area of this habitat is to be temporarily disturbed to facilitate the installation of cables, as presented in **ES Volume II Figure 2-3: Indicative Site Layout Plan [EN010152/APP/6.2]**.	Yes – temporary loss of habitat.
		Operation and Maintenance: During operation and maintenance of the Scheme, there are no pathways (e.g. habitat loss or disturbance to habitats (such as through noise, water quality or lighting)), that could affect retained habitats and maintenance is not expected to be required for any retained OMH habitats. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon OMH habitats during operation and maintenance of the Scheme.	No
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures are included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO requirements. These measures include retention and avoidance of habitats and pollution (e.g. spillages, noise, light) control.	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
Habitats – Rivers and streams	Medium/Low	**Construction**: This habitat is found throughout the Order limits. Several ordinary watercourses and ditches will be crossed by access roads or cable crossings, requiring open-cut crossings, or culvert improvements. Therefore, there will be a direct loss of Low importance running water habitats and there will be potential fragmentation of habitats, or of populations of species using habitats. Main Rivers and larger drains of Medium importance, including Moss Road and London Hill Drain, Moss Little Common Drain, Hawkhouse Green Dike, Mill Dike, Wrancarr Drain, Engine Dike and Thorpe Marsh Drain will be avoided, with cable crossings installed by non-intrusive techniques (HDD). HDD at insufficient depths can generate the potential effect of sediment mobilisation and disturbance of the bed of any watercourse, however, typically cables will be buried at a minimum depth of 1.5 m below the bed of any watercourse through HDD and this embedded mitigation removes this potential impact. However, Thorpe Marsh Drain, Engine Dike, Wrancarr Drain and Mill Dike have connectivity with the River Don and as such the minimum installation depth would be 5.0 m, which would mitigate the risk of pollution through bentonite contamination into the watercourse. Within the Solar PV Site and Grid Connection Corridor, there are several watercourse/ditch 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 through the implementation of mitigation measures outlined in the **Framework CEMP [EN010152/APP/7.7]** (e.g. water quality monitoring and buffer zones). New crossing points have been	Yes – Direct loss of sections of ordinary watercourses and ditches (Low importance).

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		included within the design to facilitate construction and similarly will be installed to allow continued connectivity along watercourses to allow fish passage. There is a risk that open-cut crossings may impact fish and other aquatic species and fish rescues may be required. 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 is provided in the **Framework CEMP [EN010152/APP/7.7]** and an explanation of these techniques is provided in **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**. Any construction within the vicinity of watercourses may require temporary lighting, which has the potential to spill into adjacent watercourses. Artificial 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. During construction, there is potential for pollutant spills and surface runoff into the watercourses which has the potential to adversely affect habitats and species associated with running water habitats. However, standard environmental protection	

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		measures will be implemented and adopted during construction, formalised through the **Framework CEMP [EN010152/APP/7.7]** and secured as part of the DCO requirements, and these measures include dust suppression and pollution prevention. Consequently, indirect effects (such as disturbance and habitat degradation) to watercourses during construction will not occur.	
		Operation and Maintenance: There are no impact pathways (e.g. habitat loss or degradation), during operation and maintenance of the Scheme which could affect running water. A change in land use from agricultural use to solar will see benefits in the water table of these habitats, which has previously been artificially lowered for the purpose of irrigation of arable fields.	No
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures are be included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO requirements. These measures will include retention and avoidance of habitats through leaving buried cables *in situ* and pollution (e.g. spillages, noise, light) control.	No
Aquatic Macroinvertebrates and Macrophytes	Low	**Construction:** The construction of the Scheme will be offset (>10 m) from any watercourses and 20 m from standing water as detailed in the embedded design mitigation (see Paragraph 8.10.6). These offsets will prevent disturbance to aquatic and riparian habitats.	Yes – aquatic macroinvertebrates associated with

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		Where ordinary watercourses and ditches are crossed, crossing points 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 of macroinvertebrates and macrophytes re-colonising naturally from adjacent habitats. 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, therefore avoiding disturbance to species, habitat loss, and direct mortality for aquatic species. 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 [EN010152/APP/7.7]** and secured through the DCO requirements. These measures include dust suppression and pollution prevention. Consequently, indirect effects to watercourses supporting aquatic species during construction will not occur. Where aquatic macroinvertebrates and macrophytes are lost during construction, these will rapidly re-colonise from adjacent habitats.	running water habitats
		Operation and Maintenance: Artificial horizontally polarising surfaces (such as solar PV panels), the reflection-polarisation characteristics of which are similar to those of water, have the	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		potential to 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 several suitable conditions to trigger such behaviour (e.g. wind direction and cloud cover). The likelihood of aquatic insects from this particular local aquatic habitat of Local Importance being attracted to large open areas of shiny surfaces is considered low given that such species will preferentially use smaller shiny surfaces. Most of the aquatic insect species identified during the desk study are of low conservation value, and do not use open water areas for any of their behaviours (i.e. few *Odonata* (dragonflies) were recorded for example). The impact of the Solar PV Panels on these aquatic insects would therefore be negligible. It is not considered that there are any other impact pathways (e.g. habitat loss or degradation), during operation and maintenance of the Scheme which could affect aquatic macrophytes or macroinvertebrates. Therefore, there are considered to be no impact pathways that would impact either directly or indirectly upon aquatic macrophytes or macroinvertebrates.	
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		requirements at the time of decommissioning. Initial measures will be included within the **Framework DEMP [EN010152/APP/7.9]** and secured as part of the DCO requirements. These measures will include retention and avoidance of habitats supporting aquatic macrophytes or macroinvertebrates (such as running water) at the time of decommissioning.	
Fish	Medium	**Construction**: The construction of the Scheme will be offset (>10 m) from any peripheral watercourses, as detailed in the embedded design mitigation. These offsets will prevent disturbance to aquatic habitats supporting fish and particularly notable species, such as European Eel, European Bullhead, Brown/Sea Trout and Lamprey spp. Where ordinary watercourses and ditches are crossed, crossings 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. This is set out in the **Framework CEMP [EN010152/APP/7.7]** and secured through the DCO requirements The construction of the Grid Connection Corridor and any internal access or cabling across the Order limits, where this crosses watercourses, will utilise non-intrusive methods, where practicable, to avoid physical disturbance to the watercourse. During construction, there is potential for pollutant spills and surface runoff into watercourses which could adversely affect fish.	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		However, standard environmental protection measures will be implemented and adopted during construction, formalised through the **Framework CEMP [EN010152/APP/7.7]** and secured through the DCO requirements. These measures will include dust suppression and pollution prevention. Consequently, indirect effects to watercourses supporting fish during construction will not occur. Impacts on Main Rivers through HDD and construction activities (i.e. sediment mobilisation, noise, and vibration) will be avoided through measures formalised through the **Framework CEMP [EN010152/APP/7.7]** and secured through the DCO. This includes HDD a minimum of 1.5 m below the bed of ordinary watercourses, and a 5 m depth for watercourses with connectivity to the River Don. This is considered a sufficient depth to avoid impacts. A buffer of at least 10 m from the bank top of any watercourse and directing lighting away from the watercourse will also be in place. With the above embedded mitigation in place, it is considered there will be minimal risk of mortality of any species associated with running water during construction of the Scheme, with appropriate mitigation to relocate fish away from the works areas during construction.	
		Operation and Maintenance: There will be no habitat loss or degradation, during operation and maintenance of the Scheme which could affect sensitive fish.	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		There are potential effects on fish and other aquatic fauna due to EMFs from cables buried beneath watercourses. Such artificial EMF may disrupt migratory cues and predatory behaviour. EMFs are emitted when electricity is transported through a power cable (Ref. 8-88). Overhead power lines are a source of two fields: the electric field (produced by the voltage and measured in volts per metre (V m-1) and the magnetic field (produced by the current and measured in microTeslas (μT) (Ref. 8-89; Ref. 8-90). Underground power cables eliminate the electric field altogether because it is screened out by the sheath around the cable, but they still produce a magnetic field (Ref. 8-89), hence, the magnetic field is the focus of this potential impact during operation. However, where there is water movement or the movement of an organism (e.g. swimming fish) through the magnetic field, an induced electric field can be generated (Ref. 8-88). Natural EMF provide important ecological cues to magneto-receptive and electro-receptive species (Ref. 8-91). For example, many species obtain locational and directional cues important for navigation from Earth's geomagnetic field and associated motion-induced electric fields (Ref. 8-92), and bioelectric fields help predators detect prey (Ref. 8-93). Since natural fields provide cues to identifying and locating resources, it is feasible that significant modifications of these fields by anthropogenic EMF could have ecological consequences (Ref. 8-91), if on a sufficient scale in the context of the environment impacted. Most of the research conducted to date on the effect of EMF on fish is based on subsea cables and marine species or marine life-	

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		stages of catadromous and anadromous migratory species (Ref. 8-94; Ref. 8-88; Ref. 8-91; Ref. 8-90). A range of responses to EMF have been reported on marine life-stages of European eel (*Anguilla anguilla*), Atlantic salmon (*Salmo salar*), and sea trout (*Salmo trutta*), i.e. migratory species that may be present in the Order limits through connected waterbodies. However, it is difficult to translate the disparate knowledge about individual-level EMF effects into assessments of biologically or ecologically significant impacts on populations (Ref. 8-95; Ref. 8-96; Ref. 8-91). Government planning policy relating to electricity infrastructure can be found in NPS EN-1 and, more specifically, the NPS EN-3 and EN-5. Paragraph 3.8.264 of NPS EN-3 states that *"burial of the cable increases the physical distance between the maximum EMF intensity and sensitive species.' No recommended burial depth is provided. The National Grid (Ref. 8-89) states that 'cables are typically installed 1 m below ground"*. For the Scheme, cables will be buried a minimum of 1.5 m below ground and up to 5 m where there are sensitive species. There are sensitive fish species present in connected water bodies that are outside the Order limits such as in the River Don which is connected to the Scheme through Thorpe Marsh Drain, Engine Dike, Wrancarr Drain and Mill Dike. These watercourses will be crossed using HDD techniques. Therefore, there is potential for these sensitive species to be present in the watercourses to be HDD and a minimum depth of 5 m has been committed toto mitigate any potential impacts from EMF on sensitive species.	

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures will be included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO requirements. These measures will include retention and avoidance of habitats supporting fish (running water) at the time of decommissioning.	No
Terrestrial Invertebrates	Low	**Construction:** The initial PEA walkover identified habitats that were of value for invertebrates, including neutral grassland, floodplain grazing marsh, woodland and hedgerows. Of species recorded within the desk study, no rare or endangered terrestrial invertebrate species were returned. The majority of habitats that support or are likely to support terrestrial invertebrates will be retained and avoided, e.g. coastal floodplain grazing marsh and the majority of hedgerows. Brown hairstreak were incidentally recorded utilising blackthorn hedgerows on site and as such the works have the potential to impact numbers of brown hairstreak through temporary hedgerow removal. In addition, OMH has value for invertebrate species and temporary removal of this habitat is proposed. Embedded mitigation measures (see Section 8.10) are formalised in the **Framework CEMP [EN010152/APP/7.7]** (secured as part of the DCO requirements) and include avoidance (where practicable) of areas of greatest value to terrestrial invertebrates, protection of retained habitats and pollution prevention to ensure	No (Effects of terrestrial invertebrates associated with potential OMH are considered alongside the habitat assessment)

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		the integrity of retained habitats supporting terrestrial invertebrates is not adversely affected.	
		Operation and Maintenance: During operation and maintenance of the Scheme, there are no pathways (e.g. habitat loss or disturbance to habitats (such as through noise, water quality or lighting)), that could affect terrestrial invertebrates and any maintenance of retained habitats will not affect terrestrial invertebrates. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon terrestrial invertebrates during operation and maintenance of the Scheme.	No
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures are included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO requirements. These measures include retention and avoidance of habitats supporting terrestrial invertebrates (where practicable), vegetation clearance being undertaken in a phased and sensitive manner and pollution (e.g. spillages, noise, light) control.	No
Reptiles – Grass Snake	Low	**Construction**: Grass Snake were recorded within the Solar PV Site in riparian habitats close to Fleet Drain and in grassland habitat bordering woodland edge. These habitats and other riparian habitats close to watercourses across the Solar PV Site (which may also support Grass Snake) are of value to Grass Snake and will be retained and avoided. All such habitats, known to support Grass Snake or with potential to support Grass Snake	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		will, where practicable, be cleared in a sensitive manner (see Section 8.10) pre-construction to ensure that no mortality occurs as reptiles will be displaced into adjacent habitats and away from construction activities. For the Grid Connection Cables, sensitive vegetation clearance, under the assumption of presence of reptiles in suitable habitat, will be adopted to displace reptiles into adjacent habitats and ensure no mortality occurs. Embedded mitigation measures (see Section 8.10) which are formalised in the **Framework CEMP [EN010152/APP/7.7]** (secured part of the DCO requirements) and include protection of retained habitats and pollution prevention, will ensure the integrity of retained habitats supporting reptiles is not adversely affected. Therefore, there are no impact pathways, either directly or indirectly, that would negatively impact upon reptiles.	
		Operation and Maintenance: During operation and maintenance of the Scheme, there will be no habitat loss or disturbance to habitats (such as through noise, water quality or lighting)) that could affect reptiles. Any maintenance of retained habitats potentially supporting Grass Snake, such as mowing of grassland beneath and between Solar PV Panels, has the potential to impact upon Grass Snake through mortality. However, this activity will be undertaken at an appropriate time of year for the sensitive management of grassland (i.e. late summer/early autumn when temperatures are >5°C) when reptiles are active and can move away to avoid incidental injuring or killing of reptiles, concordant with the requirements for other species, such as nesting birds. This is secured through the **Framework OEMP [EN010152/APP/7.8]**. Therefore, there are no impact pathways,	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		either directly or indirectly, that would impact upon reptiles during operation and maintenance of the Scheme.	
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures are included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO requirements. These measures will include retention and avoidance of habitats supporting reptiles (where practicable), vegetation clearance being undertaken in a sensitive manner and pollution (e.g. spillages, noise, light) control.	No
Breeding Birds (Breeding bird assemblage, including farmland bird species)	Medium	**Construction**: Habitats supporting the majority of breeding bird species throughout the Order limits, such as the majority of hedgerows and all woodland areas, will be retained. However, 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, a species that is ground-nesting and relies on open space. Embedded mitigation measures (see Section 8.10) which will be formalised in the **Framework CEMP [EN010152/APP/7.7]** (secured as part of the DCO requirements) and include protection of retained habitats, avoidance of the nesting bird period (typically this is March to August inclusive) where practicable, pre-construction nesting bird checks and pollution prevention, will ensure the integrity of retained habitats supporting breeding birds is not adversely affected and that there is no fragmentation of	Yes – loss of arable farmland for ground-nesting birds

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		habitats, or of populations of species using habitats and no species mortality of any breeding bird species.	
		Operation and Maintenance: During operation and maintenance of the Scheme, there will be no habitat loss or disturbance to habitats (such as through noise, water quality or lighting) that could affect breeding birds. Any maintenance of retained habitats potentially supporting breeding birds, such as mowing of grassland beneath and between Solar PV Panels, has the potential to impact upon breeding birds through mortality. However, this activity is expected to be undertaken between September and March, which is outside of the bird breeding season at an appropriate time of year to avoid incidental injuring or killing of breeding birds, concordant with the requirements for other species, such as reptiles. This is secured through the **Framework OEMP [EN010152/APP/7.8]**. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon breeding birds during operation and maintenance of the Scheme.	No
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures will be included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO requirements. These measures will include protecting retained habitats, avoidance of the nesting bird period (typically this is March to August inclusive), pre-construction nesting bird checks and pollution prevention.	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
Non-breeding birds - Assemblage of non-breeding waterbirds	Medium	**Construction**: The retention and enhancement of habitats within the Order limits along the River Went corridor will ensure that there is no loss of habitat for waterbird species utilised this area. The location of the Solar PV Site is set back from the River Went and is screened in many locations by existing vegetation. However, there is the potential that construction noise and movements for the workforce and plant may disturb waterbirds using this area during periods of construction. Embedded mitigation measures (see Section 8.10) which will be formalised in the **Framework CEMP [EN010152/APP/7.7]** (and submitted with the ES as part of the DCO application) will include protecting retained habitats, creation of new habitats and pollution prevention to ensure the integrity of retained habitats supporting non-breeding birds is not adversely affected and that there is no fragmentation of habitats, or of populations of species using habitats and no species mortality of any non-breeding bird species. The implementation of measures to minimise noise, lighting and vibration disturbance will also reduce impacts to non-breeding birds.	Yes – construction disturbance
		Operation and Maintenance: During operation and maintenance of the Scheme, there are no pathways (e.g. habitat loss or disturbance to habitats (such as through noise, water quality or lighting)), that could affect non-breeding waterbirds. Any maintenance of retained or created habitats, such as mowing of grassland beneath and between Solar PV Panels and maintenance, e.g. cleaning, of solar panels, will be very short in duration, with limited vehicle and people movements and is not considered to have any impact on non-breeding waterbirds.	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		Therefore, there are no impact pathways, either directly or indirectly, that would impact upon non-breeding birds during operation and maintenance of the Scheme.	
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures will be included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO requirements. These measures will include protecting retained habitats and pollution prevention.	No
Non-breeding birds - Assemblage of non-breeding farmland birds	Medium	**Construction**: The retention and enhancement of hedgerows and field margins, e.g. by creating permanent grassland margins, will ensure that species associated with these habitat features in arable landscapes, such as Linnet and Yellowhammer, are not subject to significant habitat loss. However, the loss of arable field habitat will displace species associated with the more open aspects of farmland landscapes, such as Skylark and Grey Partridge. Whilst the retention of areas of existing grassland and created grassland in undeveloped mitigation areas, will minimise the loss of arable fields, there may be a short-term impact whilst habitats succeed. Embedded mitigation measures (see Section 8.10) are formalised in the **Framework CEMP [EN010152/APP/7.7]** (and submitted with the ES as part of the DCO application) include protecting retained habitats, creation of new habitats and pollution prevention to ensure the integrity of retained habitats supporting non-breeding birds is not adversely affected and that there is no	Yes – loss of arable farmland

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		fragmentation of habitats, or of populations of species using habitats and no species mortality of any non-breeding bird species. The implementation of measures to minimise noise, lighting and vibration disturbance will also reduce or remove all such impacts to non-breeding birds.	
		Operation and Maintenance: During operation and maintenance of the Scheme, there are no pathways (e.g. habitat loss or disturbance to habitats (such as through noise, water quality or lighting)), that could affect non-breeding birds. Any maintenance of retained habitats potentially supporting non-breeding birds, such as mowing of grassland beneath and between Solar PV Panels, is not considered to have any impact on non-breeding birds. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon non-breeding birds during operation and maintenance of the Scheme.	No
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures will be included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO requirements. These measures will include protecting retained habitats and pollution prevention.	No
Bats – roosting	Low to Medium (depending on the species)	**Construction**: The design of the Scheme avoids features used by roosting bats, such as woodland and mature trees identified as having potential to support roosting bats, and the singular building on site. This means there will be no loss of important habitats	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		used by roosting bats anywhere within the Order limits during construction. Embedded mitigation measures (see Section 8.10) which are formalised in the **Framework CEMP [EN010152/APP/7.7]** (secured as part of the DCO requirements) include protection of retained habitats, avoidance of important habitats to roosting bats, pre-construction checks and pollution prevention (including for lighting). These measures will ensure the integrity of retained habitats supporting, or potentially supporting, roosting bats is not adversely affected and that there is no fragmentation of habitats, or of populations of species using habitats and no species mortality of any bat species. Consequently, indirect effects to habitats supporting bats during construction will be avoided. Therefore, there are no impact pathways, either directly or indirectly, that would negatively impact upon roosting bats.	
		Operation and Maintenance: During operation and maintenance of the Scheme, there will be no habitat loss or disturbance to habitats (such as through noise, water quality or lighting) that could affect roosting bats. Lighting throughout the operation and maintenance phase is to be designed sensitively for bats (see Section 8.10) which is included within the **Framework OEMP [EN010152/APP/7.8]**. Any maintenance of retained habitats potentially supporting roosting bats (such as mature trees) is not expected. However, pre-commencement checks will be required where any unexpected maintenance is required on trees potentially supporting roosting bats. Therefore, there are no impact pathways, either directly or indirectly, that would impact	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		upon roosting bats during operation and maintenance of the Scheme.	
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures are included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO requirements. These measures include protecting retained habitats, pre-construction checks and pollution prevention.	No
Bats – foraging/commuting	Medium	**Construction:** The design of the Scheme will avoid features, such as woodland and mature trees identified as being important to commuting/foraging bats. There will be loss of lower value grazed grassland and arable habitats used by bats within the Order limits. There will also be temporary loss of some sections of hedgerows which provide suitable commuting and foraging features which may affect foraging/commuting bats. Embedded mitigation measures (see Section 8.10) which are formalised in the **Framework CEMP [EN010152/APP/7.7]** (secured as part of the DCO requirements) include protection of retained habitats, avoidance and minimisation of impacts to important habitats for commuting and foraging bats (e.g. hedgerows) and pollution prevention (including for lighting). These measures will ensure the integrity of retained habitats supporting, or potentially supporting, commuting and foraging bats is not adversely affected and that there is no overall fragmentation of habitats, or of populations of species using	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		habitats and no species mortality of any bat species. Consequently, indirect effects to habitats supporting commuting and foraging bats during construction will be minimised or avoided. Therefore, there are no impact pathways, either directly or indirectly, that would negatively impact upon commuting/foraging bats.	
		Operation and Maintenance: During operation and maintenance of the Scheme, there will be no habitat loss or disturbance to habitats (such as through noise, water quality, lighting or visual) that could affect commuting or foraging bats. Any maintenance of retained habitats potentially supporting commuting or foraging bats (such as hedgerows) is not expected. However, recent research has suggested that numbers of foraging bats may be reduced by the presence of Solar PV Panels. There is limited scientific literature available on the impacts to bats from operational solar farms (Ref. 8-78, Ref. 8-79, Ref. 8-80), although a couple of recent papers (Ref. 8-82, Ref. 8-83) from small operational sites (in south west England and France) have suggested that bats avoided fields with solar panels and that bat activity was reduced by almost half at the boundaries of fields with solar panels compared to control sites The reasons for these impacts was not fully determined, but it should be noted that these sites did not have any significant new tree/hedge planting, and/or grassland creation and may not be comparable to this Scheme (and other large-scale DCO schemes) where significant areas of habitat compensation and enhancement are provided.	Yes

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures are included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO Requirements. These measures include protecting retained habitats, pre-construction checks and pollution prevention.	No
Riparian Mammals	Low	**Construction:** The presence of a bankside hole along the north bank of the River Went could offer suitably for Otter, although no evidence of use was recorded. This feature will be avoided during the works period and is 62 m north of the Solar PV construction area, with the Ecological Mitigation Area situated between the two. Due to lack of evidence indicating this as an active holt the distance is sufficient for avoidance of any potential impacts. However, in line with measures set out in the **Framework CEMP [EN010152/APP/7.7]** (secured as part of the DCO requirements), pre-commencement checks for Otter will confirm the status of the feature, as well as any changes in overall distribution. The construction of the Solar PV Site will be offset (>10 m) from any watercourses (see Section 8.10), therefore riparian habitats, including any watercourses used by Water Vole and Otter will be undisturbed. Optimal habitat for water vole was identified within Wrancarr Drain, Engine Dike, and Thorpe Marsh Drain with feeding stations being identified within Engine Dike and Thorpe Marsh Drain. These watercourses are to be crossed using HDD techniques and, as such, impacts will be located >10m from the bank top, beyond the disturbance distance for water vole which is	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		considered to be 6 m. Embedded mitigation measures (see Section 8.10) to protect Water Vole and Otter habitat during construction will include pollution prevention and control, management of flood risk and maintaining connectivity for riparian mammals. These are formalised in the **Framework CEMP [EN010152/APP/7.7]** (secured as part of the DCO requirements).	
		Operation and Maintenance: During operation and maintenance of the Scheme, there are no pathways (e.g. there will be no habitat loss or disturbance to habitats (such as through noise, lighting or visual)), that could affect riparian mammals. Maintenance is not expected to be required for watercourses. Furthermore, the management of surface water and foul water drainage (see also **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**,) will ensure no hydrological impacts occur and that there are consequently no impacts upon habitats supporting riparian mammals during operation and maintenance of the Scheme.	No
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures are included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO requirements. These measures will include protecting retained habitats, pre-construction checks and pollution prevention.	No
Badger	Low	**Construction**: The construction of the Scheme will retain and avoid all currently known Badger setts recorded within the Order	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		limits. With reference to **ES Volume III Appendix 8-4: Badger Report [EN010152/APP/6.3]** and **ES Volume III Appendix 8-4: Badger Report (Annex A) (Confidential) [EN010152/APP/6.3]** an outlier sett is currently shown as having intrusion of developable parts of the scheme (e.g. security fencing and proposed internal access track) in to the 30m buffer zone, this is due to this outlier sett only being discovered (freshly dug) once the indicative design had been fixed for the submission documentation. However, there is sufficient flexibility in the scheme design to avoid impacts on this outlier sett (should it still be active prior to construction commencing); as there is to avoid impacts on all other known setts, and at detailed design post-consent, all currently known setts shown on Figures 8-4-1 and 8-4-2 (Annex A) will be suitably buffered to avoid impacts. Embedded mitigation measures (see Section 8.10) which are formalised in the **Framework CEMP [EN010152/APP/7.7]** (secured as part of the DCO requirements) will include protection of retained habitats, avoidance (and suitable buffers) of setts and pollution prevention (including for lighting). These measures will ensure the integrity of retained habitats supporting, or potentially supporting Badger are not adversely affected and that there is no fragmentation of habitats used by Badger and no species mortality. Consequently, indirect effects to habitats supporting Badgers during construction will be minimised or avoided. Pre-construction surveys will be undertaken to determine baseline conditions remain the same as currently recorded and if any changes to Badger distribution are identified and where setts	

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
		cannot be reasonably avoided, then a Natural England licence may be required and mitigation measures updated accordingly. Therefore, there are no impact pathways, either directly or indirectly, that would negatively impact upon Badger.	
		Operation and Maintenance: During operation and maintenance of the Scheme, there will be no habitat loss or disturbance to habitats (such as through noise, water quality or lighting) that could affect Badger. Any maintenance of retained habitats potentially supporting Badger (such as woodland or hedgerows) is not expected. However, pre-commencement checks will be required where any unexpected maintenance is required within 30 m of known Badger setts or within habitats potentially supporting Badger. Therefore, there are no impact pathways, either directly or indirectly, that would impact upon Badger during operation and maintenance of the Scheme.	No
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures are included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO requirements. These measures include protecting retained habitats, pre-construction checks and pollution prevention.	No
Other mammals (SPI (Ref. 8-9): Brown Hare,	Low	**Construction**: The construction of the Scheme will seek to retain areas of open fields suitable for Brown Hare within the Order limits during the construction phase, although this species maybe temporarily displaced around the Order limits during that time.	No

IEF	Importance (see Section 8.5 and Table 8-2)	Potential Impacts (see Section 8.9)	Potential for an effect to occur?
Hedgehog and Harvest Mouse)		The majority of habitats potentially supporting Hedgehog and Harvest Mouse, such as arable margins, scrub and hedgerows will be retained and avoided with any impacts to these habitats minimised as much as is practicable. Embedded mitigation measures (see Section 8.10) which are formalised in the **Framework CEMP [EN010152/APP/7.7]** (secured as part of the DCO requirements) includes protection of retained habitats potentially supporting these species, sensitive timing of vegetation clearance and pollution prevention. This will ensure the integrity of retained habitats are not adversely affected and that there is no fragmentation of habitats, or of populations of species and that no species mortality occurs. Therefore, there are no impact pathways, either directly or indirectly, that would negatively impact upon Brown Hare and Hedgehog, Harvest Mouse.	
		Operation and Maintenance: During operation and maintenance of the Scheme, there are no pathways (e.g. habitat loss or disturbance to habitats (such as through noise, water quality, lighting or visual)), that could affect these SPI.	No
		Decommissioning: Decommissioning impacts are expected to broadly align with those for construction and would require mitigating fully in line with relevant legislative and policy requirements at the time of decommissioning. Initial measures are included within the **Framework DEMP [EN010152/APP/7.9]**, secured as part of the DCO requirements. These measures will include protecting retained habitats, pre-construction checks and pollution prevention.	No

8.12 Significance of Effects (with Avoidance and Embedded Mitigation Measures)

8.12.1 The impacts and IEFs scoped into the assessment and resulting likely significant effects (both beneficial and adverse) associated with the construction, operation (including maintenance) 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 8.10.

8.12.2 Taking into account the embedded mitigation measures as presented in Table 8-10 of this chapter, the potential for the Scheme to generate effects on IEFs was evaluated using the method as detailed in Section 8.5 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 8.10.

Construction

8.12.3 Accordingly, the evaluation presented in Tables 8-11 and 8-12 has identified that during construction, there are impact pathways on the following IEFs that have the potential to generate an effect and require further assessment:

a. Temporary loss of neutral grassland within the Solar PV Site;

b. Permanent loss of scattered trees (non-ancient/veteran);

c. Damage to veteran trees from temporary construction accesses;

d. Permanent and temporary loss of hedgerows within the Order limits, including important hedgerows;

e. Temporary loss of Open Mosaic Habitat on Previously Developed Land;

f. Direct loss of and fragmentation of running water habitats within the Order limits;

g. Loss of habitat used by ground-nesting birds;

h. Disturbance to non-breeding waterbirds within and outside the Order limits along the River Went corridor; and

i. Temporary loss of arable field habitat supporting non-breeding farmland birds, especially Skylark and Grey Partridge.

Temporary Loss of Neutral Grassland within the Solar PV Site

8.12.4 There will be temporary disturbance of some areas of this habitat within the Solar PV Site to facilitate the construction of the development, primarily through the erection of panels. However, once construction is complete, the habitat will be restored as part of the operational management. It is acknowledged that due to construction disturbance this will take some time to establish and will require effective management to achieve optimal condition. As such, it is assessed that the magnitude of this impact will be medium in the short-term, as there will be a change to the baseline condition, which results in a temporary **minor adverse** effect which is **not significant.**

Permanent Loss of Scattered Trees (Non-Ancient/Veteran)

8.12.5 In total, five individual trees and five tree groups within the Order limits will be permanently lost to facilitate the Scheme, as detailed within the **ES Volume III Appendix 10-7: AIA [EN010152/APP/6.3].** This has been limited as far as possible within the Scheme design and combined with hedgerows accounts for only 1.2% of the total tree canopy cover within the Order limits. The magnitude of this impact is low as the proportion of overall tree loss within the Order limits is minimal and as such there is a **negligible effect** on the overall tree resource, which is **not significant**.

Damage to Veteran Trees from Temporary Construction Accesses

8.12.6 Two veteran trees are subject to unavoidable buffer zone incursions, required for temporary construction facilitation access and the implementation of BESS Fire Service Access Tracks. This incursion is not considered to represent a meaningful change of land use along existing tracks as these are currently used by high-sided heavy machinery. This is detailed within the **ES Volume III Appendix 10-7: AIA [EN010152/APP/6.3].** The impacts are further reduced through embedded mitigation in the form of ground protection such as a three dimensional cellular raft system (or equivalent). The impacts on these trees are temporary making the magnitude of this impact low, and with embedded mitigation the effect will be **negligible,** which is **not significant.**

Temporary and Permanent Loss of Hedgerows within the Order limits

8.12.7 Construction activities are predicted to result in the potential for the loss of sections of hedgerow (minimised as much as is practicable) as a result of security fencing and access routes across the Solar PV Site and to facilitate works within the Grid Connection Corridor. The majority of hedgerows across the Order limits have been avoided and will be retained, including, where practicable, those which are considered as important hedgerows under the wildlife and landscape criteria of the Hedgerow Regulations. **ES Volume III Appendix 10-5: Hedgerow Report [EN010152/APP/6.3]** discusses the locations of where there is predicted to be the requirement for removal of sections of hedgerows. This amounts to approximately 3.99 km of hedgerow, including small sections for access from four which are considered to be ‘important’ hedgerows. Prior to the removal or destruction of a protected hedgerow an application must be made to the Local Planning Authority in the form of a Hedgerow Removal Notice. Full planning consent and/or a granted DCO is an exemption to this requirement.

8.12.8 New hedgerows will be planted across the Solar PV Site consisting of native species, embedded within the Scheme design (see **Framework LEMP [EN010152/APP/7.14]**) and **ES Volume II Figure 2-3: Indicative Site Layout Plan [EN010152/APP/6.2]**. Lengths of new, species rich, hedgerow will use three core species: Hawthorn, Blackthorn and Hazel with others to add diversity including: Holly *Ilex aquifolium*, Dog Rose *Rosa canina* and Guelder Rose *Viburnum opulus*. In addition, existing hedgerow will be subject to re-enforced planting to strengthen and widen existing hedgerows.

8.12.9 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 and strengthening of existing hedgerows 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.

8.12.10 Taking into account embedded protection measures and Scheme design to minimise the impact of construction activities, 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.

Temporary Loss of Open Mosaic Habitat on Previously Developed Land, including any associated invertebrate populations

8.12.11 Construction activities within the Grid Connection Corridor will result in the temporary loss of an area of potential OMH due to the digging of a trench to lay the cables. Upon installation of the cables the trench will be back-filled and the working area left undisturbed. As set out in the **Framework CEMP [EN010152/APP/7.7]** the correct handling of soils and reinstatement of the habitat will ensure that the loss is for the duration of the construction phase only. Surveys prior to commencement will determine the presence of any notable invertebrate species, to ensure that foodplants are retained, where practicable. Invertebrate eggs and larvae will remain in the stored soil and vegetation, with soil re-instated as soon as possible after installation of the cables. In addition, it is likely that the disturbance of the ground in a limited area, will provide the disturbed bare-ground conditions which form part of the criteria for OMH and especially important for associated invertebrate populations, which in the short-term post installation of the cables will allow ephemeral/short perennial plant communities to establish. Materials and vehicles will not be stored on retained areas of this habitat. Appropriate measures to ensure there is no incursion during construction into retained habitat and stand-off buffers will be put in place to avoid damage (e.g. security fencing early on in the construction process). As there will be a temporary loss of this habitat, the magnitude of this impact on both the habitat and associated invertebrate populations is low as it is reversible, with a temporary **minor adverse effect** that is **not significant**.

Direct Loss of and Fragmentation of Running Water Habitats including associated macroinvertebrate populations within the Order limits

8.12.12 The construction of the Scheme is predicted to temporarily impact upon running water habitats (where non-intrusive crossings are not possible) which in turn will lead to temporary fragmentation of running water and habitats supporting macroinvertebrate populations. Working widths will be kept to a minimum (c. 5 m) to minimise temporary habitat loss, with all machinery and materials stored at least 10 m from watercourses. Where open-cut techniques are required to cross smaller watercourses, water flow would be maintained by damming and over pumping or fluming. Impacts will be temporary, and habitats will reinstate within two years, with aquatic species re-colonising naturally from adjacent habitats. Watercourses will be reinstated as found and regular post-works observations, during vegetation re-establishment of the banks will ensure that no long-term adverse impacts occur.

8.12.13 No new culverts are proposed, however, the access track design round the Solar PV Site utilises an existing culvert over the north tributary to Fleet Drain to cross from Field NE7 to NE8. There may be the requirement to extend the existing culvert by up to 2 m. If this is the case, then length-for-length equivalent watercourse enhancements would be required. Alternatively, it may be possible to install a new bridge at this location. A further culvert extension may be required for the access track crossing an existing culvert between Field NW8 and SW1/SW2. Extensions to the existing culverts will be designed to maintain connectivity along the watercourse for aquatic species and riparian mammals. All culverts to convey watercourses will be set 150 mm below bed level to allow sedimentation and a naturalised bed to form, which will maintain longitudinal connectivity for aquatic fauna.

8.12.14 The construction of the Scheme will result in the temporary loss of running water habitats, including supporting macroinvertebrate populations, due to open-cut crossing of ordinary watercourses/ditches, which will be re-instated following completion. In addition, there may be the requirement to extend two culverts by up to 2m, which would result in the permanent loss of ordinary watercourse/ditch habitat. These habitats and their supporting macroinvertebrate populations are of Low importance. The magnitude of impact is low because the habitat will be reinstated or is sufficiently small in extent to not significantly reduce the overall habitat resource or associated macroinvertebrate populations. Taking into account the embedded mitigation, both the temporary habitat loss and permanent loss of very small sections of low valuable habitat will result in a **minor adverse** effect, which is **not significant**.

Loss of Habitat Used by Ground-Nesting Birds

8.12.15 The survey of breeding birds (**ES Volume III Appendix 8-7: Breeding Bird Report [EN010152/APP/6.3]**) identified a breeding bird assemblage of 54 species across the Survey Area, including the Order Limits. This breeding bird assemblage approaches county importance, with particular emphasis on species of elevated conservation value forming a breeding farmland bird assemblage of district importance. Within this assemblage there are species which rely on open landscapes and the arable fields themselves for nesting, such as Skylark and Grey Partridge. Although the populations of the species themselves are of no more than local importance, in recognition of their conservation value and being part of a breeding bird assemblage of greater importance, consideration is given to the impacts of loss of arable farmland on ground-nesting bird species.

8.12.16 Forty-three territorial male Skylark were present across the Order Limits, with breeding territories recorded in arable fields and ungrazed grassland. The prevalent arable crop type within the Order limits is autumn sown wheat, with occasional fields of barley and maize. Autumn sown cereals (and other crops) are now a typical feature of the arable landscape 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. It has become increasingly clear that one of the main reasons why populations have declined is that, on average, Skylark

make less than the three nesting attempts that are probably required to maintain populations.

8.12.17 As Skylark in arable habitats are particularly susceptible to nest failure or low fledgling success (in part due to autumn sown cereals), 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 43 territorial males were recorded from surveys of the Order Limits, it is not possible or practicable to search for active nests, nor is this required for territory mapping analysis and so the number of males which have successfully paired with a female, then occupy active nests as well as breeding attempts or successful fledgling, is unknown. Therefore, whilst the number of territories of this species 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 and therefore, what a loss or change in availability of this habitat resource means for maintaining the population. The dominance of arable habitats within the Order Limits, such as autumn sown wheat, would indicate that the number of successful broods and/or breeding attempts is likely to be low which in turn means that productivity and juvenile recruitment into the local breeding population is likely to be below that required to maintain the population.

8.12.18 Although Grey Partridge are a ground-nesting species of open arable landscapes, they are more commonly associated with field margins and edges, nesting in the bases of hedgerows, as well as scrub and woodland edge. As such, they are less likely to be susceptible to the loss of arable farmland, although it is acknowledged that there will be a reduction in ‘openness’.

8.12.19 Construction activities will result in the loss of arable farmland used by breeding Skylark and, to a lesser extent, Grey Partridge. Without measures providing suitable nesting and foraging habitats being incorporated within the Scheme design there is the potential for a long-term effect on a breeding Skylark population and wider farmland bird assemblage of importance at a district (medium sensitivity) level.

8.12.20 Through the 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 other farmland bird species such as Grey Partridge. Further to this these will provide extensive benefits for other IEFs and wider biodiversity. The locations of proposed measures are illustrated on the Indicative Landscape Masterplan in the **Framework LEMP [EN010152/APP/7.14]**.

8.12.21 As part of the embedded scheme design, there will be extensive areas of neutral grassland creation including areas maintaining ‘openness’. These areas will be subject to grassland creation and targeted management, 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.

8.12.22 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.

8.12.23 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.

8.12.24 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 sink for predators, the perimeter security fencing will not contain passages for mammals, as is proposed elsewhere throughout the Scheme, which will reduce nest predation.

8.12.25 Whilst the above measures will not replicate the total area of arable farmland currently available and therefore, provide like for like mitigation for all territorial male Skylark recorded, the provision of a stable quantity of improved quality habitat will deliver the following for Skylark:

a. Habitat capable of supporting higher densities of territories and nests;

b. Habitat which is not subject to agricultural rotations, i.e. temporary availability across years;

c. Removal of pesticide application which will increase the availability of prey throughout the breeding season, benefiting both Skylark nesting within the Order limits and those from outside foraging within the Scheme;

d. Removal of early harvesting and other destructive farming practices, which will reduce nest loss and increase the number of broods possible across the breeding season, i.e. with the possibility of up to three broods per year; and

e. Measures to reduce predation, which will increase the chances of fledging and maximising recruitment into the population.

8.12.26 These measures will increase productivity over the lifespan of the Scheme for Skylark, as well as other ground-nesting bird species, such as Grey Partridge, maintaining the populations of ground-nesting birds.

8.12.27 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 populations of ground-nesting birds, including Skylark and Grey Partridge.

Disturbance to Non-Breeding Waterbirds within and outside the Order limits along the River Went Corridor

8.12.28 Development can result in noise or visual disturbance to non-breeding birds. For example, noise and visual disturbance arising from construction may result in temporary behavioural changes in bird species (e.g. interruption or cessation foraging, minor and major flight responses). Three of the most important factors determining the magnitude of disturbance from developments on ecological receptors are considered to be individual species sensitivity, proximity of the disturbance source and timing/duration of the disturbance.

8.12.29 Both noise and visual stimuli may elicit disturbance responses, potentially affecting the fitness and survival of bird species. Noise is a complex disturbance parameter requiring the consideration of multiple factors, including its non-linear scale, non-additive effect and source-receptor distance. Bird responses to high noise levels include major flight or the cessation of feeding, both of which might affect the survival of birds, particularly if other stressors are also present (e.g. cold weather, food scarcity).

8.12.30 Generally, research has shown that above noise levels of 84 dB waterfowl show a flight response, while at levels below 55 dB there is no effect on their behaviour (Ref. 8-85). Therefore, these two thresholds are considered useful as defining two extremes. In addition, regular noise levels should remain below 70 dB at bird receptors, which will habituate to noise levels below this level (Ref. 8-86). Generally, noise is attenuated by 6dB with every doubling of distance from the source. Driven piling, the noisiest construction activity associated with works in the Solar PV Site (approximately 110 dB at 0.67 m from source) will thus reduce to 67 to 68 dB by 100 m away from the source. This implies that the loudest construction noise should have fallen to below disturbing levels by 100 m, and certainly by 200 m, away from the source even without mitigation. Noise levels from less noisy construction activities (approximately 85 dB at source), are expected to dissipate over considerably shorter distances. Comparison with baseline noise levels are also important rather than purely using comparison with the 70 dB metric.

8.12.31 The following parameters for the assessment of noise disturbance impacts have been identified in discussions with Natural England on other projects[1]:

a. Changes of 3 dB in noise level compared to the pre-construction baseline are perceptible (although not necessarily disturbing);

b. Noise levels below 55 dB are unlikely to be disturbing, regardless of the difference to the baseline;

c. Noise levels between 55 dB and 70 dB may be disturbing depending on the degree of change (for example, a change in noise level of 10 dB represents a doubling in loudness and, therefore, likely to be disturbing), nature of the sound (i.e. L_{Amax} or L_{Aeq}), duration of exposure and extent of habitat impacted; and

[1] Discussions over noise disturbance to SPA/Ramsar took place over several projects, including the Sea Link and Viking CCS Pipeline developments.

d. Noise levels above 70dB are likely to be disturbing unless birds are already subject to similarly high noise levels as part of their baseline soundscape.

8.12.32 Generally, visual stimuli are considered to have a higher disturbance potential than noise stimuli as, in most instances, visual stimuli will elicit a disturbance response at much greater distances than noise. For example, a flight response is triggered in most species when they are approached to within 150m across a mudflat. Visual disturbance can be exacerbated by workers moving across open habitats undertaking sudden movements and using large machinery.

8.12.33 While an increasing amount of research on visual and noise disturbance to waders and waterfowl from construction works (and other activities) is now available, no peer-reviewed experimental scientific evidence exists relating specifically to the ecological impacts of solar farms (Ref. 8-31).

8.12.34 Several general characteristics of construction-related disturbance to non-breeding birds must also be considered. For non-breeding waterbirds using the areas within and adjacent to the Order limits along the River Went corridor any disturbance from construction activities are only going to relate to those activities occurring within the first tier of fields containing Solar PV Panels immediately adjacent to the River Went corridor, i.e. Fields NW1, NW5, NW9, NW11, NE1, NE2, NE5, NE6, NE7, NE9 and NE11. To a certain degree similar disturbance levels from routine farming operations will already arise from the fields. For example, tractors and other agricultural machinery, with similar noise levels than those generated by tracked excavators (the noisiest type of mobile plant/vehicle used in the construction phase), will frequently operate in arable fields within the Order limits (e.g. for ploughing, fertilising, spraying and harvesting). This implies that noise levels may, at any time, increase beyond the 55dB threshold above which disturbance may (though not necessarily will) occur. In practice, elevated noise levels in sub-sections of fields within the Order limits are considered to be part of the ‘normal’ baseline soundscape associated with the existing agricultural use. The potential for noise and visual disturbance to occur will be limited to where construction works are undertaken at the edge of the Order limits, with any works carried out towards the centre of the Scheme having little disturbance potential outside the Order limits.

8.12.35 Noise modelling at human receptors presented in **ES Volume I Chapter 11: Noise and Vibration [EN010152/APP/6.1]** also shows that based on the criteria construction related noise quickly dissipates to below levels considered to be disturbing, at 200m and in many instances 100m. In combination with existing vegetation, such as trees and hedgerows, which will screen, in many places the presence of construction vehicles and operatives, visual disturbance is likely to be limited. The set back of Solar PV Panels at least 100m from the River Went (and further in many areas), means that any potential disturbance during construction will be restricted to areas within the Order limits, south of the River Went, with areas outside the Order limits not subject to significant disturbance. All noise generating activities carried out for the Scheme will be temporary with works in a given area typically completed in a matter of weeks. As such, the magnitude of disturbance is low, resulting in a temporary **minor adverse** effect that is **not significant.**

Temporary Loss of Arable Field Habitat Supporting Non-Breeding (Wintering and Passage) Farmland Birds

8.12.36 The survey of non-breeding birds (**ES Volume III Appendix 8-8: Non-Breeding Bird Report [EN010152/APP/6.3])** identified a non-breeding assemblage of farmland birds including Grey Partridge and Skylark as being of a District importance.

8.12.37 The construction of the Scheme will lead to the loss of arable field habitats used by non-breeding Skylark and to a certain extent Grey Partridge. Extensive areas of neutral grassland creation included areas maintaining 'openness' have been incorporated into the Scheme Design. These areas will be subject to grassland creation and targeted management, with a combination of tussocky grass and floristic diverse seed mixes used to maximise the availability of over-winter seed resource. In addition to these larger undeveloped areas, wide margins (c.15m) have been left alongside numerous internal access tracks, as well as wide grassland margins and undeveloped corners of fields, particularly along the periphery of the Scheme. A similar treatment to the larger undeveloped areas will be applied to these linear habitats, providing diverse grassland for foraging.

8.12.38 With consideration of the embedded mitigation measures set out above, the magnitude of habitat loss is low, resulting in a **minor adverse to negligible** effect which is **not significant** to populations of non-breeding Skylark and Grey Partridge.

Summary

8.12.39 Table 8-13 provides a summary of the magnitude of impacts and likely significance of environmental effects on important ecological features during the construction of the Scheme.

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

IEF	Sensitivity (Value)	Description of Impact	Magnitude of Impact	Effect Category	Significant Effect?
Neutral grassland	Medium	Temporary loss of habitat. Reversible.	Medium	Minor adverse	No
Scattered trees (non-ancient/veteran)	Medium	Permanent (long-term) loss of habitat.	Low	Negligible	No
Veteran trees	Medium	Temporary damage to Root Protection Areas	Low	Negligible	No
Hedgerows	Medium	Habitat loss, including loss of important hedgerows. Temporary (medium term while hedgerows planted establish, reversible).	Low	Minor adverse	No
Open Mosaic Habitat on Previously Developed Land including any associated invertebrate populations	Medium	Temporary (short-term) reversible loss of habitat, reversible.	Low	Minor adverse	No

IEF	Sensitivity (Value)	Description of Impact	Magnitude of Impact	Effect Category	Significant Effect?
Rivers and streams, including associated macroinvertebrate populations	Low	Habitat loss/fragmentation (wet ditches/drains only), where crossed using open-cut techniques for cable installation.	Low	Minor adverse	No
Ground-nesting breeding birds (including farmland birds)	Medium	Direct loss of habitat in the form of arable fields	Low	Minor adverse to negligible	No
Non-breeding waterbirds	Medium	Temporary disturbance due to noise/visual.	Low	Negligible	No
Non-breeding farmland birds	Medium	Temporary loss and fragmentation of habitat in the form of arable fields	Low	Minor adverse to negligible	No

Operation and Maintenance

8.12.40 The evaluation has identified that during the operation and maintenance of the Scheme the following potential impacts on IEFs have been taken forward for further assessment:

a. Displacement of foraging/commuting bats by the presence of Solar PV Panels.

Displacement of Foraging/Commuting Bats by the Presence of Solar PV Panels

8.12.41 There is limited scientific literature available on the impacts to bats from solar farms (Ref. 8-78, Ref. 8-79, Ref. 8-80), The first large scale NSIP solar scheme Cleve Hill in Kent received planning consent in May 2020 (Ref. 8-81) and is not yet operational so it is too early to fully predict long-term effects on bat populations on this comparable sized Scheme.

8.12.42 A recent study in 2019 and 2020 on 19 small solar schemes in the southwest of England (Ref. 8-82) found that bats avoided fields with solar panels during operation. Total bat activity was almost halved at the boundaries of solar panel fields compared to that of control sites and at the centre of solar panel fields, bat activity dropped by two-thirds. The reasons for this have not been fully determined but the paper suggests that solar panels could, in theory, inadvertently reduce the abundance of insects by lowering the availability of the plants they feed on. Solar panels may also reflect a bats' echolocation calls, making insect detection more difficult. Reduced feeding success around the panels may result in fewer bats using the surrounding hedgerows for commuting, potentially explaining the findings.

8.12.43 It should be noted that these sites did not have any significant new tree/hedge planting, and/or grassland creation and may not be comparable to this Scheme (and other large-scale DCO schemes) where significant areas of habitat compensation and enhancement are provided. All the small solar PV sites in the study were on grassland that was either grazed or managed through mowing or were on cut arable crops and therefore the avoidance behaviour observed by bats may be different at this Scheme where the embedded mitigation and proposed habitat compensation and enhancement will include large areas of grassland managed for conservation, habitat buffers, wetland scrapes and new tree and hedge planting. The authors also recommend maintaining boundaries, planting vegetation to network with surrounding foraging habitat and monitoring.

8.12.44 Another recent study in France in 2022 (Ref. 8-83) found an overall decrease in foraging activity over solar panels, although the exact reasons for this were not identified. The authors recommended that efforts should be made first to avoid building solar farms on sites with higher foraging potential and second to offset any perceived residual effects by improving the surrounding land and/or solar farms to provide better foraging opportunities, which the Scheme has achieved. In this way, populations of bats can be supported alongside the generation of renewable energy. The Scheme design maintains commuting and foraging routes and solar panels are largely contained to areas currently used for extensive arable farming.

8.12.45 The baseline data shows that the open fields that make up the Solar PV Site support very limited foraging and commuting behaviour. Taking this into account as well as embedded mitigation measures and a Scheme design which sets back Solar PV Panels from all important habitats used by foraging bats, i.e. hedgerows and woodlands, there is no robust data to suggest that, with the embedded mitigation measures set out in Section 8.10, significant displacement of bats from these habitats will occur. As such, it is assessed that the magnitude of this impact is low, which results in a **negligible** effect, that is **not significant** to the overall bat populations present within the Order limits and does not affect the integrity of any particular bat species population.

Summary

8.12.46 Table 8-14 provides a summary of the magnitude of impacts and likely significance of environmental effects on important ecological features during the operation and maintenance of the Scheme.

Table 8-14: Summary of Magnitude of Operation and Maintenance Impact and Significance of Effect

IEF	Sensitivity (Value)	Description of Impact	Magnitude of Impact	Effect Category	Potential for a Significant Effect?
Bats	Medium	Informed by detailed bat surveys (see **ES Volume III Appendix 8-3**: **Bat Survey Report [EN010152/APP/6.3]**) identifying important areas for foraging and commuting bats and taking into account embedded mitigation measures set out in Section 8.10 and a Scheme design which sets back the Solar PV Panels from all important habitats used by foraging bats, i.e. hedgerows and woodlands, the findings from research at small operational solar sites are not considered comparable with the careful design configuration of the Scheme. As such, no adverse effect on the overall bat populations present within the Order limits or integrity of any particular bat species population is predicted.	Low	Negligible	No

Decommissioning

8.12.47 It has been assumed that decommissioning impacts will be similar to those occurring during construction, with retention, where reasonably practicable, of important ecological features present at the time of decommissioning and any impacts mitigated fully in line with relevant legislative and policy requirements in place at the time. It is anticipated that the existing protected species legislation would remain in place, or that any replacement legislation will offer the same level of protection. The assessment of effects at construction presented in Table 8-13, is therefore also considered to represent decommissioning effects.

8.12.48 Upon decommissioning, the above-ground physical infrastructure within the Solar PV Site (e.g. Solar PV Panels, Field Stations and the Field Station Units/Substations) will be removed. Where hardstanding has been created this will be removed and the original soil profile reinstated (using stockpiled site-won soils) returning the land to its predevelopment condition. It is noted that the future of the On-Site Substation and the Grid Connection Cables, would be agreed with asset owners prior to commencement of decommissioning. It is common practice for such infrastructure to be retained and used for another purpose after the development they were originally installed to support is decommissioned. This would be subject to separate agreements at the time. Consequently, the land will be returned to the landowners in the same condition (Agricultural Land Classification [ALC] grading) as prior to development and will be capable of supporting arable production (as present). It is anticipated that the areas of habitat and biodiversity mitigation and enhancement within the Solar PV Site will be left in situ given they could contain protected species and so relevant licences at the time would be obtained for any changes. It is anticipated, however, that the majority of the Solar PV Site will be returned to its original use and condition after decommissioning, although post-development land use (for instance re-establishment of arable use) would be up to the individual landowners.

8.12.49 The mode of cable decommissioning for the Grid Connection Cables will be dependent upon government policy and best practice at that time of decommissioning taking place. Currently, the most environmentally acceptable option is considered to be leaving the cables in situ, as this avoids disturbance to overlying land and habitats and to neighbouring communities. Alternatively, the cables can be removed by opening up the ground at regular intervals and pulling the cable through to the extraction point, avoiding the need to open up the entire length of the cable route. The impact assessment in the ES is be based on the ‘worst-case’ parameters.

8.12.50 A **Framework DEMP [EN010152/APP/7.9]** is included with the DCO Application. This sets out the general principles to be following in the decommissioning of the Scheme. A detailed DEMP will be prepared and agreed with the relevant authorities at the time of decommissioning, in advance of the commencement of decommissioning works, and would include timescales and transportation methods.

8.13 Additional Mitigation, Enhancement and Monitoring

Mitigation

8.13.1 All necessary mitigation has been embedded within the Scheme design through appropriate avoidance and protection measures and detailed in the **Framework CEMP [EN010152/APP/7.7], Framework OEMP [EN010152/APP/7.8], Framework DEMP [EN010152/APP/7.9]** and **Framework LEMP [EN010152/APP/7.14]** all secured through the DCO**.** Taking into consideration all of the mitigation measures that have been embedded into the scheme, all adverse effects are deemed not to be significant, and additional mitigation is not required.

Enhancement

8.13.2 Enhancements are included within the Scheme design to increase the biodiversity of the Scheme. The Scheme is committed to deliver BNG in accordance with the requirements of the **Draft DCO [EN010152/APP/3.1**]. As set out in the **BNG Assessment [EN010152/APP/7.11],** based on the illustrative layout, the Scheme is predicted to result in a net gain of 36.46% for area-based habitat units, 62.75% for hedgerow units, and 62.75% for watercourse units.

8.13.3 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.

8.13.4 The enhancements listed below are all detailed within the **Framework LEMP [EN010152/APP/7.14]** and illustrated on the Indicative Landscape Masterplan in the **Framework LEMP [EN010152/APP/7.14]** and secured through the DCO.

Native Hedgerow Planting with Trees and Hedgerow Enhancement

8.13.5 Existing hedgerows will be managed to enhance biodiversity and improve ecosystem services. This will involve filling gaps and thickening hedgerows with a broader range of native species, where needed, and planting additional native hedgerow trees with locally appropriate species. Management practices will include adjusting cutting regimes to provide cover, shelter and food sources for biodiversity, including breeding birds and invertebrate species such as Brown Hairstreak

8.13.6 New hedgerows with trees will be planted across the Solar PV Site to help supplement the existing hedgerow network. Indicative species include Hazel *Corylus avellana*, hawthorn *Crataegus monogyna*, holly *Ilex aquifolium*, blackthorn *Prunus spinosa*, dog rose *Rosa canina*, and guelder rose *Viburnum opulus*. New hedgerows with trees will provide valuable habitats for a range of species, allowing for better connectivity across the Scheme. Indicative hedgerow trees species include field maple *Acer campestre*, black

poplar *Populus nigra,* bird cherry *Prunus padus*, English oak *Quercus robur* and white willow *Salix alba*. Hedgerows will be maintained at a height of at least 3.5 m and allowed to grow wide providing maximum benefits for biodiversity

Scrub

8.13.7 Native scrub areas will be incorporated into the Scheme to enhance biodiversity and create a diverse mosaic of scrub and grassland habitat, which includes providing shelter and food resources for birds and other wildlife. The scrub areas have been designed to have no single dominant species; however, the composition will favour dense, shrubby growth which is typical of bushes and small tree species. This will create a scrub-like environment which better caters for local biodiversity. Indicative species include field maple, hazel, hawthorn, blackthorn, holly, dog rose and white willow.

Grassland creation

8.13.8 New grassland will be established across the Scheme, throughout the Solar PV Panels and in areas outside of the fenceline, such as along hedgerows and field margins. By establishing a diverse sward of grasses and herbs biodiversity will increase, enhancing value for wildlife. A large green corridor of species-rich neutral grassland will run through the centre of the Solar PV Site, providing a continuous seam of grassland. This will connect habitats in the north and the south of the Scheme, as well as providing valuable nesting opportunities for ground nesting birds.

8.13.9 Neutral grassland features a diverse mix of grasses, herbs and wildflowers and is a valuable habitat for a wide range of wildlife, including birds, small mammals and insects. The mix of grass species found in each location will be dependent on soil composition, proximity to wetland areas, light levels and management techniques.

8.13.10 Where practicable, seed mixes will be obtained from local sources to ensure continuity and to create a species mix that is best suited to the local environment.

8.13.11 In areas where existing neutral grassland exists, which includes a number of fields within the northeast of the Solar PV Site, there will be minimal disruption to the existing grassland.

Riparian Corridor Enhancements

8.13.12 The riparian corridor south of the River Went will be extended, with the creation of wet grassland to the north of the Solar PV Site, on areas of former arable land. Elsewhere the existing riparian mosaic will be maintained, including areas of Coastal and Floodplain Grazing Marsh. This will include the River Went LWS, which will be incorporated into the wider management of the River Went corridor and riparian habitats, with an appropriate cutting and/or grazing regime introduced.

8.13.13 Wet grassland will be sown, using a wetland grassland seed mix to provide a diverse selection of native wildflowers and grasses with the ability to withstand seasonal flooding, providing environmental benefits to pollinator, ground nesting birds and other wildlife.

Wetland Scrapes

8.13.14 A series of linear wetland scrapes will be delivered within the River Went riparian corridor. The exact location of these will be determined through additional site survey work. Where practicable, a network of scrapes of different sizes and depths will be provided. These will create suitable habitat for waders and wildfowl and will enhance biodiversity generally.

Provision of Habitat Boxes

8.13.15 Habitat boxes will be installed on suitable features (buildings and trees) within the Order limits to provided additional nesting and roosting opportunities for bats and a range of bird species, including barn owl. Information on the types of boxes that will be installed is provided in the **Framework LEMP [EN010152/APP/7.14]**. The provision of a detailed LEMP and implementation the prescriptions it contains will be secured through a DCO Requirement.

Creation of Habitat Piles

8.13.16 A number of reptile and amphibian hibernacula/refugia will be provided utilising logs created during the removal of trees, through small bunds over logs/inert rubble, or brash piles, as detailed in the **Framework LEMP [EN010152/APP/7.14]**

Significance of Effects (with Enhancement)

8.13.17 With the implementation of the measures incorporated in the **Framework LEMP [EN010152/APP/7.14]** and secured through the DCO, the Scheme has the potential to generate beneficial effects for a range of the IEFs identified in Table 8-9. Where relevant, the impact of these is assessed and the significance of the effect outlined in Table 8-15.

Table 8-15: Summary of Magnitude of Impact and Significance of Effect (with Enhancement)

IEF	Sensitivity (Value)	Description of Enhancement Measures	Magnitude of Impact	Effect Category	Significant Effect?
Went Valley (Part) LWS	Medium	The retention of the LWS within the Order limits allows the opportunity to bring the site into the wider management of the Scheme. The creation and positive management of wetland grasslands along the River Went corridor will link into the LWS, creating a connected riparian corridor, specifically managed for biodiversity.	Medium	Moderate beneficial	Yes
Lowland mixed deciduous woodland and individual trees (including veteran trees)	Medium	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 existing mature woodlands. New areas of tree and hedgerow planting will be allowed to grow tall and wide to provide maximum benefits for biodiversity and will be created as screening from Scheme infrastructure, to improve habitat connectivity (for species such as bats and birds) and increase the area of hedgerow (and woodland habitat) within the Order limits. This will further secure the long-term future of these woodlands and is in line with the expectations of national and local planning policy.	Medium	Moderate beneficial	Yes

IEF	Sensitivity (Value)	Description of Enhancement Measures	Magnitude of Impact	Effect Category	Significant Effect?
Neutral grassland	Medium	Species-rich grassland will be established across the Scheme, under the PV panels and in set aside areas. By establishing a diverse sward of grasses and herbs biodiversity will increase, enhancing value for wildlife. A large area of neutral grassland in good condition will run through the centre of the Solar PV Site, and grasslands along the River Went corridor will seek to achieve characteristics of CFGM.	Medium	Moderate beneficial	Yes
Hedgerows	Up to Medium	New hedgerow planting and bolstering of existing defunct hedgerows will be undertaken during construction of the Scheme and will form broad habitat corridors across the Order limits and, during operation of the Scheme. This will increase connectivity across the Order limits for species that may use such habitats (such as bats). Gaps in currently defunct hedges will be planted with suitable native species to improve the connectivity of habitats (such as between areas of broad-leaved woodland) within and adjacent to the Order limits. Hedgerows 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.	Medium	Moderate beneficial	Yes

IEF	Sensitivity (Value)	Description of Enhancement Measures	Magnitude of Impact	Effect Category	Significant Effect?
		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.			
Running Water (Rivers and Streams)	Up to Medium	New habitats created by the Scheme will see the removal of agricultural chemicals from land parcels within the Solar PV Site reducing the quantity of agricultural run-off and chances of eutrophication in nearby rivers and ditches. This will further secure the long-term future of these habitats and is in line with the expectations of national and local planning policy.	Medium	Moderate beneficial	Yes
Aquatic macroinvertebrates	Low	As described above for running water habitats, reducing the quantity of agricultural run-off and chances of eutrophication in nearby rivers and ditches will have benefits for aquatic macroinvertebrates associated with these watercourses.	Medium	Minor beneficial	No
Terrestrial Invertebrates	Up to Medium	The conversion of intensively managed arable farmland to grassland within the Solar PV Site is likely to be of immediate benefit to terrestrial invertebrates. An increase in permanent habitat of greater floristic diversity than arable farmland and	Medium	Moderate benefit	Yes

IEF	Sensitivity (Value)	Description of Enhancement Measures	Magnitude of Impact	Effect Category	Significant Effect?
		indirect beneficial impacts through a reduction of agricultural chemical inputs to watercourses and a reduction in pesticide use on crops is likely to result in an increase in invertebrate abundance and diversity. In addition, allowing hedgerows to grow tall and wide, with sensitive management regimes and planting of native species such as Blackthorn, will be of benefit to specific species such as Brown Hairstreak.			
Reptiles	Low	The increase in permanent grassland habitat of greater floristic diversity than arable farmland across the Solar PV Site will result in an increase in invertebrate abundance and habitat niches, which, during the lifetime of the Scheme will provide conditions suitable for the spread of reptiles with the potential for increased colonisation of the Solar PV Site by reptile and common amphibian species from the wider area. This is in line with the expectations within national and local planning policy.	Medium	Minor beneficial	No
Breeding Birds (General breeding bird assemblage)	Medium	New planting of hedgerows and trees, alongside natural regeneration of woodland and allowing such habitats to grow tall and wide will be of benefit to the majority of breeding bird species by providing additional	Medium	Moderate beneficial	Yes

IEF	Sensitivity (Value)	Description of Enhancement Measures	Magnitude of Impact	Effect Category	Significant Effect?
		foraging, roosting and potential nesting habitat. The increase in woodland, scrub and hedgerow habitat, likely resulting in an increase in invertebrate abundance and of fruiting tree species (providing additional foraging resources) will, during the lifetime of the Scheme, be of benefit to the majority of breeding bird species and will also create additional opportunities for breeding bird species to nest.			
Bats (roosting and foraging/commuting)	Medium	New planting of hedgerows and trees, alongside natural regeneration of woodland and allowing such habitats to grow tall and wide will be of benefit to the majority of bat species by providing additional foraging and commuting corridors and potential roosting habitat. The increase in woodland, scrub and hedgerow habitat, creating corridors across the Order limits and likely resulting in an increase in invertebrate abundance (providing additional foraging resources) will, during the lifetime of the Scheme, be of benefit to bat species. The change from agriculture to solar panels with surrounding grassland as well as new areas of grassland (based on a net biodiversity	Low	Minor beneficial	No

IEF	Sensitivity (Value)	Description of Enhancement Measures	Magnitude of Impact	Effect Category	Significant Effect?
		gain of >10%) has the potential to improve the foraging habitat for bats. New grassland areas will provide a range of niches for invertebrates in and around the solar panels. The provision of artificial roost sites for bats in selected trees to provide roosting features in the long-term would benefit some species as tree hollow/cavity scarcity is a threat to bats and other cavity-dependent vertebrate wildlife. This is in line with the expectations of national and local planning policies pertaining to the natural environment and biodiversity.			
Badger	Low	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 of national and local planning policy.	Medium	Minor beneficial	No
Other mammals (Brown Hare, Hedgehog and Harvest Mouse)	Low	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 Brown Hare, Hedgehog and Harvest Mouse. This is in line with the expectations of national and local planning policy.	Medium	Minor beneficial	No

8.13.18 The Scheme will deliver significant enhancements for biodiversity in line with national (e.g. the NPPF) and local (e.g. the Doncaster Biodiversity Action Plan and emerging Local Nature Recovery Strategy) policies and their biodiversity priorities to deliver a net gain in biodiversity. A robust monitoring programme is also provided in the **Framework LEMP [EN010152/APP/7.14]**, secured through the DCO, to ensure mitigation and enhancement measures are delivered successfully

Monitoring

Pre-construction

8.13.19 Pre-construction surveys will be undertaken during the appropriate seasons prior to the construction of the Scheme. These will inform detailed design, provide up to date status of protected species that require mitigation during site clearance, and inform any protected species licensing that may be required should species distribution change or detailed design result in licencing requirements for species such as bats, badger or otter, which are currently not anticipated to be necessary.

Construction

8.13.20 Ongoing monitoring of habitats and species will be undertaken throughout construction, over seen by an appointed ECoW of suitable qualifications and experience, or in charge of a team of appropriately qualified ecologists. The ECoW will have the appropriate authority to review RAMS, oversee works and recommend action as appropriate, including temporarily stopping works where non-compliant working is observed, e.g. to safeguard protected species and their habitats, or where any other breaches of environmental legislation are likely to occur. This is detailed within the **Framework CEMP [ENE010152/APP/7.7**]

Operation

8.13.21 During the operational lifetime of the Scheme, habitats within the Order limits will be suitably managed and monitored, in accordance with prescriptions set out within a detailed LEMP which will be secured through a DCO Requirement and informed by the **Framework LEMP [EN010152/APP/7.14]**. Habitats will be monitored to ensure that the target conditions set out in the **BNG Assessment [EN010152/APP/7.11]** are being achieved. Additionally, the habitats within the Ecology Mitigation Area will also be monitored to ensure that they are continuing to meet the needs of the species that they have been created to support. Management prescriptions will be reviewed and potentially updated should monitoring indicate that the target conditions are not being achieved.

Decommissioning

8.13.22 Further surveys for protected habitats and species will take place prior to producing the detailed DEMP and commencing with decommissioning works. These will inform decommissioning methods and inform the need for any protected species licenses required to facilitate decommissioning. Ongoing monitoring will be undertaken throughout decommissioning, over seen by an appointed ECoW of suitable qualifications and experience, or in charge of a team of appropriately qualified ecologists. This is detailed within the **Framework DEMP [EN010152/APP/7.9].**

8.14 Residual Effects

8.14.1 This section summarises the residual significant effects of the Scheme on Ecology following the implementation of embedded mitigation and enhancement.

8.14.2 With the implementation of suitable embedded mitigation (as detailed within Section 8.10), the assessment of effects on the important ecological features (summarised in Table 8-13 and Table 8-14) has concluded that no significant adverse effects arise during construction, operation and decommissioning of the Scheme and no additional mitigation is required.

8.14.3 With consideration of the enhancement measures set out in Section 8.13 and as shown in the Indicative Landscape Masterplan in the **Framework LEMP [EN010152/APP/7.14]**, Table 8-15 concludes that the Scheme will result in significant beneficial effects on the following important ecological features:

a. Went Valley (Part) LWS
b. Lowland mixed deciduous woodland and individual trees (including veteran trees)
c. Neutral grassland
d. Hedgerows
e. Running water
f. Terrestrial invertebrates
g. Breeding Birds (General breeding bird assemblage)

8.14.4 As detailed within the **BNG Assessment [EN010152/APP/7.11],** based on the current plans the Scheme is predicted to result in a net gain of +36.46% for area-based habitat units, +62.75% for hedgerow units, and +24.97%% for watercourse units. This is likely to underestimate the actual BNG that will be achieved by the Scheme, as the assessment has been carried out based on maximum design principles, including maximum footprint of infrastructure and maximum clearance of vegetation for construction. The Applicant therefore commits to achieving a minimum 10% BNG for all units and will demonstrate this via an updated BNG assessment prior to construction.

8.15 Cumulative Effects

8.15.1 This section assesses the potential effects of the Scheme in combination with the potential effects of other proposed and committed plans and projects including other developments (referred to as 'cumulative developments') within the surrounding area.

8.15.2 The cumulative developments to be considered in combination with the Scheme have been prepared and shared with City of Doncaster Council as host, and North Yorkshire Council and East Riding of Yorkshire Council as neighbouring authorities and are listed in **ES Volume I Chapter 15: Cumulative Effects and Interactions [EN010152/APP/6.1]** and presented in **ES Volume II Figure 15-3: Location of Short List Schemes [EN010152/APP/6.2]**. The assessment has been made with reference to the methodology and guidance set out in **ES Volume I Chapter 5: Environmental Impact Assessment Methodology [EN010152/APP/6.1]**.

8.15.3 For each important ecological feature, this cumulative effect assessment identifies the areas where the predicted effects of the Scheme could interact with effects arising from other plans and, or projects on the same feature based on a spatial and, or temporal basis.

8.15.4 Cumulative ecological effects may result where effects resulting from a number of developments combine, increasing the prevalence of such effects. The likely significance of these effects relates to the number of developments affecting the particular important ecological feature, their scale, their inter-relationship and the sensitivity and ability of the particular feature to accommodate this combined level of change from the developments.

8.15.5 Important ecological features that have been assessed as having no or Negligible effects from the Scheme have not been included in the assessment of cumulative effects, as it is considered unlikely that the addition of a Negligible effect to the cumulative effects of other developments within the ZoI would lead to a significant cumulative impact.

8.15.6 For the purposes of the cumulative ecological assessment, the worst-case scenario of all the shortlist developments being constructed and therefore present in the ZoI simultaneously has been assumed; however, this is considered a highly precautionary approach and unlikely to occur. If construction were not to occur simultaneously then the reported cumulative effect would be reduced.

8.15.7 Potential likely significant ecological cumulative effects which may arise during the construction, operation and decommissioning phases of the Scheme are outlined in Table 8-13 and Table 8-14. The tables only discuss receptors and impacts where cumulative developments have specifically referred to having an impact on, and therefore have potential of a cumulative effect with this Scheme. Those receptors where none of the cumulative developments have stated to having an impact on, and therefore have no potential of cumulative effects arising, are not stated in the table.

8.15.8 In summary, the residual effects identified in Section 8.14 (which confirms there are no likely significant adverse effects associated with the Scheme) are not altered when considering any interactions with cumulative

developments, and as such there are no likely significant cumulative adverse effects.

8.15.9 The substantial benefit from the enhancements associated with the Scheme would likely be enhanced further by other cumulative developments achieving enhancements, but given the geographical separation of most the cumulative developments (and therefore not affecting the same local features), cumulative effects arising from project specific enhancements may not occur.

Table 8-16: Ecology Cumulative Effects Assessment

Important Ecological Feature	Importance (value)	Description of the Potential Impact from the Scheme	Residual Effect Category	Scheme ID	Description of Cumulative Impact	Residual Cumulative Effect Category	Cumulative Significant Effect (Yes/No)
Went Valley (Part) LWS	Medium	Habitat improvement	Moderate beneficial	4, 5	Neither of the projects identify or share impacts which may interact with the Went Valley (Part) LWS. Therefore, no cumulative effects are generated and the residual effect reported for the Scheme remains unchanged.	Moderate beneficial	Yes
Lowland mixed deciduous woodland and individual trees (including veteran trees)	Medium	Increased planting across the Scheme and positive management	Moderate beneficial	4, 5	Neither of the projects identify or share impacts which may interact with woodland and veteran trees associated with the Scheme. Therefore, no cumulative effects are generated and the residual effect reported for the Scheme remains unchanged.	Moderate beneficial	Yes
Neutral grassland	Medium	Habitat creation and positive long-term management	Moderate beneficial	1, 6, 11	All three projects are predicted to result in the loss of areas of neutral grassland and provide, or will have to provide, measures to compensate for this loss. The nature of the projects (energy generation) will likely result in opportunities to create areas of diverse grassland.	Moderate beneficial	Yes

Important Ecological Feature	Importance (value)	Description of the Potential Impact from the Scheme	Residual Effect Category	Scheme ID	Description of Cumulative Impact	Residual Cumulative Effect Category	Cumulative Significant Effect (Yes/No)
					Temporal and spatial gaps between the projects and the Scheme mean there are no shared impacts which may interact with neutral grassland associated with the Scheme, nor will there be a reduction in the habitat resource within the ZoI. Therefore, no cumulative effects are generated and the residual effect reported for the Scheme remains unchanged.		
Hedgerows	Up to Medium	Habitat creation and enhancement and positive long-term management.	Moderate beneficial	3, 4, 5, 11, 36, 37	Whilst individually the cumulative projects may have localised effects on small sections of hedgerows specific to their development area, there is no spatial overlap in the hedgerow resource, with cumulative projects mitigating any loss, where appropriate. In addition, projects 36 and 37 include the creation of new hedgerow and it would be expected that all projects will be required to look for improvements to the local hedgerow resource. Therefore, no cumulative effects are generated and the residual effect	Moderate beneficial	Yes

Important Ecological Feature	Importance (value)	Description of the Potential Impact from the Scheme	Residual Effect Category	Scheme ID	Description of Cumulative Impact	Residual Cumulative Effect Category	Cumulative Significant Effect (Yes/No)
					reported for the Scheme remains unchanged.		
Open Mosaic Habitat on Previously Developed Land	Medium	Temporary (short-term) loss of habitat due to cable installation along the Grid Connection Corridor, reversible.	Minor adverse	1, 7	An area of this habitat type will also be lost within project 7, which is 0.5km away from the Order limits. An area marked as OMH on MAGIC but assessed as a mosaic of various habitats is also to be lost within project 1. Within both projects the habitat loss is compensated for with the creation of other biodiverse habitats. As the loss of OMH associated with the Scheme will only be temporary during the installation of cables and restricted to the working corridor (30m in width), it is not considered that the Scheme will act cumulatively with the other projects (which may result in a permanent loss of this habitat type) to generate an effect on the overall OHM resource within the ZoI. Indeed, the disturbance associated with the installation of cables will likely create suitable conditions for bare/disturbed ground niches required for ephemeral/short	Minor adverse	No

Important Ecological Feature	Importance (value)	Description of the Potential Impact from the Scheme	Residual Effect Category	Scheme ID	Description of Cumulative Impact	Residual Cumulative Effect Category	Cumulative Significant Effect (Yes/No)
					perennial plant communities (a feature of OMH). Therefore, no cumulative effects are generated and the residual effect reported for the Scheme remains unchanged.		
Running Water (Rivers and streams)	Up to Medium	Improved water quality through reduction in agricultural chemicals.	Moderate beneficial	2, 7	Neither of the projects identify or share impacts which may interact with running water habitats associated with the Scheme. Therefore, no cumulative effects are generated and the residual effect reported for the Scheme remains unchanged.	Moderate beneficial	Yes
Aquatic macro-invertebrates	Low	Improved water quality through reduction in agricultural chemicals.	Minor beneficial	2, 7	Neither of the projects identify or share impacts which may interact with aquatic macro-invertebrates associated with the Scheme. Therefore, no cumulative effects are generated and the residual effect reported for the Scheme remains unchanged.	Minor beneficial	No

Important Ecological Feature	Importance (value)	Description of the Potential Impact from the Scheme	Residual Effect Category	Scheme ID	Description of Cumulative Impact	Residual Cumulative Effect Category	Cumulative Significant Effect (Yes/No)
Terrestrial Invertebrates	Up to Medium	Habitat creation and positive management	Moderate beneficial	4, 5	Neither of the projects identify or share impacts which may interact with terrestrial invertebrates associated with the Scheme. Therefore, no cumulative effects are generated and the residual effect reported for the Scheme remains unchanged.	Moderate beneficial	Yes
Reptiles	Low	Habitat creation and positive management	Minor beneficial	4, 5	Neither of the projects identify or share impacts which may interact with reptiles associated with the Scheme. Therefore, no cumulative effects are generated and the residual effect reported for the Scheme remains unchanged.	Minor beneficial	No
Breeding Birds (General breeding bird assemblage)	Medium	Habitat creation and positive management	Moderate beneficial	4, 5	Neither of the projects identify or share impacts which may interact with breeding birds associated with the Scheme. Therefore, no cumulative effects are generated and the residual effect reported for the Scheme remains unchanged.	Moderate beneficial	Yes

Important Ecological Feature	Importance (value)	Description of the Potential Impact from the Scheme	Residual Effect Category	Scheme ID	Description of Cumulative Impact	Residual Cumulative Effect Category	Cumulative Significant Effect (Yes/No)
Ground-nesting breeding birds (including farmland birds)	Medium	Direct loss of habitat in the form of arable fields	Minor adverse to negligible	1, 3, 4, 5, 6, 7, 9 and 11	Project 1 was assessed as having no residual significant effect on breeding birds. Project 3 discussed impacts of solar farms upon ground-nesting birds and identified a negligible residual effect, citing literature supporting the use of solar schemes by breeding birds. Project 3 results in a loss of arable grassland for ground-nesting birds however this is a small area and is not deemed to act in-combination. Project 7 supported skylark and grey partridge but effects were not significant beyond a site level. Project 9 assessed effects on breeding birds as being site level. As none of the nearby schemes are likely to impact breeding birds beyond a site level, impacts were not deemed significant. Therefore, no cumulative effects are generated and the residual effect reported for the Scheme remains unchanged.	Minor adverse to Negligible	No

Important Ecological Feature	Importance (value)	Description of the Potential Impact from the Scheme	Residual Effect Category	Scheme ID	Description of Cumulative Impact	Residual Cumulative Effect Category	Cumulative Significant Effect (Yes/No)
Non-breeding waterbirds	Medium	Temporary disturbance due to noise/visual.	Minor adverse	1, 4, 5	Project 1 may affect waterbirds due to the suitable habitats on site however was assessed as having no residual significant effect on wintering birds. Neither project 4 or 5 identify or share impacts which may interact with non-breeding waterbirds associated with the Scheme. Therefore, no cumulative effects are generated and the residual effect reported for the Scheme remains unchanged.	Minor adverse	No
Non-breeding farmland birds	Medium	Temporary loss and fragmentation of habitat in the form of arable fields.	Minor adverse to negligible	1, 3, 4, 5, 7, 11	Project 1 was assessed as having no residual significant effect on wintering birds. Projects 3 and 7 assessed impacts upon non-breeding birds but identified site-level effects only. Project 11 is likely to support non-breeding birds but of a significance for which an EIA is required. Neither project 4 or 5 identify or share impacts which may interact with non-breeding birds associated with the Scheme. Therefore, no cumulative effects are generated and the residual effect	Minor adverse to Negligible	No

Important Ecological Feature	Importance (value)	Description of the Potential Impact from the Scheme	Residual Effect Category	Scheme ID	Description of Cumulative Impact	Residual Cumulative Effect Category	Cumulative Significant Effect (Yes/No)
					reported for the Scheme remains unchanged.		
Bats (roosting and foraging/commuting)	Medium		Minor beneficial	3, 4, 5, 36	Projects 3 and 36 include the creation of Solar PV Sites and as such have the potential to act in-combination upon foraging bats locally, however each scheme has committed to enhancing foraging and commuting opportunities for bats and as such there is not anticipated to be a loss of foraging opportunities in the area. Neither project 4 and 5 identify or share impacts which may interact with bats associated with the Scheme. Therefore, no cumulative effects are generated and the residual effect reported for the Scheme remains unchanged.	Minor beneficial	No
Badger	Low	Habitat creation and positive management	Minor beneficial	4, 5	Neither of the projects identify or share impacts which may interact with Badger associated with the Scheme. Therefore, no cumulative effects are generated and the residual effect reported for the Scheme remains unchanged.	Minor beneficial	No

Important Ecological Feature	Importance (value)	Description of the Potential Impact from the Scheme	Residual Effect Category	Scheme ID	Description of Cumulative Impact	Residual Cumulative Effect Category	Cumulative Significant Effect (Yes/No)
Other mammals (Brown Hare, Hedgehog and Harvest Mouse)	Low	Habitat creation and positive management	Minor beneficial	4, 5	Neither of the projects identify or share impacts which may interact with other mammal species associated with the Scheme. Therefore, no cumulative effects are generated and the residual effect reported for the Scheme remains unchanged.	Minor beneficial	No

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