One Earth Solar Farm

Volume 6.0: Environmental Statement [EN010159]

Volume 2: Aspect Chapters

Chapter 6: Biodiversity

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Contents

Glossary

Term	Definition
Baseline	Refers to existing conditions as represented by latest available survey and other data which is used as a benchmark for making comparisons to assess the impact of development.
Baseline conditions	The environment as it appears (or would appear) immediately prior to the implementation of the proposed development together with any known or foreseeable future changes that will take place before completion of development.
Code of Construction Practice	The code sets out the standards and procedures to which developers and contractors must adhere to when undertaking construction of major projects. This will assist with managing the environmental impacts and will identify the main responsibilities and requirements of developers and contractors.
Construction effects	Used to describe both temporary effects that arise during the construction phases as well as permanent existence effects that arise from the physical existence of development (for example new buildings).
Cumulative effects	Additional changes caused by a Proposed Development in conjunction with other similar developments or as a combined effect of a set of developments, taken together' (Scottish Natural Heritage (SNH), 2012).
DCO Application	An application for consent to undertake a Nationally Significant Infrastructure Project made to the Secretary of State who will decide on whether development consent should be granted for the proposed development.
Environmental Impact Assessment	The process of evaluating the likely significant environmental effects of a proposed project or development over and above the Baseline.
Environmental Measures	Measures which are proposed to prevent, reduce and where possible offset any significant adverse effects (or to avoid, reduce and if possible, remedy identified effects (GLVIA3, 2013 Para 3.37).
Environmental Statement	The written output presenting the full findings of the Environmental Impact Assessment.
European Protected Species	Species of plants and animals (other than birds) protected by law throughout the European Union.
European site	European sites are those that are designated through the Habitats Directive and Birds Directive (via national legislation as appropriate). Within England additional sites designated through international convention are given the same protection through policy – overall these are referred to as European sites (GLVIA3, 2013 Para 3.37).
Feature	These are as defined in Regulation 5(2) of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and include population and human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and landscape that may be at risk from exposure to pollutants which could potentially arise as a result of a proposed development.

Term	Definition
Future baseline	Refers to the situation in future years without the proposed development.
Impact	The change resulting from an action.
Indirect effects	Effects that result indirectly from a proposed development as a consequence of the direct effects, often occurring away from the site, or as a result of a sequence of interrelationships or a complex pathway. They may be separated by distance or in time from the source of the effects. Often used to describe effects on landscape character that are not directly impacted by a proposed development such as effects on perceptual characteristics and qualities of the landscape.
Likely Significant Effects	It is a requirement of Environmental Impact Assessment Regulations to determine the likely significant effects of a proposed development on the environment which should relate to the level of an effect and the type of effect.
Local Wildlife Sites	Non-statutory designations conferred by local planning authorities and given weight through local planning policy. These sites are selected through a selection of criteria (criteria are area dependent) aimed at identifying "substantive nature conservation value".
Magnitude (of change)	A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short term or long term in duration'. Also known as the 'degree' or 'nature' of change.
Nationally Significant Infrastructure Project	Major infrastructure developments in England and Wales which are consented by DCO.
Particulate matter	Microscopic portions of solid matter suspended in air. PM_{10} -microscopic particles with an aerodynamic diameter of 10 microns or less. $PM_{2.5}$ - microscopic particles with an aerodynamic diameter of 2.5 microns or less.
Planning Inspectorate	Deals with planning appeals, national infrastructure planning applications, examinations of local plans and other planning-related and specialist casework in England and Wales.
Preliminary Environmental Information Report	The Written output of the Environmental Impact Assessment undertaken prior to application for a proposed development. It is developed to support formal consultation and presents the preliminary findings of the assessment to allow an informed view to be developed of a proposed development, the assessment approach that has been undertaken, and the preliminary conclusions on the likely significant effects of a proposed development and environmental measures proposed.
Ramsar site	Areas designated by the UK Government under the International Ramsar Convention (the Convention on Wetlands of International Importance) 1971.
Scoping Opinion	Adopted by the Secretary of State for a proposed development.
Scoping Report	A report that presents findings of an initial stage in the Environmental Impact Assessment process.

Term	Definition
Sensitivity	A term applied to specific features, combining judgements of the susceptibility of the feature to the specific type of change or development proposed and the value associated with that feature.
Significance	A measure of the importance of the environmental effect, defined by criteria specific to the environmental aspect.
Significant effect	It is a requirement of the EIA Regulations to determine the likely significant effects of a development on the environment which should relate to the level of an effect and the type of effect. Where possible significant effects should be mitigated. The significance of an effect gives an indication as to the degree of importance (based on the magnitude of the effect and the sensitivity of the receptor) that should be attached to the impact described. - Whether or not an effect should be considered significant is not absolute and requires the application of professional judgement. Significant – 'noteworthy, of considerable amount or effect or importance, not insignificant or negligible'. The Concise Oxford Dictionary. - Those levels and types of landscape and visual effect likely to have a major or important / noteworthy or special effect of which a decision maker should take particular note.
Site of Special Scientific Interest	Sites designated at the national level under the Wildlife & Countryside Act 1981 (as amended). They are a series of sites that are designated to protect the best examples of significant natural habitats and populations of species.
Special Area of Conservation	International designation implemented under the Habitats Regulations for the protection of habitats and (non-bird) species. Sites designated to protect habitats and species on Annexes I and II of the Habitats Directive. Sufficient habitat to maintain favourable conservation status of the particular feature in each member state needs to be identified and designated.
Special Protection Area	Sites designated under the Birds Directive (EU Directive (79/409/EEC) transposed by The Wildlife and Countryside Act 1981 (as amended)) to protect habitats of migratory birds and certain threatened birds.
Temporal scope	The temporal scope covers the time period over which changes to the environment and the resultant effects are predicted to occur and are typically defined as either being temporary or permanent.
Temporary or permanent effects	Effects may be considered as temporary or permanent. In the case of solar energy development, the application is for a 60 year period after which the assessment assumes that decommissioning will occur and that the site will be restored. For these reasons the development is referred to as long term and reversible.
Zone of influence	The area surrounding a proposed development which could result in likely significant effects.

List of Abbreviations and Acronyms

Term	Definition
AADMDPD	Amended Allocations and Development Management Development Plan Document
ATI	Ancient Tree Inventory
BNG	Biodiversity Net Gain
BoCC	Birds of Conservation Concern
BTO	British Trust for Ornithology
CBC	Common Bird Census
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
COCP	Code of Construction Practice
DAS	Discretionary Advice Service
DEFRA	Department of Food, Fisheries and Rural Affairs
DCO	Development Consent Order
EcIA	Ecological Impact Assessment
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
ES	Environmental Statement
EMF	Electromagnetic field
EPS	European Protected Species
EPSL	European Protected Species License
GLNP	Greater Lincolnshire Nature Partnership
ha	Hectares
HPI	Habitat of Principal Importance
HSI	Habitat Suitability Index

Term	Definition
INNS	Invasive Non-Native Species
IRZs	Impact Risk Zones
IUCN	International Union of Conservation of Nature
JNCC	Joint Nature Conservation Committee
km	Kilometres
LWT	Lincolnshire Wildlife Trust
LBAP	Local Biodiversity Action Plan
LNR	Local Nature Reserve
LNRS	Local Nature Recovery Strategies
LWS	Local Wildlife Site
Magic	Multi-Agency Geographic Information Centre
m	Metre
NNR	National Nature Reserve
NVC	National Vegetation Classification
NSIP	Nationally Significant Infrastructure Project
NE	Natural England
NBGRC	Nottinghamshire Biological and Geological Records Centre
NERC Act	Natural Environment and Rural Communities Act
NOx	Nitrous oxide
NSDC	Newark and Sherwood District Council
NWT	Nottinghamshire Wildlife Trust
oCEMP	Outline Construction Environmental Management Plan
oDEMP	Outline Decommissioning Environmental Management Plan
oLEMP	Outline Landscape and Ecological Management Plan
OS	Ordnance Survey
PINS	Planning Inspectorate

Term	Definition
pSAC	Possible Species Area of Conservation
pSPA	Potential Special Protection Area
PEIR	Preliminary Environmental Information Report
PRA	Preliminary Roost Assessment
SSSI	Site of Special Scientific Interest
SAC	Special Areas of Conservation
SPA	Special Protection Area
SPI – priority species	Species of Principal Importance – priority species
SuDS	Sustainable Drainage System
TCPA	Town and Country Planning Act
UK	United Kingdom
WCA	Wildlife and Countryside Act
ZoI	Zone of Influence

6. Biodiversity

6.1.1 This Chapter of the Environmental Statement (ES) has been prepared by Logika and presents an assessment of the likely significant biodiversity effects of the Proposed Development.

6.1.2 The structure and approach within this chapter differs to that described within **ES Volume 1, Chapter 2: EIA Methodology [EN010159/APP/6.2]**, as it aligns with guidance on Ecological Impact Assessment (EcIA) produced by the Chartered Institute of Ecology and Environmental Management[1].

6.1.3 A description of the methods used in the assessment is set out in this Chapter. This is followed by a description of the relevant baseline conditions, future baseline conditions and sensitive receptors (referred to as 'ecological features' in this chapter), together with an assessment of the likely significant effects of the Proposed Development. Consideration of the likely significant environmental effects has been undertaken throughout the design of the Proposed Development and specific environmental measures relevant to biodiversity have been identified and have been considered as part of the assessment. To conclude a summary of the assessment is presented along with the next steps, where applicable. Details of the cumulative effects assessment is presented separately within **ES Volume 2, Chapter 18: Cumulative Effects [EN010159/APP/6.18]**.

6.1.4 This Chapter is supported by the following figures located within **ES Volume 3: Figures Supporting Volumes 1 and 2 [EN010159/APP/6.20]** and further detailed information contained within the following appendices located within **Volume 3: Technical Appendices Supporting ES Volumes 1 and 2 [EN010159/APP/6.21]**:

- **Volume 3, [EN010159/APP/6.20] Figures**:
  - **Figure 6.1:** Study Area.
  - **Figure 6.2:** Zones of Influence
- **Volume 3 [EN010159/APP/6.21] Appendices**:

Appendix 6.1: Summary of Legislation, Policy and Technical Guidance relevant to Biodiversity

- **Appendix 6.2:** Ecology Desk Study
- **Appendix 6.3:** Extended Habitat Survey

[1] Chartered Institute of Ecology and Environmental Management (2019) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.3 updated September 2024.

- **Appendix 6.4:** Bat Baseline
- **Appendix 6.5:** Breeding Bird Baseline
- **Appendix 6.6:** Great-Crested Newt Baseline

Appendix 6.7: Badger, Otter and Water Vole Baseline

- **Appendix 6.8:** Wintering Bird Baseline
- **Appendix 6.9:** Reptile Baseline
- **Appendix 6.10**: Biodiversity Net Gain Assessment

6.2 Relevant Legislation, Policy and Technical Guidance

6.2.1 A summary of specific policy and legislation against which the Proposed Development has been assessed against, and technical guidance that has informed the assessment methodology can be found below. A full summary of relevant legislation, national and local policy and technical guidance can be found at **ES Volume 3, Appendix 6.1: Summary of Legislation, Policy and Technical Guidance relevant to Biodiversity [EN010159/APP/6.21]**.

- Legislation
  - The Environment Act 2021[2]
  - Conservation of Habitats and Species Regulations 2017 (as amended)[3]
  - Natural Environment and Rural Communities Act 2006 (as amended)[4]
  - Countryside and Rights of Way Act 2000 (as amended)[5]
  - Hedgerows Regulations 1997[6]

[2] The Environment Act 2021 (as amended) available at https://www.legislation.gov.uk/ukpga/2021/30/contents [accessed 03/02/2025)

[3] The Conservation of Habitats and Species Regulations 2017 (as amended) available at https://www.legislation.gov.uk/uksi/2017/1012/contents [accessed 03/02/2025)

[4] Natural Environment and Rural Communities Act 2006 (as amended) available at https://www.legislation.gov.uk/ukpga/2006/16/contents [accessed 03/02/2025]

[5] Countryside and Rights of Way Act 2000 available at https://www.legislation.gov.uk/ukpga/2000/37/contents [accessed 03/02/2025]

[6] Hedgerow Regulations 1997 available at https://www.legislation.gov.uk/uksi/1997/1160/contents [accessed 03/02/2025]

- Protection of Badgers Act 1992 (as amended)[7]
- Wildlife and Countryside Act 1981 (as amended)[8]
- The Wild Mammals (Protection) Act 1996 (as amended)[9]
- National Policy
- Overarching National Planning Policy Statement for Energy (EN-1) (2023)[10]
- National Policy Statement for Renewable Energy Infrastructure (EN3) (2023)[11]
- National Policy Statement for Electricity Networks Infrastructure (EN-5) (2023)[12]
- National Planning Policy Framework (2024) (NPPF), Paragraphs 187-195[13].

> Local Planning Policy

- Newark and Sherwood District Council (2023) Draft Local Development Framework, Amended Allocations and Development Management Development Plan Document (AADMDPD)[14]
- Newark and Sherwood District Council (2019) Amended Core Strategy Development Plan[15]

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[7] Protection of Badgers Act 1992 available at https://www.legislation.gov.uk/uksi/1997/1160/contents [accessed 03/02/2025]

[8] Wildlife and Countryside Act 1981 (as amended) available at https://www.legislation.gov.uk/ukpga/1981/69 [accessed 03/02/2025]

[9] The Wild Mammals (Protection Act) 1996 (as amended) available at https://www.legislation.gov.uk/ukpga/1996/3/contents [accessed 03/02/2025]

[10] Overarching National Policy Statement for Energy (EN-1) 2023 available at https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1 [accessed 03/02/2025]

[11] National Policy Statement for Renewable Energy Infrastructure (EN-3) 2023 available at https://assets.publishing.service.gov.uk/media/65a7889996a5ec000d731aba/nps-renewable-energy-infrastructure-en3.pdf [accesssed 03/02/2025]

[12] National Policy Statement for Electricity Networks Infrastructure (EN-5) 2023 available at https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5 [accesssed 03/02/2025]

[13] National Planning Policy Framework 2024 available at https://assets.publishing.service.gov.uk/media/675abd214cbda57cacd3476e/NPPF-December-2024.pdf [accessed 03/02/2025]

[14] Available at https://www.newark-sherwooddc.gov.uk/ldf/ [accessed 03/02/2025]

[15] Available at https://www.newark-sherwooddc.gov.uk/amendedcorestrategy/ [accessed 03/02/2025]

- Central Lincolnshire Local Plan (2023)[16]
- Bassetlaw District Council (2010) Bassetlaw Local Plan 2020 - 2038 [17]

> Local Guidance

- Planning Practice Guidance (2024) – Guidance Natural Environment (2024)
- Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.3. CIEEM, Winchester.
- British Standards Institution (2013) Biodiversity – Code of Practice for Planning and Development (BS 42020:2013)
- Lincolnshire Biodiversity Partnership (2011) Lincolnshire Biodiversity Action Plan 2011-2020 (3rd Edition)
- Nottinghamshire Biodiversity Action Group (date unknown) Local Biodiversity Action Plan
- Newark and Sherwood District Council (2024) Mandatory Biodiversity Net Gain Strategic Significance.

6.3 Baseline Establishment

Approach to baseline data collection

6.3.1 The biodiversity baseline within the Order limits was established during a programme of desk study, consultation with stakeholders and field survey throughout 2023 and 2024. A detailed account of data gathering methodologies and results are presented in **ES Volume 3, Appendices 6.2 to 6.9 [EN010159/APP/6.21]**. In summary, the biodiversity baseline was assembled on the basis of the following elements:

> Desk study (including biological data provided by the Greater Lincolnshire Nature Partnership (GLNP) and Nottinghamshire Biological and Geological Records Centre (NBGRC), and with reference to Defra's Magic map application18, Ordnance Survey (OS) online mapping, and the Woodland Trust's Ancient Tree Inventory (ATI));

[16] Available at https://www.n-kesteven.gov.uk/central-lincolnshire/adopted-local-plan-2023 [accessed 03/02/2025]

[17] Available at https://www.bassetlaw.gov.uk/media/gn1kjm1b/adopted-bassetlaw-local-plan-2020-2038.pdf [accessed 03/02/2025]

[18] Multi-Agency Geographic Information Centre (MAGIC) website: https://magic.defra.gov.uk/magicmap.aspx

- An extended habitat survey following the methodology of the Joint Nature Conservation Committee (2010)19 and the UK Habitat Classification (2023)20;
- Great crested newt environmental DNA (eDNA) sampling following methodology of Biggs et al. (2014)21;
- Reptile presence/absence surveys following methodology from Froglife (2015)22;
- Bat preliminary roost assessment (PRA) of trees and activity surveys (night-time walked transect and static acoustic monitoring) following methodology from the Bat Conservation Trust (2023)23, British Standard (BS 8596:2015)24, and with reference to 'Bat Roosts in Trees' (Andrews, 2018)25;
- Badger survey following methodology from Scottish Badgers (2018)26;
- A combined otter and water vole survey following methodology in Chanin (2003)27 and Dean et al. (2016)28;
- Breeding bird survey following an amended version (6 visits) of the Common Bird Census methodology (Gilbert et al., 1998)29;

[19] JNCC, (2010), Handbook for Phase 1 habitat survey – a technique for environmental audit, JNCC, Peterborough

[20] UKHab (2023) The UK Habitats Classification version 2.0. Available at https://www.ukhab.org/ [Accessed 03/02/2025]

[21] Biggs, J., Ewald, N., Valentini, A., Gaboriaud, C., Griffiths, R. A., Foster, J., Wilkinson, J., Arnett, A., Williams, P., & Dunn, F. (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt Defra Project WC1067 Appendix 5. Oxford: Freshwater Habitats Trust.

[22] Froglife (2015) Surveying for reptiles: tips, techniques and skills to help you survey for reptiles. FrogLife, Peterborough.

[23] Collins, J. (ed.) (2023) Bat surveys for professional ecologists: Good practice guidelines (4th edition). The Bat Conservation Trust, London.

[24] British Standards Institution (2015) BS 8596:2015 Surveying for bats in trees and woodland.

[25] Andrews (2018) Bat Roosts in Trees: A Guide to Identification and Assessment for Tree-Care and Ecology Professionals. Bat Tree Habitat Key

[26] Scottish Badgers (2018) Surveying for Badgers: Good Practice Guidelines. Version 1.

[27] Chanin, P. (2003) Monitoring the Otter Lutra lutra. Conserving Natura 2000 Rivers Monitoring Series No.10, English Nature, Peterborough.

[28] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

[29] Gilbert, G, Gibbons, D.W. & Evans, J. (1998). Bird Monitoring Methods: A manual of techniques for key UK species. RSPB, Bedfordshire.

- Wintering bird survey following an amended version of the Winter Farmland Bird Survey (Atkinson et al, 2006)30; and
- Biodiversity Net Gain (BNG) assessment using the Statutory Biodiversity Metric (Department for Environment, Food and Rural Affairs (Defra), 2024)31 and associated condition assessment criteria for habitats.

The Study Area

6.3.2 The study area varied for different ecological features, depending on their sensitivity to environmental change. Study areas adopted are defined in **Table 6.1** and presented in **ES Volume 3, Figure 6.1: Study Area [EN010159/APP/6.20]** and were determined using best practice guidance (issued by CIEEM), professional judgement and a high-level assessment of the types of ecological features present, or potentially present.

Table 6.1 Extent of Data Search for Ecological Features

Ecological Feature	Study Area
European Designated Sites	Order Limits, plus 10 km buffer[32]
Statutory Designated Sites	Order Limits, plus 2 km buffer
Non-Statutory Designated Sites	Order Limits, plus 2 km buffer
Priority Habitats and Veteran Trees	Order Limits, plus 1 km buffer
Legally protected and notable species	Order Limits, plus 2 km buffer
Habitats	Order Limits, plus 50 m buffer
Waterbodies and water courses	Order Limits, plus 500 m buffer

6.3.3 The study has been continuously reviewed and amended in response to design refinement and consultation feedback, ensuring that there is sufficient data available to conduct the assessment.

[30] Atkinson, P.W., Fuller, R.A., Gillings, S. & Vickery, J.A. (2006) Bird Study, Volume 53.

[31] Defra (2024) The Statutory Biodiversity Metric User Guide. Available at https://assets.publishing.service.gov.uk/media/669e45fba3c2a28abb50d426/The_Statutory_Biodiversity_Metric_-_User_Guide__23.07.24_.pdf [accessed 03/02/2025]

[32] Exception made for European sites linked to the area via the River Trent corridor.

Assumptions, Exclusions and Limitations

6.3.4 The extent of the land to be included within the Order Limits changed a number of times over the duration of survey visits, incorporating new areas and removing others. These areas were incorporated into the survey programme to ensure sufficient coverage. Overall, Extended Habitat Surveys covered 1,304 ha of the 1,409 ha within the Order limits. The 105 ha not subject to survey was focused on the High Marnham substation and surrounding areas where access was restricted. This area is associated with transmission cabling only to connect to the National Grid's High Marnham Substation in its present form or an extended version should National Grid receive Development Consent for its North Humber to High Marnham project.

6.3.5 The static acoustic monitoring surveys for bats aimed to record for a minimum of 5 nights per season at each monitoring location. However, as can be the case with bat monitors, technical failures occurred during the 2023 monitoring period, impacting recording at static detector locations along transect 2 (in summer and autumn) and transect 3 (in spring, summer and autumn). Further data was gathered in 2024 to ensure that overall, the survey results for bats is appropriate to underpin the assessment in Section 6.8.

6.3.6 Extensive flooding along the River Trent in December 2023 and January 2024 limited access to certain areas for the winter bird survey. These areas were viewed from vantage points and were therefore, still partially surveyed. However, records of smaller bird species may be less accurate as they may not have been visible or audible from a distance. The data gathered still provides a robust data set for the assessment of the likely significant effects of the Proposed Development on wintering birds. The desk study data gathered provides a robust basis for the assessment provided in Section 6.8.

6.3.7 The sampling of waterbodies for great-crested newt is typically conducted for all waterbodies within the Order limits and a 500 m buffer (the study area). However, due to access restrictions (located within private land, presence of dense vegetation surrounding ponds) this was not always possible. The desk study and field survey data gathered provides a robust basis for the assessment provided in Section 6.8. Further sampling is proposed for 2025 in ponds where access was previously unavailable.

6.3.8 A sampling approach for breeding bird surveys was undertaken that initially covered around 50% of the survey area. However, due to changes in the Order limits this has reduced to 27%. However, due to the similar nature of the habitat across the area, extrapolation of collected data is considered appropriate to inform the assessment. Further breeding bird survey data is to be collected in the spring / summer of 2025 to corroborate previous findings.

6.3.9 The field survey programme was discussed with stakeholders (see Section 6.7). The methods were agreed as appropriate, although additional survey for breeding birds, fish habitat and great crested newts were recommended.

6.4 Defining the Scope of the Assessment

6.4.1 The scope of assessment for biodiversity in this chapter is defined by the type of ecological features that occur within the area and the type of likely significant effects that could be realised by the construction, operation and decommissioning of the Proposed Development. Following CIEEM (2018, updated 2024) guidance on EcIA, the importance of each ecological feature present, on a geographical scale[33], has been determined and justified. The following categories have been used in this assessment:

- International/European
- National (England and the UK)
- County (Nottinghamshire and Lincolnshire)
- District (Bassetlaw, West Lindsey and Newark and Sherwood)
- Local
- Negligible

Identifying Ecological Features and their Importance

6.4.2 The baseline data collected through desk study and field survey was used to determine which of the identified ecological features are 'important'. The importance of the ecological features has been described in relation to UK legislation and policy, and with regard to the extent of habitat or size of a population that may be significantly affected by the Proposed Development.

6.4.3 The importance of ecological features can therefore differ from that which would be conferred solely by legislative protection or identification as a conservation notable species.

6.4.4 Wherever possible, information regarding the extent and population size, population trends and distribution of the ecological features was used to inform their categorisation, and to determine their importance at the project level. Where detailed criteria or contextual data were not available at this stage, professional judgement was used to determine importance.

Spatial Scope

6.4.5 Key to understanding the extent of potential likely significant effects on important ecological features is the determination of a Zone of Influence (ZoI) for each that

[33] Where this was not possible due to the level of baseline information currently available the highest relevant level of importance is assumed to ensure no ecological features are scoped out of future assessment when not appropriate.

reflects their sensitivity to environmental change. The ZoIs are tied to the type of effects that could occur due to a particular development.

6.4.6 The construction, operation (maintenance), and decommissioning phases of the Proposed Development may result in the following broad environmental changes:

- Permanent and temporary land take resulting in habitat loss and degradation associated with presence of permanent infrastructure.
- Fragmentation of semi-natural habitats due to habitat loss or degradation and reduction in landscape permeability due to the presence of infrastructure.
- Increases in noise, vibration and human presence during the construction and decommissioning phases resulting in disturbance of fauna.
- Increases in temporary lighting through all phases of the Proposed Development resulting in disturbance of fauna.
- Changes in hydrology (ground water levels and surface water run-off rates) resulting in habitat change.
- Accidental spread of invasive non-native species due to construction activity.
- Pollution of terrestrial and freshwater habitats through loss of chemicals and fines / silt or the emission of dust or NOx from work areas (including construction traffic routeing) during construction and decommissioning.
- Changes in electromagnetic field (EMF) and ground heating beneath freshwater habitats.

6.4.7 The most straightforward ZoI to define is the area affected by land-take and direct land-cover changes associated with the Proposed Development. This ZoI is the same for all affected ecological features. By contrast, for each environmental change that can extend beyond the area affected by land-take and land-cover change (for example noise created by construction), the ZoI may vary between ecological features, dependent upon their sensitivity to the change and the precise nature of the change.

6.4.8 In view of these complexities, the definition of the ZoI that extends beyond the land-take area was based upon professional judgement informed, as far as possible, by a review of published evidence (for example disturbance criteria for various species). The ZoIs for each broad environmental change are specified below. Based on the level of information available for this assessment, the ZoIs have been applied to be precautionary (also see **ES Volume 3, Figure 6.2: Zones of Influence [EN010159/APP/6.20]**):

Temporary or permanent land take and habitat degradation - ZoI within the Order limits for habitats and sedentary species; mobile species may be affected beyond that if the land within the Order limits lies within their typical home-ranges.

Fragmentation of semi-natural habitats due to habitat loss or degradation and reduction in landscape permeability due to the presence of infrastructure - ZoI within the Order limits for habitats and sedentary species; mobile species may be affected beyond that if land within the Order limits forms part of their typical home-ranges.

Increases in noise, vibration and human presence during the construction and decommissioning phases resulting in disturbance of fauna - ZoI for sensitive species is up to 500 m from construction works, noting that for mobile features of designated sites this is related to the species land use, as opposed to designation boundary.

Increases in temporary lighting through all phases of the Proposed Development resulting in disturbance of fauna - ZoI for sensitive species up to 450 m from areas which require lighting, noting that for mobile features of designated sites this is related to the species land use, as opposed to designation boundary.

Changes in hydrology (ground water levels and surface water run-off rates) resulting in habitat change - ZoI for sensitive species is within the surface and ground water features described in **ES Volume 2, Chapter 7: Hydrology and Hydrogeology [EN010159/APP/6.7]**, noting that for mobile species that occur on designated sites, this is related to the species range, as opposed to designation boundary.

Accidental spread of invasive non-native species (INNS) due to construction activity - ZoI for habitats and species is up to 500 m from the Order limits, or further if the source and the ecological feature are directly linked via the river system.

Pollution of terrestrial and freshwater habitats through loss of chemicals and fines or dust from areas of construction and decommissioning - ZoI for habitats and species is up to 500 m from the Order limits and 200 m from construction access routes, or further if the source and the ecological feature are directly linked via the river system.

Changes in EMF and ground heating – ZoI for migratory fish and other aquatic fauna is up to 2.5 m from transmission cabling.

6.4.9 It should be noted that the avoidance of likely significant effects through design are implicitly taken into account through the consideration of each ZoI. Furthermore, when scoping ecological features in, or out, from further assessment, environmental measures associated with good practice have been taken into account (for example dust suppression, appropriately scheduled vegetation removal etc.).

6.5 Assessment Methodology

Temporal Scope

6.5.1 The temporal scope of the biodiversity assessment is consistent with the period over which the Proposed Development will be carried out, and therefore covers construction, operation (maintenance), and decommissioning phases. Further details regarding each phase of the Proposed Development are provided within **ES Volume 1, Chapter 5: Description of the Proposed Development [EN010159/APP/6.5]**, with a summary relevant to biodiversity provided below:

- Construction: years 1 to 2.
- Operation (maintenance): years 3 to 63.
- Decommissioning: 64 to 65.

6.5.2 Within this assessment, the majority of likely significant adverse effects are associated with the construction phase and, even though they may have longer term consequences, are only considered once (e.g. land take). The assessment describes the effects on the ecological features scoped in and highlights the importance of the temporal scope as necessary. However, there is not a separate consideration (with a separate conclusion) of the same likely significant effect on each feature in different phases.

Significance criteria

6.5.3 CIEEM (2018, updated 2024) defines a significant effect as one '*that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general*'.

6.5.4 When considering likely significant effects on ecological features, whether these are negative or positive, the following characteristics of environmental change are taken into account:

- extent – the spatial or geographical area over which the environmental change may occur;
- magnitude – the size, amount, intensity or volume of the environmental change;
- duration – the length of time over which the environmental change may occur;
- frequency – the number of times an environmental change may occur;
- timing – the periods of the day, year or season during which an environmental change may occur; and
- reversibility – whether the environmental change can be reversed through restoration actions or regeneration.

6.5.5 Although the characteristics described above are all important in assessing effects, the magnitude of the environmental change as a result of the Proposed Development provides useful context, described in **Table 6.2**, to provide understanding of the relative scale of change from the baseline position.

Table 6.2 Guidelines for the assessment of the scale of magnitude

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

6.5.6 Consideration is also given to the duration of likely significant effects with the following timeframes referred to:

- Short term: less than 2 years;
- Medium term: 2 to 5 years;
- Long term: more than 5 years; or
- Permanent.

6.5.7 Both negative and positive effects are assessed as being significant if the favourable conservation status of an ecological feature would be altered as a result of the Proposed Development. Conservation status is defined in CIEEM 2018 (in paragraph 5.3.2) as follows:

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

"*species - conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area*".

6.5.8 Professional judgement has been used, in light of the available evidence, to determine whether the conservation status of an ecological feature will be altered either negatively or positively (see **ES Volume 1, Chapter 1: Introduction [EN010159/APP/6.1]** for professional accreditation).

6.5.9 When considering designated sites, it is their integrity that is considered. This is defined by CIEEM (2018) as "*the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified*."

6.5.10 The assessment of effects on integrity will draw upon the assessment of effects on the conservation status of the features for which the site has been designated.

6.5.11 Where likely significant adverse effects are identified, environmental measures, including mitigation, have been incorporated into the design where practicable. These are described later in this report in the environmental measures section or, where they are specific to a particular effect, in the Assessment of Likely Significant Effects below.

6.5.12 The likely significance (or otherwise) of identified effects is defined as follows:

- Not significant: No significant effect to the ecological feature.
- Significant beneficial: Advantageous or positive effect to an ecological feature.
- Significant adverse: Detrimental or negative effect to an ecological feature.

6.6 Current Baseline Conditions

Desk Study

6.6.1 **ES Volume 3, Appendix 6.2: Ecology Desk Study [EN010159/APP/6.21]** describes the approach to desk study and provides the results in full. A summary of the results is provided below.

6.6.2 There are no statutory sites designated at the international level within the 10 km study area. However, the Humber Estuary Ramsar site and Special Area of Conservation (SAC) is directly linked to the Proposed Development through the

River Trent. Although the closest point of the Order Limits to the Humber Estuary Ramsar site / SAC is over 30 km distant, migratory fish, namely river lamprey and sea lamprey, that are designated features of the Humber Estuary Ramsar site / SAC may use the freshwater habitats within or close to the Proposed Development as functionally linked land.

6.6.3 There is one site of national nature conservation importance around 2 km from the Order Limits: Spalford Warren SSSI lies 2.1 km south and comprises the best remaining example of grass heath dominated by wavy hair-grass and sand sedge in Nottinghamshire and one of the last to be found in the Midlands. Its location is shown in **ES Volume 3, Appendix 6.2: Ecology Desk Study [EN010159/APP/6.21]**.

6.6.4 SSSI Impact Risk Zones (IRZ) extend across the Site. These relate to specific developments likely to impact SSSIs and require consultation with Natural England. The types of developments described do not include solar farms. However, Natural England have been engaged with (see Table 6.5) to determine the need for consideration of nearby SSSIs.

6.6.5 There are 34 LWS within the 2 km study area, one of which occurs within the Site itself, with a further eight immediately adjacent to the Site. Details of those sites that occur either within or adjacent to the Site are summarised in **Table 6.3**, with the remaining sites presented in **ES Volume 3, Appendix 6.2: Ecology Desk Study [EN010159/APP/6.21]**. The locations of all LWS within the study area are shown in **ES Volume 3, Appendix 6.2: Ecology Desk Study [EN010159/APP/6.21]**.

Table 6.3 Summary of LWS Within or Adjacent to the Site

LWS name	Area (ha)	Location	Qualifying features
Fledborough to Harby Dismantled Railway	20.88	Within Site	Grassland and scrub on disused railway line
Dunham Dubs	19.52	Adjacent to Order Limits	Two lakes with improved grassland, planted broad-leaved trees and associated marginal flora and marsh
Dunham Oxbow	4.45	Adjacent to Order Limits	Marsh and wet woodland habitat supporting an interesting variety of characteristic plant species
Fledborough Holme	22.20	Adjacent to Order Limits	Trees, shrubs, tall herb and semi-improved grassland
Marnham Railway Yard	3.98	Adjacent to Order Limits	Dry grassland with notable species
West Wood	16.28	Adjacent to Order Limits	Deciduous woodland, plantation woodland and acid grassland With ancient woodland indicators (wood anemone and bluebell)
Road Wood	18.44	Adjacent to Order Limits	Broadleaved woodland
Darnsyke Marsh	1.05	Adjacent to Order Limits	Deciduous woodland, marshy grassland and emergent plant species associated with the Darnsyke drain
Skegby Road Triangle	-	Adjacent to Order Limits	A species-rich roadside verge

6.6.6 The Priority Habitats Inventory shows two Priority Habitats within the Order limits, namely:

- Coastal and Floodplain Grazing Marsh, associated with the River Trent (3.0 ha – all to west of the river).
- Deciduous Woodland (3.61 ha)
- Open mosaic habitat associated with the High Marnham Power Station site (22.13 ha).

6.6.7 Priority Habitats (listed on the Priority Habitats Inventory) which lie outside of but adjacent to the Order limits, are:

- Traditional Orchard to the northwest of the Order Limits.
- Lowland Fens, to the north of the Order Limits and associated with the River Trent.

- Wood Pasture and Parkland in North Clifton.

6.6.8 In addition, Ancient Woodland was recorded at Blackthorn Wood, 590 m north of the Site. The location and extent of Priority Habitat and Ancient Woodland is presented in **ES Volume 3, Appendix 6.2: Ecology Desk Study [EN010159/APP/6.21].**

6.6.9 Other Priority Habitats not shown in the Priority Habitat Inventory data are also present within the Site, namely rivers, ponds and hedgerows.

6.6.10 There were no trees assigned as being of veteran status within the Order limits. However, two veteran crack willow lie adjacent to the Site in North Clifton and three more are located north of the A57 in Dunham.

6.6.11 There are 5 ponds in the Order Limits and a further 24 within 500 m of them. Ponds and ditches holding water within the Site and the 500 m study area are presented in **ES Volume 3, Appendix 6.2: Ecology Desk Study [EN010159/APP/6.21]**.

6.6.12 Agricultural ditches holding water are found throughout the study area, running parallel to and east of the River Trent. These include the Fledborough Beck in the west of the Site and an unnamed ditch extending the full length from north to south in the east.

6.6.13 Desk study results for legally protected, notable and controlled animals are presented alongside field survey results below thereby providing better context.

Field Survey

Habitats

6.6.14 **ES Volume 3, Appendix 6.3: Extended Habitat Survey [EN010159/APP/6.21]** describes the habitat survey methodology and the results of the survey. A summary of the results is provided below.

6.6.15 The Order limits covers approximately 1,409 ha of which 92.5 percent (1,304 ha) has been subject to detailed habitat survey. The area not surveyed is around High Marnham Substation where no access was granted (the area for part of the cable connection only).

6.6.16 The River Trent bisects the Order limits from north to south with approximately ~799 ha of the area of the Order limits lying to the west and the remaining circa. ~604 ha to the east (~6 ha is the River Trent itself). Arable fields (cereal and non-cereal crops, temporary grass leys and arable field margins) account for approximately 84.47% of the Order limits. They include cereal and non-cereal crops and substantial grass-leys used for turf production. Additional grassland occurs within narrow field margins (~1 m) and as grazing pasture or hay crop. There is coastal and floodplain grazing marsh adjacent to the River Trent on the

western bank (to the north of the Fledborough Holm LWS), with water levels managed within the area via a matrix of water-filled ditches with associated sluice gates. Hedgerows and treelines bound the majority of the agricultural fields with species assemblages occurring typical of such features within the region. There are also small pockets of woodland and scrub scattered throughout the study area.

6.6.17 **Table 6.4** provides a summary of the extent of each of the habitats identified.

Table 6.4 Summary of Habitats Recorded in the Study Area

Phase 1 Habitat type[20]	UKHab[21]	Area (ha)[34] / Length (Km)
Arable	Cropland - Cereal and Non-Cereal Crops	1,115.90 ha
Arable	Field margins (game bird mix)	6.90 ha
Arable	Temporary grass and clover leys	67.38 ha
Improved grassland	Modified grassland	118.97 ha
Semi-improved grassland	Other Neutral Grassland	1.23 ha
Coastal and floodplain grazing marsh	Floodplain wetland mosaic and CFGM	3.93 ha
Broad-leaved woodland (semi-natural and plantation)	Lowland mixed deciduous woodland	3.48 ha
Broad-leaved woodland (semi-natural and plantation)	Other woodland; broadleaved	0.69 ha
Broad-leaved woodland (semi-natural and plantation)	Other woodland; mixed	2.56 ha
Dense continuous scrub	Mixed scrub	17.43 ha
Bramble scrub	Bramble scrub	0.18 ha
Urban	Bare ground	20.89 ha
Urban	Artificial unvegetated, unsealed surface	21.57 ha
Urban	Developed land, sealed surface	22.27 ha

[34] Note remaining area (5.52 ha to complete the 1,409 ha within the Order Limits) is accounted for by running water (i.e. the River Trent) which in Table 6.4 is provided as a linear measure.

Phase 1 Habitat type[20]	UKHab[21]	Area (ha)[34] / Length (Km)
Standing water	Ponds (priority habitats)	0.10 ha
Hedgerows (defunct or intact)	Native hedgerow – associated with bank or ditch	8.53 km
Hedgerows with trees (defunct or intact)	Native hedgerow with trees – associated with bank or ditch	11.90 km
Hedgerows with trees (defunct or intact)	Native hedgerow with trees	12.43 km
Hedgerows (defunct or intact)	Native hedgerows	20.31 km
Species-rich hedges (defunct or intact)	Species-rich native hedgerow – associated with bank or ditch	0.48 km
Species-rich hedges (defunct or intact)	Species-rich native hedgerow with trees – associated with bank or ditch	0.28 km
Species-rich hedges (defunct or intact)	Species rich native hedgerows with trees	0.47 km
Species-rich hedges (defunct or intact)	Species rich native hedgerows	1.00 km
Hedge and trees	Ecologically valuable line of trees – associated with bank or ditch	0.67 km
Hedge and trees	Ecologically valuable line of trees	1.43 km
Hedge and trees	Line of trees – associated with bank or ditch	2.09 km
Hedge and trees	Line of trees	3.03 km
Running water	Ditches	18.25 km
Running water	Other rivers and streams	0.71 km

Bats

6.6.18 Detailed results of the bat surveys can be found in **ES Volume 3, Appendix 6.4: Bat Baseline [EN010159/APP/6.21]**. A summary is provided below.

6.6.19 The desk study identified 552 records of a minimum of eight bat species within the study area. Species recorded within the Order limits were common pipistrelle and Leisler's bat and the genera Nyctalus, Pipistrellus and Myotis, where acoustic records could not be identified to species level. Brown long-eared bat

and soprano pipistrelle were recorded within 130 m and 810 m of the Order limits respectively, with barbastelle recorded 1.72 km to the south.

6.6.20 A single bat European Protected Species Licence (EPSL) was granted for a location 80 m from the Order limits (unrelated to the Proposed Development), near South Clifton, allowing the destruction of a resting place for both common pipistrelle and brown long-eared bats.

6.6.21 During the field survey, fifty-one trees within the Order limits were found to support features potentially suitable for roosting bats, with the majority of these being located to the east of the River Trent in species including oak, ash, beech, willow and poplar.

6.6.22 Habitats within the Order limits are generally considered to be of low and moderate quality for foraging and commuting bats due to the extensive cover of arable fields with species poor and defunct hedgerow boundaries. High-quality commuting and foraging habitat is present to the east of the River Trent, associated with woodland habitat, treelines and species-rich, intact hedgerows and the River Trent corridor. Paired static detectors (one within a linear vegetated feature and one within neighbouring open habitat) demonstrated that bat activity was highest, as expected, along hedgerows and woodland edges and lowest in arable (cereal and non-cereal crops) and grassed fields.

6.6.23 Activity surveys identified a minimum of eight bat species within the Order limits, consistent with those identified in the desk study and confirming noctule, brown long-eared bat, barbastelle and Nathusius' pipistrelle within the Site. Activity of Myotis species foraging along the River Trent are suggestive of Daubenton's bat being present.

6.6.24 Common pipistrelle was the most frequently recorded species found to be foraging and commuting on all transect routes and monitoring locations within the Order limits, and in all seasons that the surveys occurred. Soprano pipistrelle was the second most frequently recorded, and bats of the genus Myotis the third most frequent. Nathusius' pipistrelle and barbastelle were the least frequently recorded species. Monitoring locations in the north of the Order limits recorded the highest levels of activity, with the most active period being during the spring monitoring surveys.

6.6.25 The data gathered highlights the importance of the River Trent and the Fledborough to Harby Dismantled Railway as movement corridors through the area orientated north-south and east west respectively.

Badger (confidential)

6.6.26 Detailed results of the badger surveys can be found in **ES Volume 3, Appendix 6.7: Badger, Otter and Water Vole Baseline [EN010159/APP/6.21]**. A summary is provided below.

6.6.27 The desk study identified 121 records of badger within the study area in the last decade, including records from within the Order limits, although due to badger welfare concerns, exact locations were not divulged. To the east of the River Trent, all records were located in the north of the Order limits. Records were more widely distributed on the western side of the River Trent specifically: west of North Farm, north of Polly Taylor's Road, west of Main Street in Ragnall, east of Dunham on Trent, and near Newton on Trent. The most recent records were from 2022.

6.6.28 Evidence of badger activity including seven setts (one main sett), footprints and latrines, were observed in locations consistent with the desk study results, in particular in the north of the Order limits and both to the east and west of the River Trent.

Birds

6.6.29 Detailed results of the bird surveys can be found in **ES Volume 3, Appendix 6.5: Breeding Bird Baseline [EN010159/APP/6.21]** and **ES Volume 3, Appendix 6.8: Wintering Bird Baseline [EN010159/APP/6.21]**. A summary is provided below.

6.6.30 The desk study (records available up to 2023) returned 284 records of legally protected and/or notable bird species within the study area in the past 10 years.

6.6.31 During the breeding bird surveys undertaken during 2023, 78 species were recorded within the area surveyed. Of those, 39 were considered to show territorial behaviour associated with potential breeding attempts, such as singing males, display behaviour recorded on two or more occasions, nest building or active nests being found, carrying food or faecal sacks to/from an area.

6.6.32 Of species potentially breeding within the sampling area:

- Three are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended): quail, barn owl, and hobby.
- Nine are Red-listed on the Birds of Conservation Concern 5 (BoCC5) : skylark, yellowhammer, house sparrow, yellow wagtail, linnet, greenfinch, grey partridge, house martin, and turtle dove.
- Eleven are Amber-listed on BoCC5: wren, whitethroat, reed bunting, woodpigeon, sedge warbler, dunnock, song thrush, mallard, oystercatcher, quail, and kestrel.

6.6.33 Wintering bird surveys identified a flooded area in the north of the Order limits, adjacent to the River Trent, which supported large flocks of greylag goose, lapwing, black headed gull, wigeon and common gull. They were recorded foraging or resting in this area in December 2023 and January 2024.

6.6.34 A temporary scrape in a grass-ley in the southeast of the Order limits supported large flocks of lapwing, starling, woodpigeon and common gulls. They were recorded throughout the winter, foraging and resting in the area. In addition, a large flock of golden plover (approximately 400 individuals) was recorded foraging in an arable field in the southwest of the Site, to the south of Crabtree Lane in November. Smaller flocks of this species were recorded at various locations within the Site throughout the winter period.

6.6.35 Nocturnal surveys undertaken in the winter of 2024/2025 (with data available to inform this assessment from between September and December 2024) show small numbers of target species seen or heard during the hours of darkness. These include a single occurrence of golden plover (3 birds foraging in winter cereal), several occurrences of lapwing (well distributed across the Order limits) with the largest flock being of 43 individuals on winter cereal and small numbers of barn owl flights.

Great-crested newt

6.6.36 Detailed results of the great crested newt survey can be found in **ES Volume 3, Appendix 6.6: Great-Crested Newt Baseline [EN010159/APP/6.21]**. A summary is provided below.

6.6.37 The majority of records identified by the desk study were historic, with the only recent positive record of great-crested newt occurring approximately 250 m east of the Site in 2017. Additional records were provided for negative eDNA results at ponds to the south of the Order limits.

6.6.38 Arable habitats are sub-optimal for great-crested newt in their terrestrial life phase. Therefore, although ponds within and adjacent to the Order limits provide some suitable breeding habitat, these locations are not well-connected to the wider landscape, with limited opportunities for the terrestrial phase, including refuge and hibernation opportunities found in scrub, woodland edge and hedgerow habitat.

6.6.39 Regardless of their habitat suitability for great-crested newt, all ponds within and adjacent to the Order limits, where access was available, were sampled for eDNA. All ten ponds sampled for eDNA returned negative results for great-crested newt.

Otter

6.6.40 Detailed results of the otter survey can be found in **ES Volume 3, Appendix 6.7: Badger, Otter and Water Vole Baseline [EN010159/APP/6.21]**. A summary is provided below.

6.6.41 Only three records of otter within the study area were returned by the data search, the most recent being submitted in 2015, north of the Order Limits near the Foss Dyke.

6.6.42 The River Trent was considered to provide suitable habitat for commuting and foraging, with branching ditches providing access to woodland habitat suitable for holts and resting.

6.6.43 Ten signs of potential otter activity were recorded during the survey, including mammal runs. A single otter spraint was identified along the bank of Sewer Dyke at North Clifton in autumn 2024, which confirmed presence. Otter activity in the area is likely to be relatively low based on information available.

Water vole

6.6.44 Detailed results of the water vole survey can be found in **ES Volume 3, Appendix 6.7: Badger, Otter and Water Vole Baseline [EN010159/APP/6.21]**. A summary is provided below.

6.6.45 The data search revealed 16 records of water vole within the past decade, five of which occurred within the Order limits, with the most recent having been submitted in 2017. Most of the records were from the west of the River Trent, associated with the Fledborough Beck and the Old Trent ditches.

6.6.46 Wet agricultural ditches with marginal, emergent vegetation, 45 - 50 degree earth banks with a variety of vegetation providing forage and cover from predators, are suitable for water vole. These occurred within the Order limits to the east and west of the River Trent, namely Fledborough Beck, the Old Trent, Sewer Dyke and a large drain running south to north in the east of the Order limits and the smaller agricultural drainage network associated with these watercourses. No evidence of water vole presence was identified during habitat surveys.

6.6.47 Water vole surveys were conducted in spring and autumn 2024 to establish the presence or likely absence of water vole within the study area. Sixteen records of water vole activity were made (low to high confidence) including burrows, latrines and footprints. Activity was recorded to the west of the River Trent on the Fledborough Beck and to the east of the river on the Sewer Dyke and the unnamed drainage ditch west of Thorney.

6.6.48 It is notable that American mink (a predator of water vole) was confirmed as present within the Order limits during the survey programme with individual animals observed.

Reptiles

6.6.49 Detailed results of the reptile survey can be found in **ES Volume 3, Appendix 6.9: Reptile Baseline [EN010159/APP/6.21]**. A summary is provided below.

6.6.50 The desk study provided two records of grass snake from 2015 located to the northeast of the study area, the closest being 950 m from the Order limits.

6.6.51 Rough grassland with open areas, close to scattered scrub and woodland edge, and riparian habitats are suitable to support the common and widespread reptile species (grass snake, common lizard and slow worm). These habitat types were located either side of the River Trent and alongside agricultural ditches, including Sewer Dyke, the Old Trent and Fledborough Beck.

6.6.52 Surveys were conducted in 2024 to establish the presence or likely absence of common reptile species within these habitats. A sampling approach was used to assess the highest quality habitats within five locations across the Order limits. Grass snake (peak count of 2 adults) and common lizard (peak count of 3 adults) were confirmed to occur within these habitats. However, no reptiles were identified along the Fledborough to Harby Dismantled Railway LWS.

Otherwise notable species

6.6.53 The desk study identified two mammals listed as species of principal importance (SPI), both of which were recorded within the Order limits. West European hedgehog was recorded east of the River Trent and south of the A57, with the most recent record being in 2021; brown hare was recorded to the west of North Clifton in 2017. Brown hare were also recorded frequently in all areas of the Order limits throughout the ecology surveys that were undertaken.

6.6.54 Thirty-eight records within the last 10 years of European eel were identified by the desk study. Several were located within watercourses that occur within the Order limits: south of Dunham Road, southeast and southwest of Ragnall, south of Woodcoates Lane, and south of Polly Taylor's Road, with the latest record in 2022. No records of river or sea lamprey were provided, although the Trent Rivers Trust does note that these species are present[35].

6.6.55 All notable invertebrate records identified in the desk study were for butterfly or moth species which occurred outside of the Order limits. The closest was for wall, a SPI, approximately 1 km north of the of the Order limits, most recently recorded in 2020.

6.6.56 The data search returned 124 records of legally protected and/or priority flora within the study area in the past 10 years. Some of the records had low accuracy grid references and could not be mapped. A high density of records outside of the Order limits are located at the High Marnham Power Station and along the Fledborough to Harby Dismantled Railway LWS.

Legally controlled species

6.6.57 Several legally controlled plant species were identified by the desk study, mostly those which have an association with aquatic or riparian habitats. Water fern was

[35] Trent Rivers Trust (2023) Hidden wildlife in the river Trent and its tributaries (online at https://www.trentriverstrust.org/wildlife-river-trent/ [accessed 18/11/2024].

recorded at two locations within the Order limits, west of the River Trent, while parrot's feather, Himalayan balsam, floating pennywort and New Zealand pygmyweed were recorded outside of the Order limits. In addition, a single record of wall cotoneaster and another of Japanese knotweed were identified outside of the Order limits.

6.6.58 Several records of Chinese mitten crab were located along the River Trent, within and to the north of the Order limits, and American mink were recorded at a similar location. American mink was recorded incidentally during the ecology surveys undertaken occurring at the same location as was identified by the desk study.

Predicted Future Baseline

6.6.59 This section considers the likely changes to the current baseline that may occur over the duration of the Proposed Development. It also considers the changes that may occur in the absence of the Proposed Development.

6.6.60 The study area within the Order limits and up to 50 m is dominated by arable fields, with occasional sheep grazed improved grassland fields, bounded by ditches and hedgerows with occasional standard trees. Woodland copses fall adjacent to the Order limits, with woodland ponds occasionally present. The River Trent bisects the Order limits from north to south at Dunham.

6.6.61 In the absence of the Proposed Development, these habitats will be managed in the same way, continuing to provide habitat for those (limited) legally protected, notable and controlled species identified in the current baseline. Some of these species have adapted to live successfully in agricultural habitats, such as badger, brown hare and ground nesting birds.

6.6.62 In the short, medium, and long term, species populations and distributions will continue to fluctuate in response to standard agricultural management, such as crop rotations and grazing. As a result of intensive farming practices, the majority of UK species populations are in decline. Therefore, in the absence of the Proposed Development, it is likely that this trend would continue, with more common, widespread and adaptable species populations continuing to decrease.

6.6.63 In the longer term, changing climatic conditions resulting from 'climate change' may impact the resilience of certain habitats and species, for example water levels in the ditch systems may change over time. Generally though, because of the intensive nature of management that already exists in the areas of agricultural land, climate change is unlikely to significantly impact the vast majority of land that occurs within the Order limits during the lifetime of the Proposed Development.

6.7 Consultation

6.7.1 As set out in **Consultation Report [EN010159/APP/5.1]**, a number of consultation activities have been undertaken. **ES Volume 3, Appendix 2.2: ES Response to PINs Scoping Opinion [EN010159/APP/6.21]** summarises the EIA Scoping Opinion for the Proposed Development and where elements have been agreed to be scoped out of the EIA.

6.7.2 Any consultation elements which have been raised and addressed post-scoping, are detailed within the **Consultation Report [EN010159/APP/5.1]**).

6.7.3 Key issues raised and discussed in respect of Biodiversity, beyond those detailed within the Scoping Opinion, and which have been considered within the assessment are set out in **Table 6.5**.

Table 6.5 Summary of Key Consultation

Consultee	Date raised	Issue raised	How and Where Addressed within the ES
Lincolnshire Wildlife Trust	16/10/2023	Workshop run by Lincolnshire Wildlife Trust with multiple solar developers and other stakeholders	Approach to skylark mitigation/compensation described in Section 6.8 includes information gathered at this workshop (including the desire to deliver mitigation and compensation within the Order Limits)
Natural England	05/02/2024	Project overview, baseline, approach to assessment and scoping of the Discretionary Advice Service (DAS) inputs	DAS set up and agreed between parties
Lincolnshire Wildlife Trust	29/02/2024	Project overview, baseline, identifying local conservation priorities, biodiversity enhancement and Biodiversity Net Gain (BNG)	Agreement reached on extent of baseline data collection requirements and need to ensure habitat creation is focused on local conservation priorities as well as delivery of BNG
Solar developers with large scale projects in Lincolnshire and Nottinghamshire	07/03/2024	Coordination of biodiversity enhancements, designing habitat enhancements in light of local nature conservation priorities, approaches to mitigation	Agreement on further coordination and desire to ensure solar development can provide a positive benefit to biodiversity

Consultee	Date raised	Issue raised	How and Where Addressed within the ES
			Desire for solar development to integrate and bolster Local Nature Recovery Strategies and champion local conservation priorities has been addressed for the Proposed Development (see Section 6.8)
Lincolnshire County Council, Nottinghamshire County Council, Bassetlaw District Council, Newark and Sherwood District Council, West Lindsay District Council	11/03/2024	Project overview, baseline, identifying local conservation priorities, biodiversity enhancement and Biodiversity Net Gain (BNG)	Agreement reached on extent of baseline data collection (with one outstanding consideration regarding breeding bird coverage which will be responded to with further survey in 2025) requirements and need to ensure habitat creation is focused on local conservation priorities as well as delivery of BNG
Natural England	03/06/2024	Project overview, baseline, identifying local conservation priorities, biodiversity enhancement and Biodiversity Net Gain (BNG)	Agreement reached with regards to focus on both BNG and habitat creation for local conservation priorities. Extent of baseline data collection was discussed and generally agreed as reasonable, but noting that local planning authorities will be key for species that are outside of consideration for derogation licences.
Bassetlaw District Council	Summer 2024	Response to statutory consultation: Non-statutory sites, BNG and areas of regional importance (i.e. the River Trent) need to be adequately covered within the Ecological Impact Assessment.	The issues raised by Bassetlaw District Council are addressed directly within this chapter and within the accompanying appendices.
Environment Agency	Summer 2024	Response to statutory consultation:	Data has continued to be collected during 2024 and is largely complete. Small amounts of data are to be collected in early 2025 in response to consultation.

Consultee	Date raised	Issue raised	How and Where Addressed within the ES
		The Environment Agency note that at the time of statutory consultation was undertaken that the survey programme was incomplete.	
Environment Agency	Summer 2024	Response to statutory consultation: The Environment Agency recommend a range of mitigation and enhancement measures focused on riparian habitats and associated species.	Environmental measures including enhancement of riparian habitats and focus on species such as otter and water vole is included within the design (see Table 6.6).
The Environment Agency	Summer 2024	Response to statutory consultation: The Environment Agency have requested consideration of fish (including lamprey) due to the potential effects of installation of electrical transmission cables. This is on both the River Trent and connected watercourses / wet ditches.	Potential effects on fish are described in Section 6.9. This includes consideration of noise and vibration, as well as EMF. Mitigation measures such as trenchless crossings and clear span bridges are described in Table 6.6.
Forestry Commission	Summer 2024	Response to statutory consultation: The Forestry Commission highlighted a need to minimise losses of trees, woodland and hedgerows and ensure that the landscape is not fragmented by development.	Environmental measures to increase the amount and connectivity of woodland, scrub, hedgerow and individual trees is provided in Table 6.6.
Lincolnshire Wildlife Trust	Summer 2024	Response to statutory consultation: Lincolnshire Wildlife Trust encourage integration of BNG delivery with Local Nature Recovery Strategies and highlight the importance of the River Trent corridor.	Environmental measures to increase biodiversity are described in Table 6.6, Appendix 6.10 Biodiversity Net Gain Assessment and in the Outline Landscape and Ecological Management Plan **[EN010159/APP/7.7]**.

Consultee	Date raised	Issue raised	How and Where Addressed within the ES
Lincolnshire Wildlife Trust	Summer 2024	Response to statutory consultation: Lincolnshire Wildlife Trust are sceptical that species-rich grassland can be established beneath sokar modules and suggest this should be considered as modified grassland in terms of BNG.	Appendix 6.10 Biodiversity Net Gain Assessment assumes all grassland within fields that support solar modules will be modified grassland in good condition. However, this grassland will be created using species-rich mixtures that include shade tolerant species. Therefore, the BNG assessment is based on a realistic worst case outcome, yet the investment is made to have better grassland, if as is expected, a diverse sward can be established.
Lincolnshire Wildlife Trust	Summer 2024	Response to statutory consultation: Lincolnshire Wildlife Trust would like to see mitigation for ground nesting birds delivered within the Order Limits.	Table 6.6 and the Outline Landscape and Ecology Management Plan **[EN010159/APP/7.7]** outline the measures to deliver skylark territories and habitats for other ground nesting birds such as grey partridge within the Order Limits.
Natural England	Summer 2024	Response to statutory consultation: Natural England recommend consideration of river and sea lamprey associated with the Humber Estuary SAC and Ramsar site.	Potential effects on The Humber Estuary SAC and Ramsar site is assessed in Section 6.9 and again within the Shadow Habitats Regulations Assessment.
Natural England	Summer 2024	Response to statutory consultation: Natural England agree that Spalford Warren SSSI can be scoped out of detailed assessment.	This outcome is described in Table 6.8.
Natural England	Summer 2024	Response to statutory consultation:	The mitigation hierarchy and assessment are addressed in Section 6.8.

Consultee	Date raised	Issue raised	How and Where Addressed within the ES
		Natural England provided advice on the mitigation hierarchy and assessment of impacts on protected species.	
Newark and Sherwood District Council (NSDC)	Summer 2024	Response to consultation: NSDC raised queries regarding approaches to survey of bats and reptiles.	Full survey methods and results for the field survey programme are provided in Appendices 6.2 to 6.9.
NSDC	Summer 2024	Response to consultation: NSDC recommend that raising BNG alone is not the focus of the biodiversity enhancement measures as this misses the opportunities to deliver for local conservation priorities.	Table 6.6 and the Outline Landscape and Ecology Management Plan **[EN010159/APP/7.7]** outline a range of measures designed to ensure local conservation priorities are championed as part of the outcomes of the proposed development.
Nottinghamshire Wildlife Trust (NWT)	Summer 2024	Response to consultation: NWT recommend habitat perscriptions aimed at aiding turtle doves.	Table 6.6 describes the measures in terms of field margins and hedgerow enhancements and creation aimed at benefitting turtle doves.
NWT	Summer 2024	Response to consultation: NWT recognise that there should be a focus on delivering better habitats that are well connected. They note that consideration should be given to managing some of this area via grazing.	Table 6.6 describes the measures to enhance and connect a range of habitat types at the landscape scale. Allowance for conservation grazing is also made, although this cannot be guaranteed.
NWT	Summer 2024	Response to consultation: NWT caution on habitat creation within Local Wildlife Sites and note mink control projects aimed at rejuvenating water vole populations.	No habitat creation is to be undertaken within any Local Wildlife Sites, with complimentary habitats instead being created in adjacent areas. This is described within the Outline Landscape and Ecology Management Plan **[EN010159/APP/7.7]**.

Consultee	Date raised	Issue raised	How and Where Addressed within the ES
			Table 6.6 describes the commitment for the Proposed Development to contribute to local initiatives to help eradicate American mink.
NWT	Summer 2024	Response to statutory consultation: NWT have concerns regarding ground nesting birds and would like to see mitigation for ground nesting birds delivered within the Order Limits and potentially further afield. It is noted that some enhanced arable farming is being proposed in another solar farm in Nottinghamshire.	Table 6.6 and the Outline Landscape and Ecology Management Plan **[EN010159/APP/7.7]** outline the measures to deliver skylark territories and habitats for other ground nesting birds such as grey partridge within the Order Limits.
West Lindsey District Council (WLDC)	Summer 2024	Response to statutory consultation: WLDC highlight the need for a ribut baseline on which to base BNG calculations.	The habitats present within the Order Limits are described in Appendix 6.3. This information underpins the BNG assessment in Appendix 6.10.
Lincolnshire County Council (LCC)	Summer 2024	Response to statutory consultation: LCC recommend undertaking a detailed field survey programme to inform the design, underpin calculations of biodiversity net gain and contribute to ensuring local conservation priorities are addressed.	Appendices 6.3 to 6.9 provide details of the field survey programme. Appendix 6.10 provides the BNG calculations. Table 6.6 and the Outline Landscape and Ecology Management Plan **[EN010159/APP/7.7]** provide information on specific approaches to enhance biodiversity.

Consultee	Date raised	Issue raised	How and Where Addressed within the ES
Natural England, Lincolnshire County Council, Nottinghamshire County Council, Bassetlaw District Council, Newark and Sherwood District Council, West Lindsay District Council (Central Lincolnshire).	January 2025	Project overview. Application of the mitigation hierarchy, detailed description of habitats to be enhanced and created and measures taken to deliver mitigation and provide opportunities to local conservation priorities. Discussion of assumptions underlying biodiversity net gain were also held.	Approach to habitat creation and enhancement recognised as generally appropriate, with suggestions regarding individual protected and notable species (e.g. lamprey). Discussion held regarding potential for habitat creation under solar tables. Agreement reached that the assumptions regarding habitat creation need to be robust and evidenced within the Biodiversity Net Gain Assessment.

6.8 Environmental Measures

6.8.1 The Proposed Development seeks to minimise adverse ecological effects and to maximise the opportunities for biodiversity benefit by following the 'mitigation hierarchy' as generally referred to in the Overarching National Policy Statement for Energy (EN-1) (defined in the Glossary and applied to biodiversity in paragraph 4.6.1) and Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (regulation 14(2)(c)), including measures to avoid, prevent, reduce and if possible, offset any identified significant adverse effects.

6.8.2 Avoidance and mitigation measures are being achieved as a result of the careful site selection, planning and design that has occurred. The mitigation hierarchy will continue to be applied through all future stages of the Proposed Development including during the the detailed design stage (post-consent), and through the adoption of good construction and operation principles as described in **Table 6.6**.

6.8.3 These are secured through the implementation of measures within the Commitments Register (see **Table 6.6**), including Outline Design Parameters at detailed design, the **Outline Landscape and Ecology Management Plan [EN010159/APP/7.7]**, **Outline Construction Environmental Management Plan [EN010159/APP/7.4]** (oCEMP) and the **Outline Decommissioning Environmental Management Plan [EN010159/APP/7.6]** (oDEMP), during the detailed design, procurement, construction, operation and decommissioning phases where relevant.

6.8.4 The design of the infrastructure and the environmental measures are aimed at both delivering BNG and contributing towards local conservation priorities. This includes providing new and enhanced HPI including extensive hedgerow networks, coastal and floodplain grazing marsh, field margins and ditches and

habitats that could provide increases in the size and distribution of SPI including brown hare, hedgehog, turtle dove, water vole, otter, green and brown hairstreaks, harvest mouse, bats and farmland birds. This is secured through the Commitments Register and described in the **Outline Landscape and Ecology Management Plan [EN010159/APP/7.7]**.

6.8.5 The commitment to enhancing, creating and managing habitats positively recognises that for a large array of flora and fauna, solar farms provide real opportunities to increase biodiversity (see Montag, Parker and Clarkson, 2016[36], Blaydes et al., 2022[37], Solar Energy UK, 2023[38], Solar Energy UK, 2024[39], Copping et al., 2025[40]), and that simply providing habitats to align with delivering Biodiversity Net Gain, as measured by the Statutory Biodiversity Metric, misses potential opportunities to contribute towards National and Local conservation priorities. The positive approach to environmental design and extent of the One Earth Solar Farm provides the opportunity to deliver landscape scale nature conservation benefits that can positively contribute to the Local Nature Recovery Strategies (LNRS) being developed for Nottinghamshire and Lincolnshire. The Local Habitat Map for Nottinghamshire[41] (that will underpin the Nottinghamshire LNRS) shows habitats identified as 'areas of particular importance to biodiversity' both within (i.e. the Fledborough to Harby Dismantled Railway LWS) and close to the Order Limits. These provide a skeleton on which habitats created and managed positively as part of the Proposed Development can be delivered around.

[36] Montag H., Parker, G. & Clarkson T. (2016) The effects of solar farms on local biodiversity: A comparative study. Clarkson and Woods and Wychwood Biodiversity (available on line at The Effects of Solar Farms on Local Biodiversity- accessed 21/11/2024)

[37] Blaydes, H., Gardner, E., Whyatt, J.D., Potts, S.G. & Armstrong, A. (2022) Solar park management and design to boost bumble bee populations. Environmental Research Letters, 17: (available on line at Solar park management and design to boost bumble bee populations - IOPscience. Accessed 21/11/2024)

[38] Solar Energy UK (2023) Solar habitat: ecological trend on solar farms in the UK. (available on line at Solar-Habitat-Report-2023.pdf. Accessed 21/11/2024)

[39] Solar Energy UK (2024) Solar habitat: ecological trend on solar farms in the UK. (available on line at SEUK-2024-Solar-Habitat-Report.pdf. Accessed 21/11/2024)

[40] Copping, J.P., Waite, C.E., Bamford, A., Bradbury, R.B., Field, R.H., Morris, I. & Finch, T. (2025) Solar farm management influences on breeding bird responses in an arable dominated landscape. Bird Study 1-6. (available online at https://www.tandfonline.com/doi/pdf/10.1080/00063657.2025.2450392. Accessed 14/02/2025)

[41] Nottinghamshire County Council (2024) – available online at Local habitat map | Nottinghamshire County Council. Accessed 26/11/2024)

Table 6.6 Environmental Measures and Securing Mechanisms

Ref	Stage	Measure	Securing mechanism*
C1	Construction/ Operational/ Decommissioning	Habitats with a higher distinctiveness (in terms of Biodiversity Net Gain Assessment), such as woodland, mixed scrub, hedgerow, trees and ponds, will be avoided and retained wherever possible, and will be subject to biodiversity enhancement where appropriate i.e. where biodiversity gains can be achieved due to the poor baseline condition of the habitat in question.	oLEMP **[EN010159/APP/7.7]** oCEMP **[EN010159/APP/7.4]** oDEMP **[EN010159/APP/7.6]** BNG Strategy **[EN010159/APP/6.21]**
C2	Design	The cabling route will pass under the River Trent by use of trenchless crossing to minimise the effects on this main river. Trenchless crossing compounds will be located a minimum of 16 m from the bank top, and drilling will occur a minimum of 5 m below the river bed to avoid impacts of electro-magnetic fields (EMF) and heat from cables on riparian fauna. The drill profile will be designed to ensure risk of drilling fluid breakout is negligible. The design and approach to managing risks of drilling fluid breakout will be included within the CEMP. The same measures will be applied to cable crossings of wet ditches and watercourses except trenchless crossing compounds will be located a minimum of 10 m from the bank top, and drilling will occur a minimum of 2.5 m below the bed. Trenchless crossings of hedgerows along the route of transmission cables will be located a minimum of 3 m away from the hedgerow bottom.	oLEMP **[EN010159/APP/7.7]** oCEMP **[EN010159/APP/7.4]** BNG Strategy **[EN010159/APP/6.21]**
C3	Construction	Semi-natural habitats along the Fledborough Viaduct (Fledborough to Harby dismantled railway Local Wildlife Site (LWS)) will be retained and protected to maintain connectivity throughout the landscape. This will be achieved through installation of fencing/hoarding to protect sensitive habitat features during construction and a stand-off distance of no less than 5 m to solar modules and associated infrastructure.	oCEMP **[EN010159/APP/7.4]** oLEMP **[EN010159/APP/7.7]**

Ref	Stage	Measure	Securing mechanism*
C4	Construction/ Operational/ Decommissioning	Appropriate buffers (minimum 5 m) will be maintained or created around habitats of medium and high distinctiveness (in terms of Biodiversity Net Gain Assessment), including woodland, hedgerows, and trees (other than at access points and in areas of grassland loss). Watercourses, such as drainage ditches, will have a minimum buffer of 8 m, ponds 10 m and to the River Trent, the minimum buffer will be 16 m. These buffers will protect features during construction, operation and decommissioning, from impacts including pollutant loss (fines, hydrocarbons etc.), dust, noise and vibration.	oLEMP **[EN010159/APP/7.7]** oCEMP **[EN010159/APP/7.4]** oDEMP **[EN010159/APP/7.6]** BNG Strategy **[EN010159/APP/6.21]**
C5	Construction/ Decommissioning	Existing trees and hedgerows will be retained as far as possible and protected in accordance with best practice (BS 5837), where unavoidable, features of low distinctiveness and classified as poor in condition (using BNG Condition Assessment criteria) will be selected over habitats of medium or high distinctiveness or classified as moderate or good condition.	oLEMP **[EN010159/APP/7.7]** oCEMP **[EN010159/APP/7.4]** oDEMP **[EN010159/APP/7.6]** BNG Strategy **[EN010159/APP/6.21]**
C6	Construction	Existing tracks and field access locations across the Site will be utilised wherever possible. Where new access is unavoidable, where possible, habitats of low distinctiveness and poor condition will be selected, with a maximum width of 6 m removed for internal tracks and 25 m for bell mouths alongside the public highway. Vegetation within visibility splays will be retained through management to an appropriate height (0.9 m) and then allowed to regrow following completion of construction.	oLEMP **[EN010159/APP/7.7]** oCEMP **[EN010159/APP/7.4]** BNG Strategy **[EN010159/APP/6.21]**
C7	Construction	The crossing of wet ditches will be avoided wherever possible. Where unavoidable, they will be designed to ensure the maintenance of connectivity for aquatic fauna (fish) and semi-aquatic fauna (water vole and otter). They will be delivered using clear span bridges, avoiding impacts to the channel and its banks.	oLEMP **[EN010159/APP/7.7]** oCEMP **[EN010159/APP/7.4]** BNG Strategy **[EN010159/APP/6.21]**

Ref	Stage	Measure	Securing mechanism*
C8	Construction	Working hours will be limited to 07:00 until 19:00 in the construction period and 08:00 until 18:00 during the operational period to avoid the need for artificial lighting, other than at the trenchless crossing of the River Trent, where 24 hour working may be required for a short period when drilling. Where necessary, e.g. emergency requirements, lighting will be designed in line with principles set out in guidance from the Institution of Lighting Professionals and the Bat Conservation Trust[42] to avoid impacts on bats and other light averse animals.	oCEMP **[EN010159/APP/7.4]** **oOEMP [EN010159/APP/7.5]**
C9	Construction	Security fencing will be installed throughout the Order Limits, around solar array fields and supporting infrastructure. They will be constructed of wire mesh and wooden posts and designed to be stock proof, with a minimum height of 2 m. To avoid fragmentation of habitats, there will be ground level holes/gates at strategic locations, large enough to allow movement of badgers, hedgehogs and foxes. Strategic locations will be adjacent to habitat parcels of medium or high distinctiveness (woodland, mixed scrub, ponds) and on or close to established mammal runs. Specific locations will be identified during the pre-construction surveys, due to the potential for commuting routes to change frequently, however, a minimum of one hole per 150 m of fencing will be created, with a higher frequency around suitable habitats and identified badger sett locations.	oCEMP **[EN010159/APP/7.4]**

[42] Bat Conservation Trust and Institution of Lighting Professionals (2023) Guidance Note 08/23: Bats and artificial lighting in the UK. ILP, Rugby

Ref	Stage	Measure	Securing mechanism*
C10	Construction	Pre-construction surveys will be conducted during the winter period to search for any new, previously unidentified, badger setts within, or adjacent to the Order Limits. Where found, a buffer of up to 30 m will be established using hazard tape to prevent accidental disturbance during construction activities. Setts located close to the Proposed Development will be monitored prior to works using cameras at entrances to establish the presence of badgers and levels of activity. The buffer may be reduced dependent on the proposed construction activity (level of noise or vibration it may cause) and the type of sett (occasionally used outlier or main sett). Where disturbance or destruction of the sett is unavoidable (e.g. a new sett within the footprint of a substation location), a licence from Natural England (NE) will be required to close the sett and create a replacement. Badger setts are often located within dense vegetation which cannot be fully assessed during pre-construction surveys, therefore a suitably qualified ecologist will supervise vegetation clearance and search for setts as vegetation is removed, allowing access to previously unsurveyed areas. Where a sett is found, all works will stop and the process described above will be followed.	oCEMP **[EN010159/APP/7.4]**

Ref	Stage	Measure	Securing mechanism*
C11	Construction	Pre-construction surveys will be conducted to assess trees within, and adjacent to, the Order Limits for potential roost features for bats (woodpecker holes, tear outs, etc). Where found, a buffer of 15 m will be implemented to avoid disturbance during the construction period. If this is not possible, trees will be inspected using an endoscope either from the ground or by aerial access (ladder or rope and harness). Features will be classified as either PRF I (supporting individual bats of low conservation value), PRF M (supporting multiple bats of high conservation value) or negligible (little to no value to roosting bats). PRF I features will receive a single summer inspection (May to August inclusive) and PRF M features will receive three inspection visits during the summer and autumn period (May to September), and negligible features will require no further inspection. If bats, or evidence of bats (droppings) is found, the detailed scheme design e.g. buffers, standoff distances, siting of lighting columns, may require amendment to mitigate for potential adverse impacts. Alternatively, a Natural England (NE) licence may be obtained to derogate from the legislation.	oCEMP **[EN010159/APP/7.4]**
C12	Construction	Lamprey populations will be monitored during construction, for no more than 5 years, to determine any potential effects of EMF. This will be coordinated with the Environment Agency and, potentially, other operators of transmission cables running beneath the River Trent.	oLEMP **[EN010159/APP/7.7]**
C13	Construction	Construction areas will be fenced using either hoarding or Heras fencing to prevent animals from entering active works, thereby protecting them from accidental injury or killing.	oCEMP **[EN010159/APP/7.4]**
C14	Construction	Good housekeeping measures will be implemented throughout the construction period, including the safe storage of hazardous chemicals, carrying and use of spill kits, storage of equipment when not in use (overnight), covering of excavations overnight (to prevent animals from falling in and becoming trapped), and storage of heavy plant off-site or in allocated areas.	oCEMP **[EN010159/APP/7.4]**

Ref	Stage	Measure	Securing mechanism*
C15	Construction	Vegetation clearance will be timed to avoid the main bird nesting season (March to August inclusive), and periods where reptiles and amphibians are active (climate dependent) to avoid injury or killing. Where this is not possible, habitats will be inspected prior to works by an Ecological Clerk of Works (ECoW) to search for potential bird nests and features suitable to support sheltering herptiles. If found, nests will be monitored to confirm occupation (nest building, egg incubation or with young) to determine the requirement for a suitable stand-off distance to be implemented. Features suitable for sheltering amphibians or reptiles will be carefully dismantled by hand, with any animals found moved to a safe location nearby. If European Protected Species (EPS) are found (great-crested newt), all works would stop before a licence is obtained from Natural England. Where appropriate, a suitably qualified ecologist will supervise for the duration of vegetation clearance works.	oCEMP **[EN010159/APP/7.4]**
C16	Pre-construction/ Construction	The LEMP will include detailed design of habitat creation and enhancement measures which will occur within solar array fields and mitigation areas. Creation and enhancement will include species-rich grassland, created within fields which currently support arable crops or species-poor grassland and enhancement of existing hedgerows, through reduced cutting and supplemental planting to improve structure and species diversity. In particular, these measures will mitigate for the loss of bat commuting and foraging habitats. Habitats will begin to be enhanced and created 12 months prior to first installation of solar modules. Delivery of habitats within working areas will be provided on a rolling programme as localised construction finishes (e.g. on a field by field basis).	oLEMP **[EN010159/APP/7.7]**

Ref	Stage	Measure	Securing mechanism*
C17	Construction/ Operational	Species-rich grassland devoid of solar modules and other above ground infrastructure will be provided to compensate for the loss of skylark breeding habitat. The grassland will provide foraging and nesting opportunities. If necessary, skylark plots (two per pair potentially displaced due to development) will be established in the grassland. 243 ha of species -rich grassland will be created, with skylark plots established in the 86 ha that are further than 50 m from a field boundary. In addition, adjacent solar module fields will be under sown with species-rich grassland, further increasing the availability of foraging habitat. Species-rich grassland devoid of above ground infrastructure will be created 12 months before the installation of solar Modules with seed bed preparation and sowing taking place in autumn and establishment management taking place in the following summer before it is required as compensatory habitat.	oLEMP **[EN010159/APP/7.7]** BNG Strategy **[EN010159/APP/6.21]**
C18	Construction	Beetle banks will be created within solar table fields and species-rich grassland mitigation areas to improve the availability and diversity of invertebrates for skylark and other species which feed on invertebrates. They will be constructed to be 0.4 m high and 1.5–2 m wide (as per Countryside Stewardship prescription). Each field between 20 ha and 28.9 ha will have one beetle bank (unless in the flood plain), and those larger than 29 ha will have three. They will be positioned to run along solar arrays or alongside access tracks. The banks will be between 140 to 450 m in length and will be constructed in spring or autumn and sown with a species-rich grassland sward to create a diverse structure.	oLEMP **[EN010159/APP/7.7]**

Ref	Stage	Measure	Securing mechanism*
C19	Construction	A minimum of 50 habitat piles will be created within solar table fields and species-rich grassland/skylark mitigation areas. They will be strategically located close to scrub and woodland habitats and will incorporate ditch and pond bankside habitat, providing habitat for invertebrates and shelter and/or hibernating opportunities for amphibians and reptiles. They will be created from logs (ideally locally sourced from associated vegetation clearance) piled into a shallow hole up to 30cm deep and covering an area of 2 x 3-4 m and up to a height of 1-1.5 m above ground level. The pile will be topped with a layer of mulch and/or brash and leaves to help initiate decomposition of the logs below. A final layer of grass sods or turf will be applied to prevent the materials from dispersing in high winds. These will be created outside of the design flood extent.	oLEMP **[EN010159/APP/7.7]**
C20	Construction/ Operational	Gabion baskets/cages will be used to create habitat for invertebrates, amphibians and reptiles (minimum of 25). They will be filled using a range of materials, including large and small rocks/pebbles, stacked logs, bamboo, bricks and ceramic pipes. This will create a range of features for fauna of various sizes and life stages. They will be provided in a variety of sizes; a minimum of 1 m wide and high, and up to 20 m long, located in both solar table fields and species-rich grassland/skylark mitigation fields. Some will be located in the centre of fields, and others along drainages ditches and woodland edge boundaries. Where they are positioned running east to west, they can be used to support earth works to create a shallow, south facing slope, providing basking opportunities for reptiles.	oLEMP **[EN010159/APP/7.7]**

Ref	Stage	Measure	Securing mechanism*
C21	Construction/ Operational	Drainage swales and basins will form part of the Sustainable Drainage System (SuDS) for the Proposed Development. The location and size will be determined in response to detailed infrastructure design to avoid flooding in areas of high flood risk (see Hydrology and Hydrogeology Chapte**r [EN010159/APP/6.7]**); basins will be designed to hold areas of permanent water (ponds) in a way that will not compromise their primary function (minimum of three ponds). These features will be plug planted and seeded with a range of native aquatic plants and emergent vegetation, creating areas of reedbed with both steep and shallow banks. Reedbed areas of common reed, reed canary grass and reedmace will provide nesting habitat for passerines, waders and harvest mice, and will provide forage and cover for water voles. A SuDS feature will be created within the proposed coastal and floodplain grazing marsh lying adjacent to the west of the River Trent. It would take the form of a drainage ditch, connecting the existing ditch network and providing additional habitat for invertebrates, birds, reptiles and water vole which occur in the vicinity. Additional water features (minimum of 25), in the form of 'scrapes' will be created throughout the Order Limits, primarily in areas of low lying land which are more likely to hold water over the winter period, and close to existing ponds and SuDS. in each of the locations, two to three scrapes will be created (where practicable) with one larger, one medium and one small, allowing a range of conditions. The larger scrape will reach a maximum depth of 1 m, with a steep bank at one end and a shallow bank at the other, covering approximately 20 m^2 but of varying shapes (both linear and round). The surface will be left rough and will naturally colonise.	oLEMP **[EN010159/APP/7.7]** oCEMP **[EN010159/APP/7.4]** BNG Strategy **[EN010159/APP/6.21]** Flood Risk Assessment and Drainage Strategy Report **[EN010159/APP/6.21]**

Ref	Stage	Measure	Securing mechanism*
C22	Operational	The current management of drainage ditches, in line with agricultural practice, involves regular dredging to remove silt build-up from the channel and clearance of either one, or both banks of all vegetation. Fields within the Order Limits will not be ploughed or tilled (except for initial grassland habitat creation), resulting in a reduction in silt accumulation, therefore, the same level of management will not be required. Ongoing management of drainage ditches will involve the clearance of any silt build-up as required (outside of the main bird breeding season), with the aim of clearing no more than one third of each ditch in each year, and from one bank/side only. Bankside vegetation will be cut every other year (in autumn), alternating from one bank, to the opposite bank, maintaining vegetation cover all year round.	oLEMP **[EN010159/APP/7.7]**
C23	Operational	The scheme will seek to partner with the Greater Lincolnshire Nature Partnership, Waterlife Recovery Trust or other relevant stakeholder organisation to set up and deliver an American mink control project within the ditch network of the Order Limits and the wider landscape. This will be led by the stakeholder group, with funding (part or full) by the Applicant, with the aim of reducing predation pressures on water vole populations present. The approach to delivering this commitment will be included within the scope of Landscape and Ecology Management Plan (LEMP).	oLEMP **[EN010159/APP/7.7]**
C24	Construction/ Operational	Bat and bird boxes will be installed (50 of each - including at least 3 barn owl boxes) within mature trees throughout the Order Limits to increase roosting and nesting opportunities for bats and birds. A range of sizes, designs and materials will be used to provide a range of conditions for various species. They will be installed on the south-west or south-eastern aspect of a tree trunk, at a minimum of 3 m from ground level, ensuring there is a clear entry to the box with no branches or foliage which might block the entrance.	oLEMP **[EN010159/APP/7.7]**

Ref	Stage	Measure	Securing mechanism*
C25	Construction/ Operational	Scattered scrub will be planted to extend scrub and grassland mosaic habitats along the Fledborough Viaduct. Species will include gorse, dogwood, blackthorn and buckthorn, with natural colonisation of bramble, providing suitable food plants and habitat for green and brown hairstreak caterpillars.	oLEMP **[EN010159/APP/7.7]** BNG Strategy **[EN010159/APP/6.21]**
C26	Construction	Two otter holts will be constructed; one within the bank of a substantial ditch either side of the River Trent, east and west. The holts will be constructed of locally sourced logs and branches, partially buried and covered in brash to create camouflage and reduce potential for disturbance. Locations will be selected for their connectivity to the River Trent and proximity to scrub and mature trees, providing cover and support to the bank structure through root systems.	oLEMP **[EN010159/APP/7.7]** BNG Strategy **[EN010159/APP/6.21]**
C27	Construction	Hedgerow creation will include a range of native species typical of the region, such as hawthorn, blackthorn, hazel, privet and guelder-rose, with supplementary planting ('gapping up') of species-poor and defunct hedgerows. A diversity of species results in availability of berries, nuts and flowers over the year, provisioning for a range of animal species. Improvement in hedgerow structure (width and height) will improve connectivity through the wider landscape and provide nesting habitat for farmland bird species, such as turtle dove and yellowhammer. The target width and height of all hedgerows will be 3 m x 3 m, with the height being extended up to 4 m where overshadowing will not be an issue. Where temporary access is required during construction, hedgerow will be planted on completion of the works to reinstate and enhance their former structure. The length of existing hedgerow is 55.40 km (with a further 7.22 km of tree line), of which 25.5 km is defunct and will require supplemental planting, a further 14.06 km will be created, particularly within large, open fields in areas both to the east and west of the River Trent.	oLEMP **[EN010159/APP/7.7]** BNG Strategy **[EN010159/APP/6.21]**

Ref	Stage	Measure	Securing mechanism*
C28	Construction/ Operational	Trees will be planted individually and linearly, creating tree lines, and within existing and newly created hedgerows. Trees of a variety of nursery stock sizes will be planted to provide difference in age structure. Tree lines and hedgerows with trees will improve connectivity across the Order Limits and the wider landscape, they will provide habitat for fungi, invertebrates (as living, standing deadwood and fallen deadwood), nesting and food provision for birds and mammals, and roosting opportunities for bats. A range of native species typical of the region will be selected to provide a variety of conditions for multiple flora (fungi and epiphytes) and fauna, with a range of wood types (soft and hard to encourage varying rot rate and cavity features) and longevity. Proposed tree planting locations are presented in the LEMP and typically form boundaries around proposed solar array fields. Additional tree planting, will occur within three mitigation (species-rich grassland) fields in the area to the east of the River Trent.	oLEMP **[EN010159/APP/7.7]** BNG Strategy **[EN010159/APP/6.21]**
C29	Construction/ Operational	Species-rich grassland will be created under and around solar modules and other infrastructure, and within all fields within the Order Limits that are identified for enhancement only. A range of seed mixes will be used to ensure successful establishment within the conditions of a particular area (e.g. shade, water logging etc), and to provide varying plant communities and sward structures for a range of faunal species. Seed mixes will be selected to target creation of two Priority Habitats: 'Coastal and floodplain grazing marsh' and 'Lowland meadows', with coastal floodplain grazing marsh targeted either side of the River Trent, increasing the extent of existing habitat to the south (on the western bank), and lowland meadow between solar Modules and within mitigation fields. A shade tolerant seed mix, incorporating woodland species, will be selected for grassland adjacent to existing and newly created hedgerows, around areas of tree planting and underneath solar modules.	oLEMP **[EN010159/APP/7.7]**

Ref	Stage	Measure	Securing mechanism*
		Grassland habitats will be managed to ensure that target conditions are achieved, through mowing (outside of the main bird breeding season), treatment of weeds and dominating species, and reseeding at regular intervals where required. Cutting regimes will be phased to ensure a range of sward heights at any one time and to prevent the encroachment of scrub species and associated habitat succession. Should it be possible (based on availability of graziers), conservation grazing will be implemented to maintain the sward. These grassland swards will improve the diversity and populations of small mammals which will, in turn, improve prey availability for barn owl and other birds of prey. They will also improve invertebrate diversity for foraging hedgehog and badgers and the floral diversity providing forage and cover for hare, which occur in high numbers in the area.	
C30	Construction/ Operational	Field margins (4 m wide) along one edge of each field supporting solar arrays will be seeded with mixes in line with Countryside Stewardship prescriptions AB8 Flower-rich margins (targeting pollinators in the summer), AB16 Autumn sown bumblebird mix and AB9 Winter bird food (provisioning for farmland bird species in long and/or cold winters), alternated by season. In locations where hedgerows will be allowed to grow to 4 m tall mixes will be tailored with fumitory and chickweed that will benefit turtle dove. Riparian seed mixes, including dense tussocky grasses, common reed, and reed canary grass, will be used along draining ditches and banks, incorporating a 2 m strip either side of the bank top. These habitats will be suitable for nesting passerines and waders, they will provide cover and foraging opportunities for water voles and suitable nesting habitat for harvest mouse.	oLEMP **[EN010159/APP/7.7]** BNG Strategy **[EN010159/APP/6.21]**

Ref	Stage	Measure	Securing mechanism*
		Grassland habitats will be managed to ensure that target conditions are achieved, through mowing (outside of the main bird breeding season), treatment of weeds and dominating species, and reseeding at regular intervals where required. Cutting regimes will be phased to ensure a range of sward heights at any one time and to prevent the encroachment of scrub species and associated habitat succession.	
C31	Construction/ Operational	Narrow strips of woodland will be created along the margins of some solar arrays in the west of the Order Limits where screening is required. Tree planting will be irregular to create both open and more closed areas between trees and will incorporate a range of native species typical of the region and a variety of nursery stock sizes to provide difference in age structure. Scrub species will be planted between trees to establish an understorey, including a range of berry and nut producing species, such as hawthorn, dog wood, blackthorn, guelder rose and hazel. A shade tolerant seed mix will also be used to encourage a diverse woodland ground flora to develop. Supplemental planting of tree and scrub species will occur annually in the first five years to replace failed individuals and will continue to create a diversity in age class. Woodland habitats will provide foraging and roosting opportunities (in trees) for bat species and birds (nesting). These habitats will also support mammals, such as badger, and a variety of invertebrates, including butterflies and saproxylic beetles. At least one of the proposed ponds/scrapes will be created within and at the edge of newly created woodland parcels.	oLEMP **[EN010159/APP/7.7]** BNG Strategy **[EN010159/APP/6.21]**
C32	Design/ Construction	Land that is identified for mitigation and compensation purposes (e.g. grassland for skylarks) in fields where no construction works are proposed will have habitat establishment works begun at least 3 months ahead of construction activity.	Works Plan **[EN010159/APP/2.3]** LEMP **[EN010159/APP/7.7]** oCEMP **[EN010159/APP/7.4]** BNG Strategy **[EN010159/APP/6.21]**

Ref	Stage	Measure	Securing mechanism*
		Tree planting and hedgerow planting will take place over the winters of each of the two year construction programme. The aims will be to: Gap up and plant standards in one third of the defunct hedgerows each winter Plant one third of new hedgerows (including standards) each winter Take existing hedgerows into positive management for biodiversity at least 3 months ahead of construction activity commencing (other than at access points and other areas where vegetation management will be needed to aid delivery). Habitat creation and enhancement measures will be detailed within the Landscape and Ecology Management Plan.	
C33	Construction/ Operational	Monitoring of bat activity using static acoustic devices will be conducted at the same locations as baseline monitoring (once during construction and in years 1, 3, 5 and 10 post construction) to compare activity levels and to assess mitigation efficacy and inform the need for intervention - to adjust or amend the mitigation approach. The same method will be used between years to allow direct comparison of data sets. Reports will be produced to be made publicly available for the development of bat mitigation strategies for future solar schemes in the UK and beyond.	oCEMP (within a Biodiversity Management Plan (BMP) section) **[EN010159/APP/7.4]** oLEMP **[EN010159/APP/7.7]**
C34	Construction/ Operational	Skylark monitoring will be conducted to assess the efficacy of mitigation and compensation during construction and operation. Sampling of both developed and undeveloped areas will be undertaken to record breeding densities and usage (i.e. for breeding, feeding etc.). The results will be used to inform any adaptive management measures required through the LEMP.	oCEMP (through BMP) **[EN010159/APP/7.4]** oLEMP **[EN010159/APP/7.7]**

Ref	Stage	Measure	Securing mechanism*
C35	Operational	Biodiversity Net Gain (BNG) will be provided for area, hedgerow and watercourse units as measured with the statutory biodiversity metric. Monitoring will be secured through a habitat management and monitoring plan in-line with DEFRA requirements for significant habitat delivery.	oLEMP **[EN010159/APP/7.7]** BNG Strategy **[EN010159/APP/6.21]**

* It is noted that at this stage reference is made to the outline management plans. The final management plans will be approved by the appropriate authority.

Biodiversity Net Gain

6.8.6 The Proposed Development will deliver BNG for area based habitats, hedgerows and watercourses. The indicative landscape masterplan provided within the **Outline Landscape and Ecology Management Plan [EN010159/APP/7.7]** provides for an on-site net change of:

- 3,440.43 habitat units, an increase of 113.17%
- 353.22 hedgerow units, an increase of 92.49%
- 77.60 watercourse units, an increase of 57.75%.

6.8.7 Details of the BNG assessment are provided in **ES Volume 3, Appendix 6.10: Biodiversity Net Gain Assessment [EN010159/APP/6.21]**.

6.9 Biodiversity Assessment

Assessment of Likely Significant Effects

Basis of assessment

6.9.1 The assessment of likely significant effects is based upon an understanding of the Proposed Development, as described in **ES Volume 1, Chapter 5: Description of the Proposed Development [EN010159/APP/6.5]**. Broad parameters have been used to quantify the assessment in Section 6.10 to ensure conclusions are robust. **Table 6.7** outlines these parameters.

Table 6.7 Environmental Parameters

Description	Quantification	Notes
Habitat loss		
Arable Fields	1,121.40 ha	Includes all arable fields (including temporary grass and clover leys) that contain:

Description	Quantification	Notes
		1. Solar Modules 2. Substations 3. BESS 4. Allowance of 4 ha for installation of connecting transmission cabling outside of fields supporting above ground infrastructure 5. Habitat mitigation areas to be converted from arable to species-rich grassland
Arable field margins	6.99 ha	Includes all field margins within arable fields that contain: 1. Solar Modules 2. Substations 3. BESS 4. Habitat mitigation areas to be converted from arable to species-rich grassland
Modified grassland	102.47 ha	Includes all modified grassland fields that contain: 1. Solar Modules 2. Substations 3. BESS 4. Habitat mitigation areas to be converted from modifed grassland to species-rich grassland
Other neutral grassland	1.23 ha	Total loss assumed
Artificial unvegetated, unsealed surface	0.72 ha	Loss of existing farm tracks
Developed land; sealed surface	3.89 ha	Loss of existing hard standing
Hedgerow	0.34 km	Includes for access points from highway, for internal tracks and to enable erection of boundary fencing. Assumption is made that each field has the potential for two points where fencing crosses a field boundary (each through a notch 1 m in width). Assumption is that hedgerow within a visibility splay for access to the public highway will be reduced in height to 0.9 m, as opposed to removed.
Permanently wet ditches / watercourses	0.07 km	There will be 9 crossings of permanently wet ditches / watercourses by access tracks.

Description	Quantification	Notes
Habitat Gains (creation)		
Modified grassland (good condition)	918.20 ha	This is grassland that lies underneath the solar modules.
Other neutral grassland (moderate condition)	215.18 ha	This is grassland within fields managed positively for biodiversity that support no above ground infrastructure.
Coastal and floodplain grazing marsh	28.64 ha	This is species-rich grassland created within the flood plain of the River Trent.
Mixed scrub	1.32 ha	New mixed scrub to be created as shown on in the outline Landscape and Ecology Management Plan **[EN010159/APP/7.4]**.
Other woodland; broadleaved	8.53 ha	New woodland to be created as shown on the outline Landscape and Ecology Management Plan **[EN010159/APP/7.4]**.
Arable field margins	7.20 ha	Assumption of a 200 m long and 4 m wide strip in each field supporting solar tables
Sustainable Drainage Systems	2.79 ha	Detention basins (including permanent ponds), swales etc.
Ponds (non-priority habitat)	0.42 ha	New ponds created through over excavation of the detention basins
Developed land; sealed surface	34.26 ha	Substations, BESS etc.
Artificial unvegetated, unsealed surface	20.17 ha	Access tracks
Individual trees	0.81 ha[43]	New trees to be planted as shown in the outline Landscape and Ecology Management Plan **[EN010159/APP/7.4]**.
Species-rich native hedgerows with trees	6.58 km	New hedgerows to be created as shown the outline Landscape and Ecology Management Plan **[EN010159/APP/7.4]**.
Species-rich native hedgerows	7.48 km	New hedgerows to be created as shown the outline Landscape and Ecology Management Plan **[EN010159/APP/7.4]**.
Habitat Gains (enhancement)		

[43] Area derived from the Statutory Biodiversity Metric tree helper.

Description	Quantification	Notes
Coastal and floodplain grazing marsh	3.93 ha	Enhancement of small area of coastal and floodplain grazing marsh adjacent to the River Trent and immediately north of Fledborough Holm LWS.
Mixed scrub	5.85 ha	Enhancement of mixed scrub present within the Order Limits
Lowland mixed deciduous woodland	0.95 ha	Enhancement of woodland present within the Order Limits
Other woodland; broadleaved	0.69 ha	Enhancement of woodland present within the Order Limits
Other woodland; mixed	2.56 ha	Enhancement of woodland present within the Order Limits
Hedgerows	53.85 km	Enhanced hedgerows including gapping up and changes in management to encourage larger more complex structures.
Lines of trees	5.03 km	Enhancement of tree lines
Construction and decommissioning duration		
Construction programme	2 years	See ES Volume 2, Chapter 5 **[EN010159/APP/6.5]**
Trenchless crossing of River Trent	Up to 6 months – although drilling comprises up to 4 weeks during this period (not continuous).	Includes site mobilisation and demobilisation and allows for flexibility of the drilling of each cable that makes up the circuit (up to 4).
Solar Modules	Up to 6 months per field	Each field will have solar modules delivered and installed within a 6 month period. The installation will be a rolling programme (i.e. not all fields will be worked upon simultaneously.
Substation(s)	Up to 2 years	Complex infrastructure that may be delivered over the whole construction period.
BESS	Up to 2 years	Complex infrastructure that may be delivered over the whole construction period.

6.9.2 Within the area of '*land for potential cable route'* shown on the Illustrative Landscape Masterplan around the High Marnham substation no habitat losses have been accounted for. This is on the basis that any habitats of interest such as hedgerows or scrub would be crossed using trenchless techniques and uncertainty about where the cable connection point would be. This uncertainty is driven by the National Grid's North Humber to High Marnham project that would see large changes in this area if Development Consent was granted. It should be

noted that the One Earth Solar Project is not the triggering party that results in the need for this upgrade.

6.9.3 However, it should be noted that the losses shown in Table 6.7 are highly precautionary (for example it assumes the loss of whole fields should they contain any above ground infrastructure or be shown as Habitat Mitigation Areas).

Scope of the Assessment

6.9.4 **Table 6.8** presents the biodiversity scoping assessment. Ecological features identified within the individual ZoIs of the Proposed Development are listed alongside their importance in terms of legsilation and policy and within the context of the area within the Order Limits. Environmental measures described in **Table 6.6** are considered within the assessment only where they are tried and tested methods that are typical of construction sites (e.g. pollution prevention measures).

Table 6.8 Scope of Assessment

Ecological feature	ZoI (km)	Importance (legislation/policy)	Importance (Site level)	Importance justification	Scoped in/out
Humber Estuary Ramsar site / SAC	Connected via River Trent	International	International	Designated site covered by legislation	Scoped in – crossings of the River Trent by transmission cables and connected wet ditches by cables and access tracks.
Spalford Warren SSSI	0.5	National	National	Designated site covered by legislation	Scoped out –Increased traffic during the construction phase will pass within 200 m of this site, but increases in NOx will be negligible (see ES Volume 2, Chapter 13 Air Quality **[EN010159/APP/6.13]**).
Fledborough to Harby Dismantled Railway LWS	0.5	County	County	Fulfils the criteria for selection at the county level	Scoped in – parts of this LWS occurs within the Order Limits.
Dunham Dubs, Dunham Oxbow, Darnsyke Marsh, and Fledborough Holme LWS	0.5	County	County	Fulfils the criteria for selection at the county level	Scoped in – these sites are outside of the Order Limits but support waterbodies within the ZoI for groundwater, pollution and INNS.
All other LWSs (described in Appendix 6-2 EN010159/APP/6.21])_	0.5	County	County	Fulfils the criteria for selection at the county level	Scoped out – these LWS lie outside of any relevant ZoI.
Coastal and floodplain grazing marsh HPI	0.1	National	County	Listed as a conservation priority and a material consideration in the planning process	Scoped in – this HPI lies within the Order Limits and new areas will be created as part of the LEMP.

Ecological feature	ZoI (km)	Importance (legislation/policy)	Importance (Site level)	Importance justification	Scoped in/out
Deciduous Woodland (including HPI)	0.1	National	County	Listed as a conservation priority and a material consideration in the planning process	Scoped out – although this habitat lies within the Order Limits it is avoided through design and the environmental measures are in place to manage indirect effects such as dust deposition and pollutant loss using standard industry best practice. Small areas of this habitat will also be created.
Hedgerow HPI	0.1	National	County	Listed as a conservation priority and a material consideration in the planning process	Scoped in – an extensive hedgerow network is present within the Order Limits and losses, enhancements and gains will occur.
Ponds HPI		National	County	Listed as a conservation priority and a material consideration in the planning process	Scoped in – ponds are present within the Order Limits.
The River Trent HPI	0.5	National	National	Listed as a conservation priority and a material consideration in the planning process	Scoped in – the river occurs within the ZoI for all environmental changes.
All other HPI: (see paragraph 6.3.15	0.1	National	County	Listed as a conservation priority and a material consideration in the planning process	Scoped out – located outside of the Order Limits and the ZoI for all environmental changes.

Ecological feature	ZoI (km)	Importance (legislation/policy)	Importance (Site level)	Importance justification	Scoped in/out
Permanently wet ditches		County	County	Listed as a conservation priority and a material consideration in the planning process	Scoped in – permanently wet ditches are present within the Order Limits.
Other neutral grassland	Within Order Limits	County	County	Grassland capable of forming a feature within LWS as described within selection criteria for Lincolnshire and Nottinghamshire	Scoped in – the grassland occurs within the ZoI for all environmental changes.
Common and widespread habitats: cropland, modified grassland, scrub, tall ruderal and dry drainage ditches	Within Order Limits	Local	Local	Common and widespread habitats within farmed landscapes in Lincolnshire and Nottinghamshire	Scoped out – local losses of common and widespread habitats are not a material consideration. Delivery of the LEMP and commitment to BNG ensures overall benefit to the biodiversity of the area.
Badger	0.03	National	Local	Badgers are common and widespread, but legally protected for welfare reasons	Scoped in – occur within the ZoI for all environmental changes.

Ecological feature	ZoI (km)	Importance (legislation/policy)	Importance (Site level)	Importance justification	Scoped in/out
Bats	1.00	International	County	European Protected Species, although habitat types on Site, species present and levels of activity are indicative of County importance	Scoped in – bat species occur within the ZoI for all environmental changes.
Skylark	Within Order Limits	National	County	Range of bird species with varied conservation status	Scoped in – bird species occur within the ZoI for all environmental changes.
Other breeding birds	Within Site boundary	National to Local	National to Local	Range of bird species with varied conservation status	Scoped in – bird species occur within the ZoI for all environmental changes.
Wintering birds	Within Site boundary	National to Local	National to Local	Range of bird species with varied conservation status	Scoped in – bird species occur within the ZoI for all environmental changes.
Great-crested newt	0.5	International	Negligible	Great crested newts not present	Scoped out – it is unlikely that this species occurs within the ZoI for all environmental changes. Pond habitats will not be directly impacted and the creation of ponds, scrapes, scrub and hibernacula will be beneficial for this species, should dispersal occur from the wider landscape.
Otter	1	International	County		Scoped in – this species was confirmed to occur within the Order Limits.
Water vole	0.5	National	County		Scoped in – this species was confirmed to occur within the Order Limits.

Ecological feature	ZoI (km)	Importance (legislation/policy)	Importance (Site level)	Importance justification	Scoped in/out
Reptiles: Grass snake and ommon lizard	Within Site boundary	National	Local		Scoped in – reptiles have been confirmed to occur within the Order Limits.
Fish: European eel, sea and river lamprey	0.5	International	International	Sea and river lamprey are designated features of the Humber Estuary SAC	Scoped in – Note the assessment for fish is undertaken within that for the Humber Estuary Ramsar site and SAC.
Other mammal SPIs: hare and hedgehog	Within Order Limits	National	Local	Listed as a conservation priority and a material consideration in the planning process	Scoped in – brown hares have been confirmed to occur within the Order Limits.
Invertebrates	Within Order Limits		County		Scoped out – these species occur within the ZoI for all environmental changes. However, the extent of land take will be far exceeded by habitat creation and enhancement which will benefit these species.
Vascular plants	Within Order Limits		International to Local		Scoped out – no protected or notable vascular plants recorded within the ZoI.

6.10 Assessment of Likely Significant Effects

Humber Estuary Ramsar site and SAC

6.10.1 The Humber Estuary Ramsar site is designated through meeting Criteria 1, 3, 5, 6 and 8 (Ramsar Sites Criteria, Ramsar Convention on Wetlands 1971[44]). Criterion 1 covers estuary habitats such as saltmarsh; Criterion 3 covers a colony of breeding grey seals and natterjack toad; Criteria 5 and 6 cover wintering and passage birds; whilst Criterion 8 covers both river lamprey and sea lamprey. The Humber Estuary SAC is designated for various estaurine habitats, grey seal and river and sea lamprey.

6.10.2 Given the distance between the Humber Estuary Ramsar site / SAC and the Order Limits the functional linkage is only relevant with regards river and sea lamprey given their habit of migrating between different parts of the River Trent to achieve different parts of their life cycle. Both sea and river lamprey will migrate upstream from the sea/estuary to locate spawning gravels. Once hatched the young lamprey (known as ammocetes) will drift downstream before resting within soft sediments within the river system for several years.

6.10.3 The River Trent and connected water courses including the Fledborough Beck and the Sewer Dyke have the potential to support lamprey breeding in spawning gravels and the larval stages within the silts in locations with limited flows.

Likely Significant Effects

6.10.4 There is no construction works proposed within the Humber Estuary Ramsar site and SAC. Neither is consent sought for any surface excavation within functionally linked land (River Trent) to the Humber Estuary Ramsar site and SAC. The River Trent and other water features (permanently wet ditches and minor watercourses) will be crossed by transmission cables installed using horizontal directional drilling.

6.10.5 River and sea lamprey could be affected by noise and vibration during the installation of transmission cables underneath watercourses (including the River Trent) and the placement of clear span bridges across wet ditches to provide access for construction, maintenance and decommissioning. During construction fine materials could also be lost into the watercourse from terrestrial habitats or drilling fluid lost from trenchless crossing that could impact spawning gravels.

6.10.6 Avoidance of direct effects on bed habitats used by river and sea lamprey is achieved through the use of trenchless crossing to install cables beneath

[44] The Ramsar Site Criteria – The nine criteria for identifying wetlands of international importance. Available at https://www.ramsar.org/sites/default/files/documents/library/ramsarsites_criteria_eng.pdf [accessed 03/02/2025]

watercourses (see commitment C2 in **Table 6.6**) and clear span bridges for access routes (C7). However, the works to install transmission cables and bridges will create noise and vibration that could disturb breeding adult lamprey within spawning gravels or ammocetes within the silt. The trenchless crossing of the River Trent will take a number of weeks to complete, although the time of active drilling beneath the river bed is likely to be measured in days. Similarly the installation of each clear span bridge (nine in total) will be completed in a small number of days. These short periods of distubance are considered highly unlikely to alter lamprey behaviour, noting that Maitland (2003)[45] does not identify impacts of noise and vibration as a risk to river or sea lamprey.

6.10.7 The loss of fine materials from terrestrial construction works is controlled through the general set back of working areas from river, stream and wet ditch banks and the general pollution prevention measures to be implemented (C4). The avoidance of excavation within any river, watercourse and wet ditches and the pollution prevention measures to be implemented will ensure smothering of local spawning gravels is avoided. Risk of drilling fluid breakout from trenchless crossing will be managed through design (e.g. minimum drill depth) and management measures (secured through the CEMP).

6.10.8 Electro-magnetic frequencies and heat originating from transmission cables could result in changes in behaviour by adult and juvenile lamprey altering distribution or acting as a barrier to movement (particularly EMF). However, the trenchless crossing will install the cables beneath the bed of the River Trent at a minimum depth of 5 m below bed level, and below smaller water features at a minimum depth of 2.5 m I (C2). EMF and heat generation result in environmental changes that dissipate rapidly with distance from the cables. Changes in EMF and heat are unlikely to be detectable within a few metres (likely under 1.5 m) from each cable. At the minimum specified depths no effects would be expected[46]. To inform future consideration of lamprey and EMF, monitoring will be implemented (C12) in coordination with the Environment Agency and Natural England (as has been requested of other solar developers in the general locale[47]).

6.10.9 The environmental measures associated with the Humber Estuary Ramsar site and SAC deliver mitigation through the method of installation (trenchless crossing) and avoidance by ensuring sufficient burial depth beneath bed level. Enhancement to permanently wet ditches and watercourses may benefit river

[45] Maitland, P.S. (2003) Ecology of the River, Brook and Sea Lamprey. Conserving Natura 2000, Rivers Ecology Series No. 5. English Nature, Peterborough.

[46] Based on information provided in paragraph 2.6.76 of the National Policy for Renewable Energy Infrastructure (EN-3) (2011). It is noted that the updated version of the NPS does not repeat this paragraph.

[47] West Burton Solar Project (2024) Outline Operational Environmental Management Plan (Revision D) – available at https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010132/EN010132-001762-West%20Burton%20Solar%20Project%20Limited%20-%20Any%20further%20information%20requested%20by%20ExA%2024.pdf

and sea lamprey but unlikely at a scale that would be detectable and therefore this is not considered as a beneficial effect in this assessment.

6.10.10 The Humber Estuary Ramsar site and SAC is an ecological feature of International importance. The effects of noise and vibration during construction would be negative and short-term, however the environmental measures would reduce the scale of effect to Very Low to Negligible. The longer term effects of EMF and heating would be negated by the burial depths of the cables and therefore, the scale of effect would be Negligible. The negative effects on river and sea lamprey of the Humber Estuary Ramsar site and SAC would be so small (or absent) that the overall effect of the Proposed Development on this designated site is assessed as not significant.

Fledborough to Harby Dismantled Railway LWS

6.10.11 The Fledborough to Harby Dismantled Railway LWS comprises grassland (including some acid grassland) scrub and woodland along the course of a dismantled railway line. This LWS is not contiguous with distinct parts both east and west of the River Trent.

6.10.12 The LWS provides a long linear corridor running east to west across the area and is likely to be a corridor used by a wide range of species to disperse across the landscape.

Likely Significant Effects

6.10.13 The Proposed Development does not require any permanent or temporary land take within the Fledborough to Harby Dismantled Railway LWS, however construction works and habitat enhancements are proposed to take place within adjacent areas.

6.10.14 Likely significant effects of the Proposed Development during construction include changes to ground water levels and surface water movement patterns, accidental spread of invasive non-native species and pollution of terrestrial habitats. In the medium to long term the LWS will be buffered by creation and enhancement of semi-natural habitats.

6.10.15 Habitats within the LWS (scrub and grassland) will not be directly impacted by construction activities (C1) and will be protected from indirect impacts through the installation of hoarding (C3), the implementation of buffers (minimum of 5 m), and good housekeeping as detailed within the CEMP (C4 and C14) to control dust, prevent pollution and reduce the risk of spreading invasive non-native species. At the point of decommissioning the likely significant effects will be similar to construction, although will be less intrusive as cables, piles and other below ground infrastructure is proposed to remain in place.

6.10.16 During the operational phase the likely signficant effects are positive, with the amount of biodiverse habitats in the locality of the LWS providing resilience to it and connecting it to wider areas of complimentary habitats (C21) – see the **Outline Landscape and Ecology Management Plan [EN010159/APP/7.7]**. These habitats include scrub, hedgerows and species-rich grasslands (C21, C27 and C28). Although habitat creation and enhancement measures will positively benefit the LWS it is unlikely to change the overall importance of this ecological feature or alter markedly its conservation status.

6.10.17 The design of the Proposed Development ensures avoidance of the Fledborough to Harby Dismantled Railway LWS, whilst the implementation of controls associated with indirect effects of pollutants such as dust, silt and chemicals provides appropriate mitigation. Direct enhancement of the LWS is not proposed, although the creation of bordering habitats will ensure that the resillience and connectivity of the habitats within is improved.

6.10.18 The Fledborough to Harby Dismantled Railway LWS is an ecological feature of County importance. The indirect effects of construction would be negative and short-term, however the environmental measures would reduce the scale of effect to Very Low to Negligible. The creation and management of biodiverse habitats in adjacent areas will positively benefit the LWS, but will not lead to a change in status. Taking into account both negative and positive effects on the Fledborough to Harby Dismantled Railway LWS the overall effect of the Proposed Development is assessed as not significant.

Dunham Dubs, Dunham Oxbow, Darnsyke Marsh, and Fledborough Holme LWS

Baseline

6.10.19 Dunham Dubs LWS is designated for its lakes and associated marginal and surrounding habitats, whilst Dunham Oxbow supports marsh and wet woodland habitats. Darnsyke Marsh LWS supports deciduous woodland and emergent plant species associated with Darnsyke drain, whilst Fledborough Holm supports a range of habitats including coastal and floodplain grazing marsh.

Likely Significant Effects

6.10.20 All of the LWS described above lie outside, but adjacent (or very close) to the Order Limits. Therefore, the Proposed Development does not require any permanent or temporary land take. All likely significant effects, both negative and positive, would be indirect.

6.10.21 Likely significant effects of the Proposed Development include changes to ground water levels and surface water movement patterns, accidental spread of invasive non-native species and pollution of freshwater habitats, such as those for which the LWS are designated. These effects will be restricted to the construction and decommissioning phases.

6.10.22 Habitats within the LWSs will not be directly impacted by construction activities (C1) and will be protected from indirect impacts through the implementation of buffers (minimum of 5 m), and good housekeeping as detailed within the CEMP (C4 and C14) to control dust, prevent pollution and reduce the risk of spreading invasive non-native species. At the point of decommissioning the likely significant effects will be similar to construction, although will be less intrusive as cables, piles and other below ground infrastructure is proposed to remain in place.

6.10.23 During the operational phase the likely significant effects are positive, with the amount of biodiverse habitats in the locality of the LWSs providing resilience to the LWS network and connecting it to wider areas of complimentary habitats (C21). These habitats include scrub, hedgerows and species-rich grasslands (C21, C27 and C28). Although habitat creation and enhancement measures will positively benefit the LWS network it is unlikely to change the overall importance of this ecological feature or alter markedly its conservation status.

6.10.24 The design of the Proposed Development ensures avoidance of the adjacent LWS network, whilst the implementation of controls associated with indirect effects of pollutants such as dust, silt and chemicals provides appropriate mitigation. Direct enhancement of the LWS network is not proposed, although the creation of bordering habitats will ensure that the resillience and connectivity of the habitats within is improved.

6.10.25 These LWS are ecological features of County importance. The indirect effects of construction would be negative and short term however, the environmental measures would reduce the scale of effect to Very Low to Negligible. The creation and management of biodiverse habitats in adjacent areas will positively benefit the LWS network in the medium to long term but will not lead to a change in status. Taking into account both negative and positive effects on these LWS' the overall effect of the Proposed Development is assessed as not significant.

Coastal and Floodplain Grazing Marsh HPI

Baseline

6.10.26 Coastal and floodplain grazing marsh occurs within the Order Limits in small amounts (3.93 ha) when adjacent to the River Trent. The area of this habitat shown on the Priority Habitat Inventory lies to the west of the River Trent and supports neutral grassland and a patch of common nettle. This habit is all to the river side of the flood defence. There is no proposal for the construction of permanent above ground infrastructure in this location, although it does lie within an area that could support underground transmission cables.

Likely Significant Effects

6.10.27 The Proposed Development does not require any permanent or temporary land take of coastal and floodplain grazing marsh. All likely significant effects, both negative and positive, would be indirect.

6.10.28 Likely significant effects of the Proposed Development include changes to ground water levels and surface water movement patterns, accidental spread of invasive non-native species and pollution of freshwater habitats. These effects will be restricted to the construction and decommissioning phases. Avoidance of habitat loss is controlled through commitment C1 (see **Table 6.6**).

6.10.29 Habitats within the coastal and floodplain grazing marsh will not be directly impacted by construction activities (C1) and will be protected from indirect impacts through the implementation of buffers (minimum 5 m on the land side), and good housekeeping as detailed within the CEMP (C4 and C14) to control dust, prevent pollution and reduce the risk of spreading invasive non-native species. At the point of decommissioning the likely signficant effects will be similar to construction, although will be less intrusive as cables, piles and other below ground infrastructure is proposed to remain in place.

6.10.30 During the operational phase the likely signficant effects are positive, with the current area of coastal and floodplain grazing marsh within the Order Limits becoming subject to positive management to enhance its biodiversity value, whilst arable land to the east of the River Trent will have this habitat created across it (C21 and C29). The habitat creation and enhancement measures will positively benefit this priority habitat in the area and link to other remnants of this habitat (such as that within Fledborough Holm LWS). The extent of habitat creation (28.64 ha) is larger than the closeby Fledborough Holme LWS (22.2 ha).

6.10.31 The design of the Proposed Development ensures avoidance of direct effects on existing coastal and floodplain grazing marsh, whilst the implementation of controls associated with indirect effects of pollutants such as dust, silt and chemicals provides appropriate mitigation. Direct enhancement of coastal and floodplain grazing marsh and creation of a large new area of this HPI ensure that its status in the medium to long term will be improved.

6.10.32 The coastal and floodplain grazing marsh is an ecological feature of County importance. The indirect effects of construction would be negative and short term however, the environmental measures would reduce the scale of effect to Very Low to Negligible. The creation and management of coastal and floodplain grazing marsh will be a positive benefit in the medium to long term, with a scale of effect of medium. The Proposed Development is therefore assessed as significant beneficial on this receptor.

Hedgerows HPI

Baseline

6.10.33 There are a wide range of hedgerows within the Order Limits. **Table 6.9** provides a break down of the hedgerow and tree line types and lengths within the Order Limits.

Table 6.9 Hedgerows within the Order Limits

Hedgerow type	Length (km)
Native hedgerow – associated with bank or ditch	8.53 km
Native hedgerow with trees – associated with bank or ditch	11.90 km
Native hedgerow with trees	12.43 km
Native hedgerows	20.31 km
Species-rich native hedgerow – associated with bank or ditch	0.48 km
Species-rich native hedgerow with trees – associated with bank or ditch	0.28 km
Species rich native hedgerows with trees	0.47 km
Species rich native hedgerows	1.00 km
Ecologically valuable line of trees – associated with bank or ditch	0.67 km
Ecologically valuable line of trees	1.43 km
Line of trees – associated with bank or ditch	2.09 km
Line of trees	3.03 km

6.10.34 These hedgerows and tree lines include well managed intact examples and those that are defunct and gappy. They provide a network of connected habitats within a large area of intensively managed arable fields with limited biodiversity value. In general hedgerows are relatively small in size (e.g. under 2 m tall) and managed without consideration of biodiversity (i.e. both sides managed in same period, entire lengths of hedgerow managed in same period etc.).

Likely Significant Effects

6.10.35 The Proposed Development will see losses of hedgerow and tree line to enable for new and widened accesses and for the installation of fencing. Accesses from the highway will require hedgerow losses and other management to enable the delivery of a bellmouth and adequate visibility, whilst those within the solar farm will be 6 m in width to allow access by construction vehicles (and latterly for operational maintenance and decommissioning). Fencing will surround the solar tables but will likely be installed in large sections that cover several fields at one time meaning that it will cross through hedgerows on occassion.

6.10.36 The Proposed Development will lead to the loss and degradation of hedgerow due to direct land take. It will also result in the delivery of new hedgerow and the enhancement of existing hedgerows (see **Table 6.10**).

Table 6.10 Hedgerow losses and gains

Hedgerow type	Lost (km)	Created (km)	Enhanced (km)
Native hedgerow – associated with bank or ditch	0.07	0.00	8.40
Native hedgerow with trees – associated with bank or ditch	0.12	0.00	11.19
Native hedgerow with trees	0.04	0.00	12.91
Native hedgerows	0.06	0.00	19.64
Species-rich native hedgerow – associated with bank or ditch	0.02	0.00	0.47
Species-rich native hedgerow with trees – associated with bank or ditch	0.00	0.00	0.27
Species rich native hedgerows with trees	0.00	6.58	0.47
Species rich native hedgerows	0.01	7.48	0.49
Ecologically valuable line of trees – associated with bank or ditch	0.00	0.00	0.33
Ecologically valuable line of trees	0.01	0.00	0.95
Line of trees – associated with bank or ditch	0.01	0.00	1.22
Line of trees	0.01	0.00	2.53
TOTAL	**0.34**	**14.06**	**58.88**

6.10.37 In total, 0.34 km of hedgerow is expected to be lost and ~250 m is to be managed during the construction and decommissioning periods to a height of 0.9 m (C6). No hedgerow will be lost to deliver transmission cables as short trenchless crossings will be used to enable hedgerow retention (C2).

6.10.38 Hedgerows are HPI which occur within the Order Limits. Losses cannot be avoided due to the extent of hedgerows and their layout across the Order Limits. However, wherever possible existing access points and gaps have been used to minimise losses in the outline design (C1, C5 and C6) and will be accounted for in detailed design.

6.10.39 Degradation of hedgerows away from access points and fence crossings is avoided through the provision of a minimum stand off of 5 m (C4) between them and infrastructure (solar modules, substations, tracks etc.). This space will be used to allow hedgerows to be enhanced and to enable the establishment of fringing semi-natural habitats such as species-rich grassland or field margin treatments (e.g. winter bird cover strips).

6.10.40 There will be planting of long lengths (14.06 km) of new species rich native hedgerows (C16, C27) and the enhancement of all remaining hedgerows within the Order Limits (58.88 km). The enhancement will include the planting up of gaps and changes in management to increase width, height and structural complexity (C16, C27).

6.10.41 The design of the Proposed Development has sought to avoid hedgerows in the first instance by grouping solar modules within existing field patterns. Where losses are required mitigation is in place to minimise losses (e.g. reducing height of hedgerow in visibility splays as opposed to removing and limiting access point widths (C6)). Compensation for losses and enhancement are provided by the positive management of retained hedgerows and the planting of extensive lengths of new hedgerow.

6.10.42 Hedgerows are ecological features of County importance. The direct effects of construction would be negative, low to very low in scale and long term (as access points would be maintained). However, the permanent losses are small relative to the extent of the habitat within the Proposed Development and the extent of newly created and enhanced hedgerow. The creation and enhancement of large lengths of an HPI will have a positive effect with a high magnitude in the medium to long term. The habitat created will bring new HPI (that is also a local conservation priority) and help to increase the level of habitat connectivity at a landscape scale. The overall effect on hedgerows and tree lines of the Proposed Development is therefore Significant beneficial.

Ponds HPI and non-HPI

Baseline

6.10.43 There are 5 ponds within the Order Limits, all of which will be retained through the design. The ponds are mainly small farm ponds and are often choked with vegetation. There are also garden ponds and some woodland pools in the general area.

Likely Significant Effects

6.10.44 All ponds will be retained on the Order Limits and at least three new permanent ponds will be created within the basin that will form part of the sustainable drainage scheme (SuDS) (C21). Additionally, a minimum of 25 scrapes (temporary pools) will also be created within the Order Limits (C21). These will not be designed or expected to hold permanent water, but will provide new wet habitats that have the potential to support some of the flora and fauna expected within permanent ponds in the area.

6.10.45 Likely significant effects of the Proposed Development on ponds include changes to ground water levels and surface water movement patterns, accidental spread of invasive non-native species and pollution of freshwater habitats. These effects will be restricted to the construction and decommissioning phases.

6.10.46 The ponds will not be directly impacted by construction activities (C1) and will be protected from indirect impacts through the implementation of buffers (minimum of 10 m), and good housekeeping as detailed within the CEMP (C4 and C14) to control dust, prevent pollution and reduce the risk of spreading invasive non-native species. At the point of decommissioning the likely significant effects will be similar to construction, although will be less intrusive as cables, piles and other below ground infrastructure is proposed to remain in place.

6.10.47 Ponds within the Order Limits will be taken into positive management through the implementation of the LEMP (C16) and a minimum of three ponds (based on outline design of SuDS basins[48]) will be created (C21). In addition, temporary ponds and scrapes[49] will be created within at least 25 fields within the Order Limits. Although, these will not be designed to hold permanent water they will provide damp habitats that provide opportunities for some of the same flora and fauna as the ponds, as well as others.

6.10.48 The Proposed Development avoids existing ponds through careful design and mitigates for indirect effects through the implementation of stand-off distances to construction and decommissioning works and by control of potential pollutants. Enhancement is to be provided through the positive management of existing ponds and by the creation of new permanent and temporary ponds.

6.10.49 Ponds are ecological features of County importance. The indirect effects of construction would be negative, very low to negligible in magnitude and short term. The enhancement of existing ponds, the creation of new ponds and the creation of complimentary habitats (i.e. temporary ponds and scrapes) will have a positive effect with a medium magnitude in the medium to long term. The habitat

[48] Current expectation is for three or four basins to be created as part of the drainage strategy (see Chapter 7). Therefore, it is precautionary to assume three ponds will be created within this assessment.

[49] Note these temporary ponds and scrapes are considered to be similar to SuDS, as opposed to the Annex I habitat H3170.

created will contribute towards meeting local conservation priorities and help to increase the level of habitat connectivity at a landscape scale. The overall effect on ponds of the Proposed Development is therefore significant beneficial.

The River Trent HPI

Baseline

6.10.50 The River Trent is a large main river that is still tidal as it flows through the Order Limits, with the extent of its tidal nature being at Cromwell Lock around 6 km upstream. The river is approximately 50 to 80 m wide as it passes through the Order Limits and it has earth bunds along its length as flood defences.

Likely Significant Effects

6.10.51 The River Trent is within the Order Limits, although there are no bankside or in-channel works proposed. Therefore, the Proposed Development does not require any permanent or temporary land take. All likely significant effects would be indirect.

6.10.52 Likely significant effects of the Proposed Development include changes to ground water levels and surface water movement patterns, accidental spread of invasive non-native species and pollution of freshwater habitats. These effects will be restricted to the construction and decommissioning phases.

6.10.53 Habitats within the River Trent will not be directly impacted by construction activities (C1) and will be protected from indirect impacts through the implementation of buffers (minimum 16 m), and good housekeeping as detailed within the CEMP (C2, C4 and C14) to control dust, prevent pollution and reduce the risk of spreading invasive non-native species. At the point of decommissioning the likely significant effects will be similar to construction, although will be less intrusive as cables, piles and other below ground infrastructure is proposed to remain in place.

6.10.54 During the operational phase the likely significant effects are positive, with connected habitats being subject to creation and enhancement works (e.g. creation of coastal and floodplain grazing marsh and enhancement of the permanently wet ditch network). Although habitat creation and enhancement measures will positively benefit the River Trent system, these will be localised benefits to the individual habitats as described above and not of a scale to markedly effect the main river course itself.

6.10.55 Direct effects on the River Trent are avoided through design via the use of trenchless crossing, with mitigation associated with the implementation of a stand off distance and robust pollution control measures. Enhancement is focused on connected habitats, as opposed to the River Trent itself.

6.10.56 The River Trent is an ecological feature of National importance. The indirect effects of construction would be negative and short term however, the environmental measures would reduce the scale of effect to Very Low to Negligible. The creation and management of biodiverse habitats in adjacent areas will positively benefit the river in the medium to long term but will not lead to a change in status. Taking into account both negative and positive effects on the River Trent the overall effect of the Proposed Development is assessed as not significant.

Permanently Wet Ditches

Baseline

6.10.57 There are four main ditch systems within the Order Limits, two to the west of the River Trent and two to the east. To the east of the River Trent these are known as the Fledborough Brook and the Old Trent (both of which have numerous connections). To the east of the River Trent is the Sewer Dyke system and an unnamed channel to the west of North Clifton.

6.10.58 The channels are all variable in width and depth but are thought to hold water permanently. There are sluice gates present in places to control water levels and some signs of use of the water present in some locations for irrigation. In-channel and bankside vegetation varies and is likely to vary over time as ditch maintenance takes place. Evidence of ditch maintenance suggests that long sections of ditches are managed as single work packages.

6.10.59 In total there are 18.25 km of permanently wet ditches within the Order Limits.

Likely Significant Effects

6.10.60 Likely significant effects of the Proposed Development on permanently wet ditches include changes to ground water levels and surface water movement patterns, accidental spread of invasive non-native species and pollution of freshwater habitats. These effects will be restricted to the construction and decommissioning phases. In addition, there will be some loss of bank top through the use of clear span bridges. At this stage it is expected that up to nine clear span bridges will be required to cross permanently wet ditches, some of these may be temporary in areas through which construction work is limited to the delivery of underground cabling. It is noted that ditches that are not permanently wet (e.g. drainage channels collecting run-off) are present throughout the area and these would be crossed through the use of permanent or temporary culverts.

6.10.61 The permanently wet ditches will be impacted by construction activities (C1) and will be protected from indirect effects through the implementation of buffers, and good housekeeping as detailed within the CEMP (C4 and C14) to control dust, prevent pollution and reduce the risk of spreading invasive non-native species. At the point of decommissioning the likely significant effects will be similar to construction, although will be less intrusive as cables, piles and other below ground infrastructure is proposed to remain in place. It is also expected that the

clear span bridges used throughout the operational period will also remain in place as they will provide future access for landowners.

6.10.62 The placement of clear span bridges (approximately 6 m wide) will result in the loss of some banktop vegetation through shading, even though the footings of the bridges would be set back from the channels edge. In addition, the bridge itself will cast shadows on to the water and subsequently the bed beneath. The nine clear span bridges would result in the overshading of approximately 0.054 km of permanently wet ditch.

6.10.63 Permanently wet ditches within the Order Limits (17.35 km) will be taken into positive management (C22) in order to increase their value for a range of flora and fauna. The details of positive management will need to be agreed with the internal drainage board should consent be granted. New permanently wet ditch would also be created (linking to an existing network) in land immediately to the east of the River Trent where coastal and floodplain grazing marsh creation is being proposed. The length and the depth of this ditch is uncertain as it will depend on the exact location of the transmission cables, but it expected to be a minimum of 100 m in length and 1.5 m in depth.

6.10.64 The design of the Proposed Development has sought to avoid permanently wet ditches in the first instance by arrangement of the access tracks. However, it is not possible to deliver the Proposed Development without crossing permanently wet ditches. Mitigation is in place to limit effects, including the implementation of buffer zones other than at crossing points. Compensation and enhancements are provided through positive management of the ditch network within the Order Limits and the creation of a new ditch close to the River Trent.

6.10.65 Permanently wet ditches are ecological features of County importance. The indirect effects of construction would be negative, low to very low in magnitude and short term. The delivery and maintenance of clear span bridges will also be of low magnitude, although the effects will be long term (i.e. some or all of the bridges will remain in place until decommissioning). The habitat created and enhanced will contribute towards meeting local conservation priorities and help to increase the level of habitat connectivity at a landscape scale. The overall effect on ponds of the Proposed Development is therefore Significant beneficial.

Other Neutral Grassland

Baseline

6.10.66 There are small extents (1.23 ha) of other neutral grassland present within the Order Limits. These are restricted to areas around the River Trent corridor or in habitats along the edges of fields or near to the ditch system where cultivation does not take place.

6.10.67 The grassland typically comprises species such as soft brome, barren brome, Yorkshire fog, meadow foxtail, crested dog's tail, meadow grass, bent-grass, red

fescue, perennial rye-grass, tall fescue and cocksfoot grass. Herb species included common and widespread white clover, creeping buttercup, ribwort plantain, greater plantain, cleavers, common nettle, creeping thistle, yarrow, spear thistle, tufted vetch, dandelion, ground ivy and broad-leaved dock. Locally common species were white campion, field pansy, stitchwort, mugwort, herb-Robert, weld, bugloss, hemlock, white dead-nettle and red dead-nettle, common vetch, common sorrel, and various sedge and rush species in locations with water logging.

Likely Significant Effects

6.10.68 Approximately 1.23 ha of other neutral grassland would be lost to the Proposed Development. In addition, changes to ground water levels, surface water movement patterns, accidental spread of invasive non-native species and pollution through loss of chemicals and fine materials or dust from work areas could result in degradation.

6.10.69 Direct land-take of this feature will only occur where there is no other alternative (C1 and C6). It will be protected from indirect effects through environmental measures including best practice construction activities relating to the prevention and control of pollution (C14).

6.10.70 Other neutral grassland will be created across 215.19 ha and, where it is retained within the Order Limits it will be enhanced. The other neutral grassland created would be in areas where there is no proposed above ground infrastructure and managed positively to deliver both Biodiversity Net Gain and mitigation, compensation and enhancement for a range of local fauna (e.g. invertebrates, farmland birds, herptiles etc.).

6.10.71 Other types of species-rich grassland would also be created within the Order Limits. Modified grassland (good condition) is to be created in fields that support solar modules (918.20 ha). This grassland will be created to be diverse and with the aim of becoming other neutral grassland, however, to due to the presence of panels (shading, changes in water availability under panels, need for infrastructure maintenance) a precautionary conclusion of a low distinctiveness habitat has been drawn. In addition, the coastal and floodplain grassland to be created (28.64 ha) and enhanced (3.93 ha) will also be designed to support a diverse range of flora.

6.10.72 The Proposed Development has sought to avoid other neutral grassland through design, although as it is well distributed in small patches this has not always been possible. Mitigation is focused on controlling indirect effects that could degrade habitat that is to be retained. Compensation and enhancement is provided through a large increase in this type of habitat (and related grassland habitats) across the Order Limits.

6.10.73 Other neutral grassland is an ecological feature of County importance. The loss of this ecological feature to development and indirect effects of construction

would be negative, low in magnitude and short term. The habitat created and enhanced will markedly contribute towards meeting local conservation priorities and help to increase the level of habitat connectivity at a landscape scale. The overall effect on other neutral grassland of the Proposed Development is therefore significant beneficial.

Badger

Baseline

6.10.74 Badger setts were recorded in seven locations, with occurrences either side of the River Trent. [redacted] Cubs were seen and heard confirming successful breeding, and signs of foraging and latrines were recorded. Badger are likely to be present across the Order Limits, although results of surveys suggest that this is at relatively low densities.

Likely Significant Effects

6.10.75 Likely significant effects of the Proposed Development include temporary direct land-take and habitat fragmentation, increases in noise, vibration and human presence, and increases in temporary lighting. The loss of habitat and disturbance (particularly during construction and decommissioning) could displace existing badger clans.

6.10.76 Badgers utilise on-Site habitats for foraging and commuting, with sett excavation identified within the Order Limits. Wherever possible habitats associated with sett construction will be avoided through design (C1 and C5), and existing setts (including any identified post-consent) will be buffered (C10), unless avoidance is not possible at which time a derrogation licence from Natural England would be applied for. Based on current knowledge of badger sett location no derrogation licence is necessary as the design is flexible enough to enable avoidance.

6.10.77 Disturbance will be minimised through limitations on working hours and lighting (C8) during the construction period, and accidental injury due to animals entering active works sites controlled via fencing and other good practice (C13, C14). These measures would be repeated during the decommissioning phase. During the operational phase disturbance of badgers is not considered an issue due to the nature of solar farms in that the activities undertaken are not considered likely to impact them adversely in any way.

6.10.78 Fragmentation would be avoided through the design of the fencing around the solar arrays that would allow for holes/gates at ground level to be left at least every 150 m (C9), with spacing of holes more frequent in areas where badgers are known to be present. Holes/gates will be strategically located around habitats that are most suitable (e.g. woodland, scrub etc.).

6.10.79 During construction and decommissioning badger will be excluded from active working areas which will reduce the area available for foraging. However, as the solar modules will be delivered in discrete parcels (e.g. field by field) and the general area provides large areas with foraging potential, temporary displacement is unlikely to reduce foraging efficiency. As habitat creation and enhancement measures are delivered (C16, C18, C29, C32), including prior to and during early construction stages, the amount of good quality foraging habitat for badgers will increase.

6.10.80 The Proposed Development has avoided loss of known sett locations through design. Mitigation is delivered through pre-construction surveys and associated actions by an Ecological Clerk of Works and ensuring that boundary fences are porous for badger. Compensation and enhancement for badger will be delivered through the creation of habitats that will provide better quality foraging habitat.

6.10.81 Badgers are ecological features of Local importance. The effects of construction would be negative, low to very low in magnitude and short term. The delivery and management of large areas of semi-natural habitat during the operational phase will be positive, of low to medium magnitude and long term. Although the habitat created and enhanced will be beneficial for badgers as it will likely create better foraging opportunities, it is uncertain as to whether it will influence number or distribution of animals and therefore the overall effect on badgers of the Proposed Development is not significant.

Bats

Baseline

6.10.82 Habitats within the Order Limits are generally considered to be of low and moderate quality for foraging and commuting bats due to the extensive cover of arable fields with a mixture of field boundary types (including intact and defunct hedgerows, ditches and tree lines). Most of the areas of higher quality commuting and foraging habitats are present to the east of the River Trent where there are more species-rich hedgerows and woodland occurring.

6.10.83 The bat surveys demonstrated that a minimum of eight bat species use the Proposed Development and that the majority of activity is located along linear features such as hedgerows and woodland edge, as opposed to within cropped areas. This pattern of habitat usage is what would be typically expected for the majority of bat species present in the area.

Likely Significant Effects

6.10.84 Likely significant effects of the Proposed Development on bats include temporary and permanent land-take, and habitat fragmentation, increases in noise, vibration and human presence, and increases in temporary lighting.

6.10.85 Avoidance of habitats of high-quality for roosting and foraging/commuting bats (hedgerows, tree lines, woodland edge) is a priority in the design (C1, C3, C5 and C6), with the majority of land-take occurring in arable fields that provide limited interest for bats.

6.10.86 Buffers around retained high-quality habitat will be implemented (C4) and pre-construction surveys will confirm the presence of existing roost features and identify new ones within, or adjacent to, the Order limits (C11). Further survey may be required to confirm the presence or likely absence of a roost in the vicinity of construction works and, if necessary, a licence will be obtained from Natural England. In addition, supervision of vegetation clearance will include the assessment of trees for bat roosting potential, specifically where access restrictions have prevented assessment during baseline and pre-construction survey (C15).

6.10.87 Effects of construction will be avoided and mitigated through best practice measures C14, and will include limited working hours and minimal use of security lighting (C8) secured through the CEMP. The Proposed Development would not be lit during operation other than for emergency repairs in localised areas (e.g. at a substation site).

6.10.88 During the operational phase, bats may be displaced from fields by the presence of solar arrays. Szabadi et al. (2024) identified similar levels of bat activity within solar farms as in arable fields, but both these habitats were used less than grassland and woodland habitats. Barrè et al. (2024) showed that bat activity in paired sites (i.e. comparing activity within grazed grassland inside and outside of a solar installation) was lower in places where panels were present, with Tinsley et al. (2023) showing similar results with bat activity lower across solar arrays than in other open habitats, but noted boundary features had the greatest bat activity.

6.10.89 Given the scale of the Proposed Development, it is possible that the level of bat activity will fall in places where solar arrays are situated. However, as Szabadi et al. (2024) showed that levels of activity above solar arrays were similar to activity above arable fields, the difference may be small. Further, the stand offs (C4, C5) from infrastructure to habitats that bats have a preference for (hedgerows, woodland etc.) and the provision of new and enhanced habitats that will provide high quality commuting and foraging habitats such as hedgerows (14.06 km of newly planted hedgerow), diverse field margins (7.2 ha of new field margins), species-rich grassland (215.19 ha of new other neutral grassland and 28.64 ha of new coastal and floodplain grazing marsh), a minimum of 25 new temporary ponds and scrapes etc. (C16, C17, C18, C19, C20, C21, C22, C24, C25, C27, C28, C29, C30, C31, C32) are suggestive that levels of bat activity will at least be maintained within the Order Limits and potentially increased. However, the level of benefit is uncertain given the likely negative effects of solar arrays described in the literature and the lack of published evidence regarding the benefits of habitat creation and positive management of habitats on bat activity levels in and around

solar farms. As there is currently limited evidence on bat activity around solar arrays due to reliance on comparable studies (i.e. not before, after, control, impact or BACI studies) monitoring of the Proposed Development would take place using the paired static detector locations (i.e. within field and at field edge) and previously used transects to provide a more robust analysis of effects (C33).

6.10.90 The Proposed Development has sought to avoid the habitats most used by bats by retaining over 99% of the hedgerows and tree lines within the Order Limits and 100% of the woodland. Mitigation has been put in place to buffer the habitats used by bats to ensure that commuting corridors and feeding opportunities persist and enhancement is delivered through the provision of habitats favoured by this species group (e.g. 14.06 km of new hedgerow).

6.10.91 Bats are ecological features of County importance. The effects of construction would be negative, low in magnitude and short term. The delivery and management of large areas of semi-natural habitat during the operational phase will be positive, long-term, but given uncertainty about the potential for solar farms to reduce bat activity, considered to be of low magnitude. Therefore, the overall effect on bats of the Proposed Development is assessed as not significant.

Skylarks

Baseline

6.10.92 Skylarks are well distributed across the area surveyed. A total of 66 pairs were located within areas shown as being developed. These 66 pairs represented a density of 0.2 pairs per hectare. Extrapolation was used to define the number of skylark present across the remainder of the Order Limits. This was achieved by first excluding habitat within which skylark would not nest (e.g. fields growing sports turf, woodland etc.) or where no development is to take place (i.e. areas for habitat creation and enhancement) and then applying a buffer of 50 m[50] to boundary features (noting this buffer is also used when applying mitigation). This extrapolation (when including the 66 recorded pairs) provided a total of 115 skylark pairs that could be displaced by the delivery of solar modules.

Likely Significant Effects

6.10.93 Skylark are known to inhabit solar farms, although evidence suggests that they choose to nest elsewhere and use solar modules for feeding (including as nursery habitat) and displaying (Solar Energy UK, 2023, Solar Energy UK, 2024). This means that the greatest effect is from displacement of nesting pairs during

[50] Rural Payments Agency and Natural England (2024) AB4: Skylark Plots. Available at https://www.gov.uk/countryside-stewardship-grants/skylark-plots-ab4 [accessed 03/02/2025]

operation of the solar array, with this first beginning during construction as arable farming is ceased.

6.10.94 Given that displacement from construction and operation is likely, other effects associated with disturbance such as noise and vibration can be discounted.

6.10.95 In total 243.83 ha of new species rich grassland (other new grassland and coastal and floodplain grazing marsh) will be created that does not contain any above ground infrastructure (C17). This grassland will be created prior to solar modules being installed with seed bed preparation and sowing accomplished in autumn and first growing season annual weed management delivered prior to its need for displaced skylark. Approximately 86 ha of this species rich grassland is located more than 50 m from existing or newly proposed boundary features. The grassland will be managed specifically to benefit skylark, as well as a wide range of other species (e.g. invertebrates, reptiles etc.). This management will include using a diverse range of floral species to ensure that there is an abundant food source year round of seeds and an abundance of invertebrates during the chick rearing period. The structure of the grasslands will be varied to provide habitat for foraging and nesting and will include 258 skylark plots within the 86 ha of grassland (three per hectare) more than 50 m from a boundary. Although skylark plots are usually created within arable fields, the premise will remain the same with each plot comprising of an area at least 3 m wide and 16 m^2 in extent comprising of shorter vegetation to enable skylark to access nesting sites in neighbouring vegetation. These plots will be cut to ground level in mid-March each year and then cut again in May and June should no active nests be present within the plots.

6.10.96 In addition to the grassland being created outside of the solar arrays, the species-rich grassland (918.20 ha of modified grassland) within the solar arrays (C29) will provide feeding opportunities for skylark, as will the field margins (C30) and beetle banks (C18). It is also possible that skylark will nest in some fields where solar modules are located due to stand-offs with features such as hedgerows and permanently wet ditches and habitat close to tracks or overhead power lines providing open areas that could be utilised. Overall, the extent and quality of the habitat creation and enhancement would, as a minimum, be expected to maintain the local skylark population albeit altering its distribution. Skylark monitoring (C34) will take place to assess the effect that the Proposed Development will have on this species.

6.10.97 The Proposed Development cannot avoid skylark breeding habitat through design due to their widespread nature and use of arable land. Mitigation is provided to avoid damage or destruction of active nests and provide nesting opportunities (skylark plots) and is secured via the Commitments Register. Compensation and enhancement is delivered through the provision of large areas of more diverse habitats that provide good feeding resources by producing a wide-range of seed and invertebrate food.

6.10.98 Skylark are ecological features of County importance. The effects of construction would be negative, low in magnitude and short term. The delivery and management of large areas of semi-natural habitat during the operational phase will be positive, long-term, but given uncertainty on whether this would maintain or increase numbers, considered to be of low magnitude. Therefore, the overall effect on skylark of the Proposed Development is assessed as not significant.

Other breeding birds

Baseline

6.10.99 Of species potentially breeding within the sampling area:

- Three are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended): quail, barn owl, and hobby.

Nine are Red-listed on the BoCC5: skylark, yellowhammer, house sparrow, yellow wagtail, linnet, greenfinch, grey partridge, house martin, and turtle dove.

- Eleven are Amber-listed on BoCC5: wren, whitethroat, reed bunting, woodpigeon, sedge warbler, dunnock, song thrush, mallard, oystercatcher, quail, and kestrel.

6.10.100 Many of the species listed have been recorded as using solar farms (Solar Energy UK (2024)) including red-listed species such as skylark, yellowhammer, house sparrow, yellow wagtail, linnet, greenfinch, grey partridge and house martin and all of the amber listed species listed above. The only red-listed species not seen in the Solar Energy UK (2024) data was turtle dove and this is likely an artefact of scarcity as opposed to solar development per se.

Likely Significant Effects

6.10.101 Likely significant effects of the Proposed Development on breeding birds include land-take, habitat fragmentation, increases in noise, vibration and human presence, temporary lighting and changes to ground water levels and surface water movement patterns during the construction and operational phase.

6.10.102 Land-take during the construction phase may result in the loss of breeding or foraging habitat, directly within the development footprint, or indirectly within adjacent areas through disturbance or displacement, if undertaken within the bird breeding season. Hedgerows and trees located along field boundaries (which will largely or entirely be retained and protected) will typically support a range of farmland nesting bird species; these habitats will likely be subject to some level of localised indirect disturbance or displacement for a temporary period during the construction phase (should this occur during the breeding season).

6.10.103 Land take will occur during the construction phase, as the construction activity reduces the amount of vegetation growing. However, prior to and during construction, creation and enhancement measures undertaken during the

construction phase will result in a marked increase in semi-natural habitat. This will include 14.06 km of new hedgerow planting (C27), 58.88 km of hedgerow and tree line enhancement (C27), 243.83 ha of species-rich grassland created outside of the solar arrays and a further 918.20 ha within (C16, C17), species-rich field margins (including those designed for turtle dove) (C30), beetle banks (C18), at least 25 temporary ponds and scrapes (C21) and SuDS features (C21).

6.10.104 Disturbance will be temporary and localised as the construction progresses. However, as the majority of activity will take place within large arable fields away from features such as hedgerows it is not expected that this would result in a marked level of disturbance of farmland birds.

6.10.105 The design of the Proposed Development avoids the majority of nesting habitat for farmland birds (e.g. hedgerows), with mitigation delivered through the timing of vegetation removal where necessary. Compensation and enhancement is delivered through landscape scale delivery of habitats that will provide a wide range of nesting and feeding opportunities for farmland birds, the majority of which have been demonstrated to utilise areas supporting solar modules.

6.10.106 Other breeding birds are ecological features of between National (e.g. turtle dove) and Local (e.g. wren) importance. The effects of construction would be negative, low in magnitude and short term. The delivery and management of large areas of semi-natural habitat during the operational phase will be positive, long-term, and of high magnitude. Therefore, the overall effect on other breeding birds of the Proposed Development is assessed as Significant Beneficial.

Wintering birds

Baseline

6.10.107 Wintering birds were present within the Proposed Development with a range of waders and waterfowl occurring. These included the waders golden plover, lapwing, snipe and oystercatcher and waterfowl such as greylag geese and wigeon that were often associated with flooded fields close to the River Trent. During nocturnal periods usage by birds was limited with small flocks of lapwing and golden plover recorded. These birds were well distributed and not occurring in a recognisable pattern.

6.10.108 The distribution of wintering birds during diurnal survey was heavily influenced by locations that were flooded (completely or had large scrapes where water pooled).

Likely Significant Effects

6.10.109 Likely significant effects of the Proposed Development on wintering birds include land-take, increases in noise, vibration and human presence, temporary lighting and changes to ground water levels and surface water movement patterns during the construction and operational phase.

6.10.110 The potential for disturbance from noise, vibration, human presence and temporary lighting is small, as the areas of most interest to the wintering birds are those fields that are within the flood plain. The design avoids the River Trent corridor (other than for the trenchless crossing transmission cable crossing of the river), thereby reducing the potential for disturbance. This is because the timing of the trenchless crossing works would be scheduled to avoid times of potential flooding as a matter of practicality (i.e. trenchless crossing compounds would not be functional at times of flood).

6.10.111 Habitat loss may affect species such as golden plover who feed in fields away from flooded areas. However, the survey results show that their occurrence is sporadic and therefore any displacement would be minor as they have a wide-range of other arable fields to target. In addition, the species rich grassland (including coastal and floodplain grazing marsh) being created outside of the solar arrays (243.83 ha) will provide good opportunities for this species to forage effectively (C16, C17).

6.10.112 The Proposed Development avoids much of the habitat frequently used by wintering birds due to its overlap with the flood plain. Mitigation is in the form of general good practice to manage potential pollutants, whilst compensation and enhancement is provided through habitat creation that will provide feeding opportunities for wintering birds.

6.10.113 Wintering birds are ecological features of between National (e.g. golden plover) and Local (e.g. mallard) importance. The effects of construction would be negative, low in magnitude and short term. The delivery and management of large areas of semi-natural habitat during the operational phase will be positive, long-term, but of low magnitude given the wide ranging nature of wintering birds. Therefore, the overall effect on wintering birds of the Proposed Development is assessed as not significant.

Otter

Baseline

6.10.114 The presence of otter was confirmed in autumn 2024 when a single spraint was located on the Sewer Dyke, near North Clifton. This spraint confirms presence but is suggestive of a low density population.

Likely Significant Effects

6.10.115 Likely significant effects of the Proposed Development on otter are include land-take, habitat fragmentation, increases in noise, vibration and human presence, changes to ground water levels and surface water movement patterns, and pollution of freshwater habitats during the construction and operational phase.

6.10.116 The permanently wet ditches where effects would be manifest will be impacted by construction activities (C1) but will be protected through the implementation of

buffers, and good housekeeping as detailed within the CEMP (C4 and C14) to control dust, prevent pollution and reduce the risk of spreading invasive non-native species. At the point of decommissioning the likely significant effects will be similar to construction, although will be less intrusive as cables, piles and other below ground infrastructure is proposed to remain in place. Some habitat loss will occur but this will be minimal and be a result of the use of approximately nine clear span bridges (approximately 6 m wide) (C7).

6.10.117 Permanently wet ditches within the Order Limits (17.32 km) will be taken into positive management (C22) in order to increase their value for a range of flora and fauna including otter. In addition, new ditch (100 m in length) would be created (linking to an existing network) in land immediately to the east of the River Trent where coastal and floodplain grazing marsh creation is being proposed.

6.10.118 Two otter artificial otter holts (C26) will be constructed within suitable locations on the ditch network to encourage breeding. Currently there is limited terrestrial habitat for this species to create holts and therefore this enhancement measure is provided as a way to encourage this species to use the Proposed Development area more extensively.

6.10.119 The Proposed Design avoids loss of otter habitat through maintaining all permanently wet ditches. Mitigation is delivered through the commitment to the use of clear span bridges (as opposed to culverts). Enhancement is provided through the creation of new habitat for otter and more positive management for that which is to be retained.

6.10.120 Otter are ecological features of County importance. The indirect effects of construction (i.e. disturbance) would be negative, low to very low in magnitude and short term. The delivery and maintenance of clear span bridges will also be of low magnitude, although the effects will be long term (i.e. some or all of the bridges will remain in place until decommissioning). The habitat created and enhanced (including artificial holts) will contribute towards meeting local conservation priorities and help to increase the level of habitat connectivity at a landscape scale. The overall effect is however, uncertain due to the unpredictable nature of this species. Therefore, although the overall effect will be beneficial it will be not significant.

Water Vole

Baseline

6.10.121 The presence of water vole was confirmed in autumn 2024 along the Sewer Dyke the unnamed ditch west of Thorney and the Fledborough Beck.

Likely Significant Effects

6.10.122 Likely significant effects on water vole include direct habitat loss habitat fragmentation, increases in noise, vibration and human presence, changes to ground water levels and surface water movement patterns, and pollution of freshwater habitats during the construction and operational phase.

6.10.123 The permanently wet ditches where effects would be manifest will be impacted by construction activities (C1) but will be protected through the implementation of buffers, and good housekeeping as detailed within the CEMP (C4 and C14) to control dust, prevent pollution and reduce the risk of spreading invasive non-native species. At the point of decommissioning the likely significant effects will be similar to construction, although will be less intrusive as cables, piles and other below ground infrastructure is proposed to remain in place. Some habitat loss will occur, but this will be minimal and be a result of the use of approximately nine clear span bridges (approximately 6 m wide) (C7).

6.10.124 Permanently wet ditches within the Order Limits (17.32 km) will be taken into positive management (C22) in order to increase their value for a range of flora and fauna including water vole. In addition, new ditch (100 m in length) would be created (linking to an existing network) in land immediately to the east of the River Trent where coastal and floodplain grazing marsh creation is being proposed.

6.10.125 Mink control (C23) will be delivered within the Proposed Development to provide the opportunity for this species to thrive, as has been the case in other locations where this non-native predator has been removed.

6.10.126 The Proposed Design avoids loss of water vole habitat through maintaining all permanently wet ditches. Mitigation is delivered through the commitment to the use of clear span bridges (as opposed to culverts). Enhancement is provided through the creation of new habitat for water vole and more positive management for that which is to be retained, as well as controlling American mink.

6.10.127 Water vole are ecological features of County importance. The indirect effects of construction (i.e. disturbance) would be negative, low to very low in magnitude and short term. The delivery and maintenance of clear span bridges will also be of low magnitude, although the effects will be long term (i.e. some or all of the bridges will remain in place until decommissioning). The habitat created and enhanced (including mink control) will contribute towards meeting local conservation priorities and help to increase the level of habitat connectivity at a landscape scale. The overall effect is expected to be medium to high in the medium to long term. Therefore, the overall effect will be Significant beneficial.

Reptiles

Baseline

6.10.128 Rough grassland with open areas, close to scattered scrub and woodland edge, and riparian habitats are suitable to support the common and widespread reptile species (grass snake, common lizard and slow worm). These habitat types were located either side of the River Trent and alongside agricultural ditches, including the Sewer Dyke, the Old Trent and Fledborough Beck.

6.10.129 Sampling surveys in the most suitable habitats identified grass snake and common lizard. These species are likely to occur more widely across the Proposed Development in patches of suitable habitat. However, their occurrence is likely sporadic due to the intensively managed nature of the farmland present.

Likely Significant Effects

6.10.130 Likely significant effects on reptiles will largely be beneficial through the creation and enhancement of connected habitats at a landscape-scale. However, there remains the potential for injury or death of individuals during construction.

6.10.131 Potential for reptiles to be killed or injured during vegetation clearance is the largest risk to individuals. To avoid this monitoring of vegetation clearance by an Ecological Clerk of Works (C15) would be undertaken. Any reptiles located would be moved to suitable habitat in the near vicinity where they could continue to exist during the construction phase.

6.10.132 The provision of diverse grasslands (both within and outside of solar arrays – 1,162.03 ha) (C16, C17), 14.06 km of new hedgerow planting (C27), 58.88 km of hedgerow and tree line enhancement (C27), species-rich field margins (C30), beetle banks (C18), at least 25 temporary pools and scrapes (C21), SuDS features (C21) and at least 50 habitat piles (C19) will be beneficial for reptiles in the medium to long term.

6.10.133 The Proposed Development largely avoids habitats suitable for reptiles (e.g. hedgerows and wet ditches). Mitigation is provided through the employ of an Ecological Clerk of Works to manage the risk of injury or death of individuals during vegetation clearance. Enhancement is provided through landscape scale habitat creation of habitats suitable for this species group.

6.10.134 Reptiles are ecological features of between Local importance. The effects of construction would be negative, low in magnitude and short term. The delivery and management of large areas of semi-natural habitat during the operational phase will be positive, long-term, and of high magnitude. Therefore, the overall effect on reptiles of the Proposed Development is assessed as Significant beneficial.

Brown hare and hedgehog

Baseline

6.10.135 Brown hare have been observed across the area using arable fields for feeding and resting. Hedgehog have not been observed directly, but there are records of this species in the area and it is most likely present within the Order Limits.

Likely Significant Effects

6.10.136 Likely significant effects on brown hares and hedgehog will largely be beneficial through the creation and enhancement of connected habitats at a landscape-scale. However, there remains the potential for construction works to disturb and displace animals through noise and vibration, human presence and temporary lighting.

6.10.137 Construction will be localised with solar arrays being delivered and installed in stages (i.e. not all fields will be subject to construction at any given time). This will allow re-distribution of brown hares to neighbouring fields. Hedgehogs, where present, are likely to remain in habitats that will be largely retained (e.g. hedgerows) (C1, C4) so should largely remain unaffected due to working hours being restricted (C8) and their activity being largely nocturnal.

6.10.138 The provision of diverse grasslands (both within and outside of solar arrays – 1,162.03 ha) (C16, C17), 14.06 km of new hedgerow planting (C27), 58.88 km of hedgerow and tree line enhancement (C27), species-rich field margins (C30), beetle banks (C18), at least 25 temporary pools and scrapes (C21) and SuDS features (C21) will be beneficial for brown hares and hedgehogs in the medium to long term. Brown hare has been shown to favour solar farms for feeding and sheltering (Solar Energy UK, 2024). Ensuring that they can access the solar arrays via gaps in the fencing is therefore necessary and has been included within the design (C9). Although evidence of hedgehog use of solar farms is sparse because of a lack of research, the People's Trust for Endangered Species and BHPS The Hedgehog Conservation Charity[51] recommends creating and managing well connected hedgerows (C27), delivering diverse field margins (C30) and beetle banks (C18), all of which have been included within the design.

6.10.139 The Proposed Development avoids habitats that are utilised by these species (particularly hedgehog) and mitigates for losses through up front habitat creation in neighbouring areas. Compensation and enhancement is delivered through landscape scale delivery of better foraging and sheltering habitats suitable for these species.

6.10.140 Brown hares and hedgehogs are ecological features of County importance. The effects of construction would be negative, low in magnitude and short term. The

[51] BHPS and PTES (date not specified) Helping hedgehogs on your land. Available at https://www.britishhedgehogs.org.uk/leaflets/Farmers-Guidance.pdf (accessed 27/11/2024)

delivery and management of large areas of semi-natural habitat during the operational phase will be positive, long-term, and of high magnitude. Therefore, the overall effect on reptiles of the Proposed Development is assessed as Significant beneficial.

6.11 Summary

6.11.1 **Table 6.11** sets out a summary of the likely significant environmental effects considered.

Table 6.11 Summary of Significant Environmental Effects

Receptor	Environmental Measures	Description of the Effect	Geographic Scale	Nature of Effect	Significant / Not Significant	Next Steps
Humber Estuary Ramsar site and SAC	C2, C7	Noise and vibration; heat and EMF	International	Negligible	Not Significant	Contractor to agree CEMP and DMP with LPA
Fledborough to Harby Dismantled Railway LWS	C1, C3, C4, C14, C21, C27, C28	Changes to hydrology, spread of INNS, pollution	County	Very low to negligible	Not Significant	Contractor to agree CEMP and DMP with LPA
Dunham Dubs, Dunham Oxbow, Darnsyke Marsh and Fledborough Holm LWS	C1, C3, C4, C14, C21, C27, C28	Changes to hydrology, spread of INNS, pollution	County	Very low to negligible	Not Significant	Contractor to agree CEMP and DMP with LPA
Coastal and floodplain grazing marsh	C1, C4, C14	Changes to hydrology, spread of INNS, pollution Habitat creation / enhancement	County	Medium	Significant beneficial	Contractor to agree CEMP, DMP and LEMP with LPA
Hedgerow	C1, C4, C5, C6, C16, C27	Habitat loss / degradation	County	Medium	Significant beneficial	Contractor to agree CEMP, DMP and LEMP with LPA

Receptor	Environmental Measures	Description of the Effect	Geographic Scale	Nature of Effect	Significant / Not Significant	Next Steps
		Habitat creation / enhancement				
Ponds	C1, C4, C14, C16, C21	Changes to hydrology, spread of INNS, pollution Habitat creation / enhancement	County	Medium	Significant beneficial	Contractor to agree CEMP, DMP and LEMP with LPA
The River Trent HPI	C1, C2, C4 and C14	Changes to hydrology, spread of INNS, pollution Related habitat creation / enhancement	National	Very low to negligible	Not Significant	Contractor to agree CEMP, DMP and LEMP with LPA
Permanently wet ditch	C1, C4, C14, C22	Habitat loss and degradation, changes to hydrology, spread of INNS, pollution Habitat creation / enhancement	County	Medium	Significant beneficial	Contractor to agree CEMP, DMP and LEMP with LPA
Other neutral grassland	C1, C6, C14	Changes to hydrology, spread of INNS, pollution	County	Medium	Significant beneficial	Contractor to agree CEMP, DMP and LEMP with LPA

Receptor	Environmental Measures	Description of the Effect	Geographic Scale	Nature of Effect	Significant / Not Significant	Next Steps
		Habitat creation / enhancement				
Badger	C1, C5, C8, C9 C10, C13, C14	Habitat loss, degradation, fragmentation, disturbance Habitat creation / enhancement	Local	Low to very low	Not significant	Contractor to agree CEMP, DMP and LEMP with LPA
Bats	C1, C3, C4, C5, C6, C8, C11, C15, C16, C17, C18, C19, C20, C21, C22, C24, C25, C27, C28, C29, C30, C31, C32, C33	Habitat loss, degradation, fragmentation, disturbance Habitat creation / enhancement	County	Low	Not significant	Contractor to agree CEMP, DMP and LEMP with LPA
Skylark	C17, C18, C29, C30, C34	Habitat loss, degradation, disturbance Habitat creation / enhancement	County	Low	Not significant	Contractor to agree CEMP, DMP and LEMP with LPA
Other breeding birds	C16, C17, C18, C21, C27, C30	Habitat loss, degradation, disturbance	National to local	High	Significant beneficial	Contractor to agree CEMP, DMP and LEMP with LPA

Receptor	Environmental Measures	Description of the Effect	Geographic Scale	Nature of Effect	Significant / Not Significant	Next Steps
		Habitat creation / enhancement				
Wintering birds	C16, C17	Habitat loss, degradation, disturbance Habitat creation / enhancement	National to local	Low	Not significant	Contractor to agree CEMP, DMP and LEMP with LPA
Otter	C1, C4, C7, C14, C22, C26	Habitat loss, degradation, fragmentation, disturbance Habitat creation / enhancement	County	Low to very low	Not significant	Contractor to agree CEMP, DMP and LEMP with LPA
Water vole	C1, C4, C14, C22, C23	Habitat loss, degradation, fragmentation, disturbance Habitat creation / enhancement	County	Medium to high	Significant beneficial	Contractor to agree CEMP, DMP and LEMP with LPA
Reptiles	C15, C16, C16, C17, C18, C19, C21, C27	Habitat loss, degradation, fragmentation, disturbance	Local	High	Significant beneficial	Contractor to agree CEMP, DMP and LEMP with LPA

Receptor	Environmental Measures	Description of the Effect	Geographic Scale	Nature of Effect	Significant / Not Significant	Next Steps
		Habitat creation / enhancement				
Brown hare and hedgehog	C1, C4, C8, C9, C16, C17, C18, C21, C27, 30	Habitat loss, degradation, fragmentation, disturbance Habitat creation / enhancement	County	High	Significant beneficial	Contractor to agree CEMP, DMP and LEMP with LPA

one earth

solar farm