Great North Road Solar and Biodiversity Park

Environmental Statement

Volume 2 – Chapters

Chapter 8 – Ecology and Biodiversity

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Contents

8.1 INTRODUCTION

1 This chapter of the ES describes the potential effects of the Development on Ecology and Biodiversity.

2 The Development would be located to the northwest of Newark, in the Newark and Sherwood district of Nottinghamshire, East Midlands. The Development would be within an area bound by the Order Limits. The Order Limits are to the west of the A1, north of the A617, east of Eakring, and south of Egmanton, to the north and northwest of Staythorpe.

3 The Development is described by ES Chapter 5, Development Description, [EN010162/APP/6.2.5], and briefly summarised here. The Development essentially consists of discrete land parcels proposed to be occupied by solar PV panels and associated infrastructure (Work no. 1), connected by cable route areas (Work no. 2). Up to 4 intermediate substations (Work no. 4) will be spaced around the solar areas, and a Battery Energy Storage System (BESS; Work no. 5a) and 400 kV Compound (Work no. 5b) will collate the electrical energy and step up the voltage before cabling it to the National Grid Staythorpe Substation (Work no. 6), likely via the Consented Staythorpe BESS (Work no. 7). Road works (Work no. 8; access) will be undertaken, principally to create passing places and create or upgrade access points. Other areas within the Order Limits are identified for mitigation/enhancement (Work no. 3). The Work Areas are shown on ES Figure 5.1 [EN010162/APP/6.3.5.1] and a summary of mitigation/enhancement measures is shown on ES Figure 5.2 [EN010162/APP/6.3.5.2].

4 The chapter has been informed by a range of baseline studies and consultations and full details of these are provided in Volume 4 in the following Technical Appendices (TA):

- TA A8.1 Ecology and Biodiversity Consultation [EN010162/APP/6.4.8.1];
- TA A8.2 Ecology and Biodiversity Designated Sites Baseline [EN010162/APP/6.4.8.2];
- TA A8.3 Habitats and Vegetation Baseline [EN010162/APP/6.4.8.3];
- TA A8.4 Breeding Birds Baseline [EN010162/APP/6.4.8.4];
- TA A8.5 Wintering Birds Baseline [EN010162/APP/6.4.8.5];
- TA A8.6 Bats Baseline [EN010162/APP/6.4.8.6];
- TA A8.7 Great Crested Newt Baseline [EN010162/APP/6.4.8.7];
- TA A8.8 Otter, Water Vole and White-clawed Crayfish Baseline [EN010162/APP/6.4.8.8];
- TA A8.9 Other Notable and Protected Species [EN010162/APP/6.4.8.9];
- TA A8.10 Badger Baseline [Confidential] [EN010162/APP/6.4.8.10][1];
- TA A8.11 Schedule-1 Breeding Birds Baseline [Confidential][1] [EN010162/APP/6.4.8.11];
- TA A8.12 Arboricultural Impact Assessment (AIA) [EN010162/APP/6.4.8.12];
- TA A8.13 Biodiversity Net Gain [BNG] Assessment [EN010162/APP/6.4.8.13]; and

[1] Species are considered to be at risk of persecution and so the baseline results are presented in Confidential Technical Appendices

- TA A8.14 Electromagnetic Fields and Fish [EN010162/APP/6.4.8.14].

5 This chapter has informed the production of the following TAs:

- TA A5.1 Outline Landscape and Ecological Management Plan (LEMP) [EN010162/APP/6.4.5.1]; and
- TA A5.3 Outline Construction Environmental Management Plan (CEMP), incorporating a Construction Ecological Management Plan (CEcMP) [EN010162/APP/6.4.5.3];
- TA A5.5 Outline Operational Environmental Management Plan (OEMP) [EN010162/APP/6.4.5.5];

6 TA A5.6 Outline Decommissioning and Restoration Plan (DRP) [EN010162/APP/6.4.5.6]. Only the common, vernacular names of species are used in this chapter. Where necessary, scientific names are presented to help disambiguation, but otherwise are provided only in the TAs.

7 A glossary of terms is provided in Volume 2, Chapter 20, Glossary [EN010162/APP/6.2.20].

8.1.1 Worst-case Design Scenarios

8 The assessment reported in this chapter assumes realistic worst-case scenarios from the range allowed by Chapter 5, Development Description, [EN010162/APP/6.2.5], as follows:

- It is assumed that the activities specified for Work no.s 1 (Solar PV), 4 (Intermediate Substations), 5a (BESS), 5b (400 kV Compound), 6 (National Grid Staythorpe Substation and 7 (Consented Staythorpe BESS Connection) fully occupy, insofar as they are able to given the constraints set out in Table 5.1 of Chapter 5, the area covered by those Work no.s as shown on Figure 5.1 [EN010162/APP/6.3.5.1];
- It is assumed that cable routes (Work no. 2) use the maximum expected 30 m-wide corridor including a 12 m-wide trench for construction activity and that this area could be anywhere within the Work no. 2 area (which is generally 60 m wide);
- It is assumed that the activities specified for Work no. 8 (Access) include road widening and vegetation clearance only insofar as is required to meet the traffic management aims, such as passing places involving widening the road by up to c. 3 m rather than for the full width of the adopted highway;
- It is assumed that all parameters take the maximum of the range specified in the tables in Section 5.4.3 of Chapter 5; and
- It is assumed that the infrastructure elements in certain Work no.s are permanent, in that they will be retained following decommissioning of the Development (this will be decided when the final DRP is approved, prior to decommissioning). These are: Work no. 4 (Intermediate Substations), 5b (400 kV Compound), 6 (National Grid Staythorpe Substation) and 7 (Consented Staythorpe BESS and Connection), and those elements of Work no. 2 (Cables) that connect these other elements. In addition, access tracks may be retained after decommissioning for future land use. Woodland, hedgerows and trees planted as mitigation/ enhancement as part of the Development will be retained following decommissioning.

8.2 CONSULTATION

9 Consultation with a range of stakeholders and interested parties has been undertaken since 2022 and has informed the scope of baseline studies, Development design, and the assessment of effects. A summary of consultation responses and how they have been addressed in this chapter is provided in Volume 3, TA A8.1, Ecology and Biodiversity Consultation [EN010162/APP/6.4.8.1].

8.3 LEGISLATION AND PLANNING POLICY

10 The following legislation and planning policies are relevant to this chapter:

- The Environment Act 2021[2];
- The Invasive Non-native Species (Amendment etc.) (EU Exit) Regulations 2019[3];
- The Conservation of Habitats and Species Regulations 2017[4] (as amended) [the 'Habitats Regulations'];
- The Eels (England and Wales) Regulations 2009[5]
- The Natural Environment and Rural Communities [NERC] Act 2006[6];
- The Countryside and Rights of Way Act 2000[7];
- The Protection of Badgers Act 1992[8];
- Wildlife and Countryside Act [WCA] 1981[9] (as amended);
- Salmon and Freshwater Fisheries Act 1975[10];
- Overarching National Policy Statement [NPS] for Energy (EN-1)[11] [section 4.6 Environmental and Biodiversity Net Gain; section 5.4 Biodiversity and Geological Conservation];
- National Policy Statement for Renewable Energy Infrastructure (EN-3)[12] [section 2.10 Solar Photovoltaic Generation, paragraphs 2.10.75–90; 2.10.128];

[2] UK Government. Available at: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted [accessed on 31/05/2025]
[3] UK Government. Available at: https://www.legislation.gov.uk/ukdsi/2019/9780111176269 [accessed on 31/05/2025]
[4] UK Government. Available at: https://www.legislation.gov.uk/uksi/2017/1012/contents/made [accessed on 31/05/2025]
[5] UK Government. Available at: https://www.legislation.gov.uk/uksi/2009/3344/made (accessed on 31/05/2025]
[6] UK Government. Available at: https://www.legislation.gov.uk/ukpga/2006/16/contents [accessed on 31/05/2025]
[7] UK Government. Available at: https://www.legislation.gov.uk/ukpga/2000/37/contents [accessed on 31/05/2025]
[8] UK Government. Available at: https://www.legislation.gov.uk/ukpga/1992/51/contents [accessed on 31/05/2025]
[9] UK Government. Available at: https://www.legislation.gov.uk/ukpga/1981/69/contents [accessed on 31/05/2025]
[10] UK Government. Available at: https://www.legislation.gov.uk/ukpga/1975/51 [accessed on 31/05/2025]
[11] UK Government. Available at: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1/overarching-national-policy-statement-for-energy-en-1 [accessed on 31/05/2025]
[12] UK Government. Available at: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3/national-policy-statement-for-renewable-energy-infrastructure-en-3 [accessed on 31/05/2025]

- National Policy Statement for Electricity Networks Infrastructure (EN-5)[13] [section 2.5 Environmental and Biodiversity Net Gain; paragraphs 2.10.2–4, 2.11.1, 2.14.2]
- National Planning Policy Framework (NPPF)[14];
- Blueprint for Halting and Reversing Biodiversity Loss: the UK's National Biodiversity Strategy and Action Plan for 2030[15];
- Newark and Sherwood Local Development Framework Amended Core[16] Strategy DPD [Core Policy 12 Biodiversity and Green Infrastructure]; and
- Newark and Sherwood Local Development Framework Amended Allocations and Development Management Development Plan Document[17] [Policy DM5 Design (5) Trees, Woodlands and Biodiversity and Green Infrastructure; Policy DM7 Biodiversity and Green Infrastructure; Policy DM10 Pollution and Hazardous Materials].

11 Consultation drafts of the NPSs have been issued (April 2025) in response to changing climate change policy, however, the content of these with respect to the topic covered in this chapter is materially unchanged from the adopted versions, and hence the adopted versions are referred to elsewhere in this chapter.

12 The TAs expand on the above legislation and planning policies as they apply to different ecological features. Chapter 6, Planning Policy, [EN010162/APP/6.2.6] provides details of legislation and planning policies relevant to the wider ES.

8.4 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

8.4.1 Baseline Studies

13 A range of studies has been undertaken to establish a baseline against which the potential effects of the Development can be assessed. These studies include consultation, desk study and field surveys, the methods and results of which are presented in full in the TAs.

8.4.1.1 Study Areas and Zone of Influence

14 The Study Areas include the areas within which the baseline needs to be established to understand the effects of the Development for a given feature. The Study Areas are defined with reference to the Order Limits and are based on professional judgement and prevailing good practice. In all cases,

[13] UK Government. Available at: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5/national-policy-statement-for-electricity-networks-infrastructure-en-5 [accessed on 31/05/2025]
[14] UK Government. Available at: https://assets.publishing.service.gov.uk/media/675abd214cbda57cacd3476e/NPPF-December-2024.pdf [accessed on 31/05/2025]
[15] Department of Agriculture, Environment and Rural Affairs (DAERA), Scottish Government, Welsh Government and UK Government (2025). Blueprint for Halting and Reversing Biodiversity Loss: the UK's National Biodiversity Strategy and Action Plan for 2030.
[16] NSDC (2019). Available at: https://www.newark-sherwooddc.gov.uk/media/newark-and-sherwood/images-and-files/planning-policy/pdfs/core-strategy/ACS2019.pdf [accessed on 31/05/2025]
[17] NSDC (2013). Available at: https://www.newark-sherwooddc.gov.uk/media/newark-and-sherwood/images-and-files/planning-policy/pdfs/allocations-development-managment-options-report/20161205AdoptedAllocationsDevelopmentManagementDPD.pdf [accessed on 31/05/2025]

the Study Areas extend outwards from the Order Limits, but access restrictions may have limited physical access to some of these areas, although observations from a distance were still possible in many cases.

15 In defining the Study Area for an ecological feature, it is recognised that the Zone of Influence (ZoI) of the Development (i.e., the area within which biophysical changes to an ecological feature may be significant) may extend over a larger area, due, for example, to the mobility of some species or the potential for some impacts (e.g., water-borne pollution) to extend large distances. The ZoI for a feature is therefore a variable distance based on a combination of the characteristics of an impact and the sensitivity of a feature. As a general rule, a Study Area is considered to correspond approximately to a ZoI, but deviations from this are highlighted as appropriate.

16 The ecology Study Areas are summarised in Table 8.1. Field surveys for some features were undertaken beyond the defined Study Areas, typically due to changes to the Order Limits during or following the completion of surveys. The results from surveys outside the Study Areas have been included in some TAs to provide context to the baseline and assessment.

Table 8.1: Study Areas for Ecological Features

Ecological Feature	**Study Area[18]**	**Rationale**
Desk Study		
International Sites	30 km	Maximum distance over which there could be potential functional links and significant effect pathways for highly mobile or sensitive qualifying features of the following: • Special Area of Conservation (SAC); • Special Protection Area (SPA); • Ramsar site; and • Candidate, Possible and potential International Sites.
National Sites	5 km	Maximum distance over which there could be potential functional links and significant effect pathways for notified features of the following: • Site of Special Scientific Interest (SSSI); and • National Nature Reserve (NNR).
Local Sites	2 km	Maximum distance over which there could be potential functional links and significant effect pathways for notified features of the following: • Local Wildlife Site (LWS); and • Local Nature Reserve (LNR).

[18] Maximum radius from the Order Limits, access permitting.

Ecological Feature	Study Area[18]	Rationale
Species and Habitat Records	2 km	Encompasses the Study Areas of all species and habitats likely to be considered in the assessment. Provides landscape-scale context.
Field Surveys		
Habitats and Vegetation	Order Limits	Habitats within the Order Limits are mostly likely to be affected.
White-clawed crayfish	100 m	Maximum distance over which direct effects (e.g., disturbance) are possible.
Great crested newt	250 m	Area within which effects of the Development are most likely based on development type, predominant habitats and the likely distribution of the species. The Study Area may be reduced or extended under certain circumstances (e.g., very low- or high-impact works or low/high-value habitats).
Reptiles	Order Limits	Includes habitats likely to be directly impacted by the Development.
Otter	200 m	Maximum distance over which direct effects (e.g., disturbance) are possible.
Water vole	100 m	Survey area for likely small-scale works to watercourses[19].
Bats	Order Limits and adjacent woodlands	Includes habitats likely to be directly affected by the Development. Barbastelle Study Area comprises contiguous high-value habitat (broadleaved woodland).
Breeding birds	100 m	To understand the effects of displacement and disturbance. Extended up to 500 m for Schedule-1 (of the Wildlife and Countryside Act; WCA) raptors.
Wintering birds	100 m	To understand the effects of displacement and disturbance.
Other ecological features	Order Limits	Likely ZoI, or reasonable search area, for most other features.

8.4.1.2 Desk Study

17 Information and data about designated sites and protected and notable habitats and species has been sought from the following key sources:

- MAGIC[20];

[19] Dean, M., et al. (2016). The Water Vole Mitigation Handbook. The Mammal Society.
[20] Magic.gov.uk website. Available at: https://magic.defra.gov.uk/ [last accessed 10/04/2025]. Including links to Natural England and Joint Nature Conservation Committee (JNCC) web pages.

- Natural England Open Data Geoportal[21];
- The National Biodiversity Network (NBN) Atlas[22];
- Nottinghamshire Biological and Geological Record Centre (NBGRC);
- National Tree Map[23];
- Environment Agency[24];
- Local specialist recorders;
- British Trust for Ornithology (BTO); and
- Planning documents from other nearby developments (see Section 8.9, Cumulative Assessment).

18 For the purposes of this assessment, legally protected and notable habitats and species are those included in at least one of following:

- Species protected by the Conservation of Habitats and Species Regulations ('European Protected Species');
- Species included in schedules 1, 5, 8 and 9 of the Wildlife and Countryside Act 1981;
- Habitats and Species of Principal Importance (HPI and SPI) in the NERC Act 2006;
- Birds listed in Annex I of EU Birds Directive (Annex-I species);
- Amber- and Red-Listed Birds of Conservation Concern (BoCC);
- Priority habitats and species in the Nottinghamshire [Local] Biodiversity Action Plan (LBAP), some of which have standalone Habitat Action Plans (HAPs) or Species Action Plans (SAPs);
- Qualifying or notified features of functionally linked designated sites; and
- Badger.

19 Information and data was obtained from other planning applications, published material and specialist recorders as necessary to inform the assessment. The sources and results are reported in the TAs and relevant parts of this chapter.

20 As set out in Table 8.11 in Section 8.9 Cumulative Effects Assessment, two developments are considered to be part of the baseline for this assessment, and so their 'as built' landscape designs have been included in TA A8.3 Habitats and Vegetation Baseline [EN010162/APP/6.4.8.3].

8.4.1.3 Ecology Field Surveys

21 Field surveys have been undertaken since early 2022 by suitably qualified, professional ecologists. The early commencement of surveys has enabled ecological constraints and opportunities to be considered in the evolving design of the Development. A Preliminary Ecological Appraisal (PEA) was carried out for all areas brought into the Order Limits and determined the need for and scope of further baseline studies. A summary of the PEA and further surveys is provided in Table 8.2.

[21] Natural England. Available at: https://naturalengland-defra.opendata.arcgis.com/ [last accessed on 10/04/2025]
[22] National Biodiversity Network. Available at: https://nbnatlas.org/ [last accessed 10/04/2025]
[23] Bluesky International Ltd. Available at: https://bluesky-world.com/ntm/ [accessed on 04/03/2024]
[24] UK Government. Available at: https://environment.data.gov.uk/catchment-planning/ [last accessed on 10/04/2025]

8.4.1.4 Arboriculture

22 A desk study was undertaken to identify woodland and trees with the potential to be affected by the Development. In addition to the desk study sources, ecology survey results and Tree Protection Order (TPO) data (sourced from Newark and Sherwood District Council) were used to inform the Development design, principally through the application of buffers which the Development design sought to avoid. The buffers include:

- 15 m radius from the stem centre of individual trees;
- 15 m from the woodland boundary, including ancient woodland; and
- 5 m from hedgerow centreline.

23 The resulting Development design, after taking consideration of the above buffers, was screened for potential arboricultural impacts by considering:

- Development activity: different activities vary in their potential to impact trees depending on their characteristics; and
- Land use: the existing land use can influence potential impacts. For example, roads and arable land are subject to pre-existing disturbance.

24 The screening identified potential adverse effects that can be mitigated by establishing Root Protection Areas (RPA) or by implementing other good practice during construction. Where this has not been possible – principally in locations where direct works to trees may be required – an AIA (TA A8.12, [EN010162/APP/6.4.8.12]) was undertaken to determine likely effects and appropriate mitigation.

8.4.1.5 Biodiversity Net Gain

25 Nationally Significant Infrastructure Projects (including the Development) are currently exempt from mandatory BNG until an anticipated date of May 2026, and there is not yet any guidance about how statutory BNG will apply to such projects. A government open consultation[25] was launched on 28/05/2025 seeking views on the implementation of biodiversity net gain (BNG) for nationally significant infrastructure projects (NSIPs).

26 In the absence of guidance, and based on the themes in the open consultation, the BNG Assessment (TA A8.13 [EN010162/APP/6.4.8.13]) is based on the prevailing Department for Environment, Food and Rural Affairs (Defra) metric[26]. The BNG Assessment calculates the net change in the biodiversity units of habitats, watercourses and hedgerows based on the difference between the current baseline habitats and the post-Development habitats.

27 The Development will also support and improve biodiversity in ways that are not captured by the biodiversity metric or may otherwise be difficult to quantify. For example, the Development will improve landscape and habitat connectivity through its riparian corridors and woodland planting thereby having beneficial effects beyond its geographic limits.

[25] UK Government. Available at: https://www.gov.uk/government/consultations/biodiversity-net-gain-for-nationally-significant-infrastructure-projects [accessed on 29/05/2025]
[26] UK Government. Available at: https://www.gov.uk/government/publications/statutory-biodiversity-metric-tools-and-guides [accessed on 17/07/2024]

Table 8.2 Summary of baseline studies

Study	Technical Appendix	Method	Date
Preliminary Ecological Appraisal (PEA)	N/A	The PEA comprised a desk study, a Phase 1 habitat or UKHab (site walkover) survey and an assessment of the potential of habitats to support notable and protected species. The PEA is a process rather than a product and is not, therefore, presented as a standalone study; instead, it has been used to inform the design process and the scope of other ecological studies. The components of the PEA are reported in the relevant Technical Appendices.	2022–2024
Designated Sites	A8.2 [EN010162/APP/6.4.8.2]	Desk study to identify statutory and non-statutory designated sites.	2022–2025
Habitats and vegetation	A8.3 [EN010162/APP/6.4.8.3]	Phase 1 habitat (2022) or UKHab (2023–2024) survey to classify and map habitats and record their constituent plant species.	2022–2024
Breeding birds	A8.4 [EN010162/APP/6.4.8.4]	Four-visit survey to each part of the Study Area (in a single season) to determine the status and distribution of breeding birds.	2022–2024
	A8.11 (confidential) [EN010162/APP/6.4.8.11]	Schedule-1 (WCA) bird surveys.	2022–2024
Wintering birds	A8.5 [EN010162/APP/6.4.8.5]	Monthly walkover surveys to quantify and map the distribution of non-breeding (passage and wintering) birds.	2022–2024
Bats	A8.6 [EN010162/APP/6.4.8.6]	Walked transects (*n* = 31 routes) and remote monitoring (*n* = 36 locations) on either three (for low value habitats) or six (for higher value habitats) occasions.	2022–2024

Study	Technical Appendix	Method	Date
		Advanced Licensed Bat Survey Techniques surveys (focused on barbastelle) up to three times per woodland. Ground Level Tree Assessment (GLTA) of tree with the potential to be affected by works.	2023–2024 2024
Great crested newt	A8.7 [EN010162/APP/6.4.8.7]	Habitat Suitability Index (HSI) assessment and eDNA[27] sampling. Population surveys of selected ponds.	2022–2024
Otter, water vole and white-clawed crayfish	A8.8 [EN010162/APP/6.4.8.8]	Habitat assessment of watercourses followed by a search for evidence and eDNA sampling (for white-clawed crayfish) in a subset.	2022–2024
Other notable and protected species	A8.9 [EN010162/APP/6.4.8.9]	Habitat assessment and incidental observations. Walked transects (for reptiles).	2022–2024
Badger	A8.10 (confidential) [EN010162/APP/6.4.8.10]	Walkover survey to identify field signs and to map and classify setts.	2021–2024
Arboriculture	A8.12 [EN010162/APP/6.4.8.12]	Desk Study to identify trees and woodlands. Targeted tree survey and AIA to BS 5837:2012[28]	2024–2025
Biodiversity Net Gain (BNG)	A8.13 [EN010162/APP/6.4.8.13]	Habitat condition assessment. MoRPh Rivers survey. Calculation of change in biodiversity units using Defra statutory biodiversity metric.	2024

[27] Environmental DNA (eDNA) is genetic material present in the environment. The presence of such material can be used to confirm the presence of likely absence of a species.
[28] British Standards Institution (BSI) (2012). British Standard (BS 5837:2012): Trees in Relation to Design, Demolition and Construction – Recommendations.

8.4.2 Assessing Impacts

28 The assessment method follows the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment[29] (EcIA), which can be summarised in the following steps:

- Identifying Important Ecological Features (IEFs);
- Identifying and characterising effects;
- Identifying measures to avoid and mitigate and compensate effects;
- Assessing the significance of any residual effects (including cumulative) after mitigation;
- Identifying appropriate compensation measures to offset significant residual effects; and
- Identifying opportunities for ecological enhancement.

8.4.2.1 Identifying Important Ecological Features

29 The sensitivity, value or importance of ecological features can be related to a wide range of ecosystem services that they can provide to the environment, people or wider society. A summary of the approach to valuing ecological features is provided in Table 8.3 and shows how ecological importance can be determined using a combination of statutory measures (i.e., legally protected sites and species) and non-statutory but widely accepted measures, such as the presence of priority habitats and species. If a feature cannot be clearly differentiated between two scales, it is assigned to the higher one.

30 Features of Less than Local value (i.e., 'Site' value), or which fall outside the ZoI of the Development, will be scoped out of the EcIA, except where they have policy implications, such as legally protected species. The ZoI will vary among ecological features and will be determined iteratively as the baseline studies are completed and the Development design furthered

Table 8.3: Determining the Importance of Ecological Features

Importance	Example
International	A designated site of international importance (*i.e.,* SAC, SPA and Ramsar sites) or a site meeting criteria for such designations. This includes candidate/potential sites and mitigation land.
	Species present in internationally important numbers.
National	A SSSI or NNR, or sites meeting the criteria for such designations.
	Species present in nationally important numbers.
	Large areas of priority habitats listed on Annex I of the Habitats Directive and smaller areas of such habitats that are essential to maintain the viability of that resource
Regional	East Midlands. Species present in regionally important numbers e.g., making an appreciable contribution to regional strategies[30,31].

[29] Chartered Institute of Ecology and Environmental Management (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (version 1.3).
[30] Anon (2006). A Biodiversity Strategy for East Midlands.
[31] Natural England (2009). State of the natural environment in the East Midlands.

Importance	Example
County	Nottinghamshire. LNR and LWS, or equivalents. Features meeting LWS site selection criteria[32]. HPI, SPI and LBAP priorities making a substantive contribution to the County resource.
District	Newark and Sherwood District. Sites that may be designated or informally recognised according to criteria at the local authority or Parish level.
	Habitats or species that enrich the ecological resource within the District, such as LBAP species recorded with reasonable abundance.
Local	Habitats or species that enrich the ecological resource within the local context – between the Site and the District – such as LBAP species recorded with low abundance.
Site (Less than Local)	Usually widespread and common habitats and species and typically of value at the scale of the Order Limits or less. Features of this value are not considered in detail in the assessment process unless they have policy implications for the Development (e.g., legally protected species).

31 The application of Local Wildlife Site (LWS) site selection guidelines to the assessment of importance (i.e., the identification of features that could qualify as a LWS) is confounded by the scale of the Development because the large extent of the Order Limits increases the likelihood of meeting at least one criterion, and it is not straightforward to compartmentalise the survey data or Order Limits into discrete parts. Furthermore, some selection criteria (e.g., for birds) require observations over several years to demonstrate the 'regular' occurrence of a species, which the baseline studies for the Development do not provide. Nonetheless, the LWS criteria provide a framework for identifying features of potential value and contextualising the baseline.

8.4.2.2 Identifying and Characterising Effects

32 An effect is defined as a change in distribution or status of a feature as a result of the Development and can be adverse, neutral or beneficial. In assessing the magnitude of effects, the identified effect will be characterised according to the sensitivity of the receptor and the potential for recovery from temporary adverse conditions, taking into account that: different impacts can result in reversible or permanent effects; different effects have different probabilities of occurring; and that some changes may be beneficial. The criteria that will be used in the assessment for describing the overall magnitude of an effect are summarised in Table 8.4.

[32] Crouch, N. C. (2018). Nottinghamshire LWS Handbook – Guidelines for the selection of Local Wildlife Sites in Nottinghamshire. Nottinghamshire Biological and Geological Records Centre, Nottingham.

Table 8.4: Determining the Magnitude of Effects

Magnitude	Example
High	May include those that result in large-scale, permanent or long-term changes in an IEF and are likely to change its ecological integrity. These effects are likely to result in overall changes in the conservation status of a population or habitat type at the location(s) or geographical scale under consideration.
Medium	May include moderate-scale permanent or long-term changes in an IEF, or larger-scale temporary changes, but the integrity of the feature is not affected. This may mean that there are temporary changes in the conservation status of a population or habitat type at the location(s) or geographical scale under consideration, but these are unlikely to be irreversible or long term.
Low	May include those that are small in magnitude, have medium-scale short- or medium-term and temporary changes, and where integrity is not affected. These effects are unlikely to result in overall changes in the conservation status of a population or habitat type at the location(s) under consideration, but it does not exclude the possibility that mitigation or compensation will be required.
Negligible	There is no perceptible change in the ecological receptor.

8.4.2.3 Significance of Effect

33 A significant effect is one that either supports (beneficial) or undermines (adverse) the conservation status or objectives of an IEF. These significant effects are sufficiently important to warrant explicit assessment and reporting so that decision-makers are adequately informed of the potential environmental consequences of a project.

34 The significance of an effect on an IEF is given with reference to a spatial scale which may not be the same as the geographical scale at which an IEF is valued. Effects that are significant at or above the Local scale are considered to be 'significant' in the context of the Environmental Impact Assessment (EIA) Regulations[33]. For the avoidance of doubt, effects that are significant at the Site scale (i.e., Less than Local) are considered to be 'not significant' in the context of the EIA Regulations Mitigation and compensation may be needed to ensure that outcomes are consistent with the scale at which the significant effect has been identified.

8.5 BASELINE CONDITIONS AND VALUATION

35 This section provides a summary of the ecological baseline conditions and provides a valuation of ecological features. The full methods and results of the baseline studies are presented in TA A8.2–A8.12 [EN010162/APP/6.4.8.2–12].

[33] UK Government. Available at: https://www.legislation.gov.uk/uksi/2017/572/contents [accessed on 31/05/2025]

8.5.1 Assumptions and Limitations

36 The ecological surveys included a range of potential limitations and these are discussed in the relevant TAs, but overarching limitations are addressed below. Despite the potential limitations identified, the large spatial and temporal extents of the baseline studies provide a comprehensive and robust data set upon which to base this assessment.

8.5.1.1 Age of survey data

37 Survey data have been collected since early 2022 and therefore some are approaching three years old. CIEEM guidance[34] suggests that three years is the upper limit for the lifespan of ecological reports and surveys. However, the guidance recognises that it is difficult to set definitive timeframes and that there are advantages to undertaking surveys early during the scoping or design phases of a project. The age of the survey data has been addressed in the following ways:

- The Development design and the ecological surveys have progressed in an iterative manner with each informing the other. This ecologically sensitive design process has been essential in helping to avoid and reduce potential adverse ecological effects and this would not have been possible without surveys over the three years;
- Much of the survey data are less than three years old. The most recent surveys in 2024 and 2025 included work to validate the findings of earlier surveys;
- The predominantly agricultural landscape has changed very little over the course of surveys, notwithstanding the typical agricultural rotation. The non-agricultural, semi-natural habitats have undergone no obvious changes over this time frame. It is reasonable to assume that the abundance and distribution of species associated with such habitats will also have changed very little, or at least not be discernible from background fluctuations;
- Local desk study data (from NBGRC) were obtained in 2022 and updated in 2024, thereby providing an up-to-date and comprehensive complement to the survey data. National and freely available desk study data (e.g., MAGIC) have been accessed at various stages and updated as recently as April 2025; and
- The Outline CEMP [TA A5.3 EN010162/APP/6.4.5.3], incorporating the CEcMP, includes a commitment to undertake pre-commencement and pre-construction surveys so that mitigation proposals are based on the most up-to-date and relevant baseline data.

8.5.1.2 Seasonality of Surveys

38 Habitat surveys of some parts of the Study Area were undertaken (as part of the PEA) outside the optimal survey season, typically defined as April to September, which could result in some non-agricultural habitats being misclassified and undervalued due to the absence of key indicator plant species. However, subsequent surveys in the optimal period, including of both new and previously surveyed areas of the Order Limits, provide the necessary confidence in classifications.

[34] CIEEM (2019) Advice Note on the Lifespan of Ecological Reports and Surveys.

39 Dense vegetation in the summer months may mask evidence of some animal species or hinder access for surveys. Nevertheless, the range of surveys undertaken across the Order Limits at all times of year have provided a large body of incidental records of non-target species; for example, observations of badger setts during wintering bird surveys. Furthermore, the long timescale over which surveys have been undertaken has provided the opportunity to revisit and resurvey areas previously identified as constrained.

8.5.1.3 Revised Guidance

40 Survey guidance for bats and birds has been revised during the course of the baseline studies, but the changes are relatively minor and the surveys undertaken are largely consistent with the revised approaches such that the differences are unlikely to qualitatively alter conclusions. Continuing with the prevailing guidance at the time when surveys were initiated is a reasonable approach for such work and helps to provide a consistent baseline. Pre-commencement surveys for protected species, where required, will be based on the prevailing methods and good practice of the time.

8.5.2 Designated Sites

41 Designated sites are shown in Figure A8.2.1 and A8.2.2 in TA A8.2, Ecology and Biodiversity Designated Sites Baseline [EN010162/APP/6.4.8.2].

42 There are two International Sites within 30 km of the Order Limits: Birklands and Bilhaugh SAC is 7.0 km north-west and Sherwood Forest possible Potential SPA (ppSPA) is 4.5 km west and north-west.

43 There are nine National Sites within 5 km of the Order Limits including one NNR and eight SSSIs. Eakring and Maplebeck Meadows SSSI borders the Order Limits, abutting an unclassified road along its 1.5 km southern boundary. Mather Wood SSSI is outside and less than 100 m from the Order Limits.

44 SSSIs are associated with Impact Risk Zones (IRZ) which help provide an initial assessment of the likely risk of impacts on SSSIs posed by different types of development. The Order Limits cross several IRZ including two for which ‘All Planning Applications’ are included as a development category warranting consultation between local authorities and Natural England. These IRZs relate to Eakring and Maplebeck Meadows SSSI and Mather Wood SSSI. None of the other IRZs in the Order Limits include ‘Wind and Solar Energy’ as a development category.

45 There are 120 Local Sites within 2 km of the Order Limits. All but six of these are LWS and they include 16 within or bordering the Order Limits, 15 of which are noted for their botanical interest and one for its water beetle populations. The other Local Sites, none of which are within or bordering the Order Limits, include four LNRs and two informal, locally designated sites.

8.5.3 Habitats and Vegetation

8.5.3.1 Desk Study

46 The desk study identified the following priority habitats within the Order Limits: Coastal and Floodplain Grazing Marsh; No Main Habitat but

Additional Habitats Present; Wood-pasture and Parkland; and Deciduous Woodland. Some of these habitats border the Order Limits in other areas, as do Traditional Orchards and Lowland Meadows.

47 Patches of Ancient and Semi-natural Woodland and Ancient Replanted Woodland are distributed around but outside the boundary of the Order Limits and all but one are designated as LWS.

48 The desk study returned 827 records of rare, scarce or threatened plant species listed in the Nottinghamshire Rare Plant Register, including ten species recorded in the Order Limits. The desk study also returned 124 records of six invasive non-native plant species.

8.5.3.2 Field Survey

49 The Study Area comprised a relatively limited range of habitats and exhibited a degree of homogeneity at the landscape scale. Habitats are summarised in Table 8.5 and shown in Figure A8.3.1 in TA A8.3, Habitats and Vegetation Baseline [EN010162/APP/6.4.8.3].

50 Given the large extent of the Order Limits, it is probable that it supports notable plant species that may not have been recorded during surveys, but these are likely to be in small, discrete areas of a limited range of higher value habitats such as ancient woodland, which will be retained.

51 Four invasive non-native plant species were recorded in the Study Area: giant hogweed, Himalayan balsam, Japanese knotweed and New Zealand Pygmyweed.

Table 8.5 UKHab Habitat Types within the Study Area

Habitat (UKHab code)	Extent	Description
Other Neutral Grassland (g3c)	31.9 ha	Intergrading habitats distributed around hedgerows, field margins and watercourses.
Modified Grassland (g4)	182.9 ha	Permanent pasture and arable field boundaries and margins. Generally species-poor.
Lowland Mixed Deciduous Woodland (w1f)	18.9 ha	Most woodland has been excluded from the Order Limits. Small patches throughout. Varied structure and composition.
Other Broadleaved Woodland (w1g)	4.8 ha	Plantation and secondary woodland dominated by semi-mature trees.
Other Woodland Mixed (w1h)	6.1 ha	Woodland in which neither broadleaved nor coniferous species (typically Scots pine) were dominant.
Other Coniferous Woodland (w2c)	0.2 ha	Small block of plantation.
Dense Scrub (h3)	5.2 ha	Mixed scrub (h3h) and bramble scrub (h3d) typically around fields, roads, railway and water bodies.

Habitat (UKHab code)	Extent	Description
Cereal Crops (c1c)	1481.7 ha	Variety of crops in rotation, mostly cereals, including transient cover crops.
Bare Ground (510)	1.7 ha	Associated with farm traffic.
Built-up Areas and Gardens (u1)	32.1 ha	Residential and farm properties, roads and other built infrastructure.
Other Standing Water; Ponds (r1g; 42)	0.3 ha	Ponds (*n* = 11) included a range of sizes, conditions and settings.
Line of Trees (33)	31.9 ha	Frequent along field boundaries and watercourses, some are remnant hedgerows. Variety of broadleaved species.
Native Hedgerow (h2a)	145.6 km	Dominated by hawthorn and blackthorn. Mostly intact and managed, though some were defunct or gappy. Six categories recorded: • Native Hedgerow (h2a6) • Native Hedgerow with Trees (h2a6 11) • Native Hedgerow – Associated with Bank or Ditch (h2a6 50) • Native Hedgerow with Trees – Associated with Bank or Ditch (h2a6 11 50) • Native Species-Rich Hedgerow (h2a5) • Native Species-Rich Hedgerow with Trees (h2a5 11) • Native Species-Rich Hedgerow – Associated with Bank or Ditch (h2a5 50)
Rivers and Streams (r2)	9.1 km	The Beck and Moorhouse Beck retain a degree of naturalness and are tributaries of the River Trent (outside the Order Limits). Many other smaller watercourses with a variety of forms.
Ditch (50)	37.3 km	Extensive network, many only seasonally wet.

8.5.4 White-clawed Crayfish

8.5.4.1 Desk Study

52 No records of white-clawed crayfish were returned.

8.5.4.2 Field Survey

53 Five watercourses provided suitable habitats for white-clawed crayfish (Figure A8.8.3 in TA A8.8, Otter, Water Vole and White-clawed Crayfish Baseline [EN010162/APP/6.4.8.8]). The unsuitable watercourses had one or more features that reduced their potential to support the species, such as no or highly seasonal water, limited flows, poor water quality, high levels of disturbance, and unsuitable physical characteristics (e.g., substrates).

54 eDNA testing from the five watercourses were negative and no white-clawed crayfish were observed. An inconclusive observation of crayfish in Pingley Dyke (from which water samples tested negative) was most likely of the non-native invasive signal crayfish which is widely distributed in the River Trent catchment. White-clawed crayfish is considered to be absent from the Study Area.

8.5.5 Great Crested Newt

8.5.5.1 Desk Study

55 The predominantly agricultural landscape does not provide widespread optimal habitats for great crested newts. However, the landscape includes discrete aquatic and terrestrial habitats of value to the species, particularly ponds, woodland, scrub and grassland.

56 Based on a review of aerial imagery and OS maps, 111 ponds were identified in the Great Crested Newt Study Area.

57 NBGRC returned six records of great crested newts, one of which was within the Study Area. MAGIC returned no granted European Protected Species (EPS) licenses or license returns for great crested newt.

8.5.5.2 Field Survey

58 Access was achieved to 86 ponds, including all 14 within the Order Limits, and all of these were surveyed to determine their Habitat Suitability Index (HSI) classification. Based on the HSI results and access permissions, 22 ponds were sampled for eDNA of which five tested positive. Population surveys undertaken in 2022 as part of preliminary studies confirmed small and medium populations in two of these. The results suggest a low density and sparsely distributed population. Pond locations and surveys results are shown in Figure A8.7.1 in TA A8.7, Great Crested Newt Baseline [EN010162/APP/6.4.8.7].

8.5.6 Bats

8.5.6.1 Desk Study

59 The desk study returned 500 records of bats including 19 confirmed roosts, one possible roost and the remaining records pertaining to sightings of foraging/commuting bats. There are seven granted EPS licenses.

8.5.6.2 Field Survey

60 The Ground Level Tree Assessment of high-impact work identified 319 trees with potential roost features or requiring further assessment, of which up to 16 may need to be felled.

61 Transect and remote monitoring surveys (locations shown in Figure A8.6.1 in TA A8.6, Bats Baseline [EN010162/APP/6.4.8.6]) of bat activity confirmed a diverse assemblage of bats comprising nine taxa[35] (Table 8.6). The assemblage was dominated by common and soprano pipistrelle bats but it

[35] Registrations have been classified into 11 taxonomic groups, but two of these include registrations identifiable only to genus – *Pipistrellus* sp. and *Nyctalus* sp. – which must be from other congeneric species recorded and thus are not considered to be distinct taxa.

also included locally rare and scarce species, notably serotine and barbastelle.

Table 8.6 Summary of bat activity survey results

Species	Transects		Remote Monitoring	
	Registrations	**% of total**	**Registrations**	**% of total**
Common pipistrelle	2,828	57.1	71,309	62.7
Soprano pipistrelle	957	19.3	23,264	20.5
Pipistrellus sp.	1	<0.1	202	0.2
Nathusius' pipistrelle	15	0.3	217	0.2
Brown long-eared	43	0.9	81	0.1
Barbastelle	13	0.3	291	0.3
Myotis sp.	448	9.0	11,975	10.5
Noctule	381	7.7	3,285	2.9
Leisler's bat	216	4.4	1,360	1.2
Nyctalus sp.	37	0.7	989	0.9
Serotine	12	0.2	63	0.1
Unidentified	0	0	704	0.6
Total	**4,951**	**100**	**113,740**	**100**

62 Bat trapping in woodlands captured 465 individuals of 10 species. Females and males of all species were captured. Female bats included breeding (post-lactating or parous) individuals of all ten species. Juvenile animals of all species except barbastelle were also captured. Nine barbastelle bats, including one breeding female, were caught in three woodlands.

8.5.7 Otter

8.5.7.1 Desk Study

63 The desk study returned no recent (2012 onwards) records of otter within the Order Limits, but there were 21 records within 2 km, concentrating around the River Trent and Car Dyke.

8.5.7.2 Field Survey

64 Seventy-six watercourses or sections of watercourse were assessed for their potential to support otter. Unsuitable watercourses had one or more features which reduced their potential to support the species, such as no or highly seasonal water, poor water quality and high levels of anthropogenic disturbance (e.g., farming).

65 Evidence of otter was widely distributed but scarce and included prints, spraints, slides and feeding signs. Otters were present in nine watercourses and potentially present in 22 others. No potential holts or resting places were identified. Otter survey locations and results are shown in Figure A8.8.1 in TA A8.8, Otter, Water Vole and White-clawed Crayfish Baseline

[EN010162/APP/6.4.8.8]. Otter is assumed to be present in all suitable watercourses due to its highly mobile behaviour.

8.5.8 Water Vole

8.5.8.1 Desk Study

66 The desk study returned no recent records of water vole within the Order Limits, but five records were identified within 2 km. American mink is an invasive non-native species that predates water vole and records show it in watercourses directly linked to the Order Limits.

8.5.8.2 Field Survey

67 Seventy-six watercourses or sections of watercourse were assessed for their potential to support water vole. Unsuitable watercourses had one or more features which reduced their potential to support the species, such as no or highly seasonal water, poor water quality, high levels of anthropogenic disturbance (e.g., farming), unsuitable physical characteristics (e.g., bank profiles), and unsuitable vegetation.

68 Evidence of water vole was widely distributed but scarce and included mainly prints and burrows, but conclusive evidence (i.e., droppings) was very limited. Water voles were present in 14 watercourses and potentially present in 19 others. Suitable watercourses in which water vole was not recorded are assumed to support the species if they have direct connectivity to watercourses in which the species was confirmed to be present. No evidence of American mink was recorded. Water vole survey locations and results are shown in Figure A8.8.2 in TA A8.8, Otter, Water Vole and White-clawed Crayfish Baseline [EN010162/APP/6.4.8.8].

8.5.9 Badger

69 Evidence of badger was widespread and included setts, latrines, prints, hairs, feeding sign and footprints. Full details are provided in TA A8.10, Badger Baseline [Confidential] [EN010162/APP/6.4.8.10].

8.5.10 Breeding Birds

8.5.10.1 Desk Study

70 The Nottinghamshire Biological and Geological Records Centre (NBGRC) returned 12,341 recent (2015 onwards) records of 229 species within 2 km of the Order Limits, including 2,001 records of 52 Schedule-1 species, alongside a range of other species of conservation concern. Of these, 17 records occurred within the Order Limits comprising 14 species: buzzard, chiffchaff, fieldfare, great spotted woodpecker, hobby, jay, kestrel, lesser spotted woodpecker, marsh tit, oystercatcher, peregrine falcon, tawny owl, and willow warbler.

8.5.10.2 Field Survey

71 A total of 844 territories of 40 species of conservation concern (SoCC; defined in TA A8.4, Breeding Birds Baseline [EN010162/APP/6.4.8.4]) were confirmed to be breeding or holding territory within the Order Limits. A further 17 SoCC were present but showed no evidence of breeding or holding territory. A total of 31 species not of conservation concern were also

recorded, many of which were considered likely to be breeding, but not in locally notable numbers. Territory locations of red- and amber-listed species are shown, respectively, in Figures A8.4.1 and A8.4.2 in TA A8.4, Breeding Birds Baseline [EN010162/APP/6.4.8.4].

72 The SoCC with the highest number of territories within the Order Limits were skylark (*n* = 233), yellowhammer (*n* = 161), dunnock (*n* = 145) and whitethroat (*n* = 88). The density of skylark territories is approximately 0.13 per hectare in the areas surveyed.

73 Schedule-1 (of the WCA) breeding species included red kite, barn owl, kingfisher, hobby and peregrine. Red kite, kingfisher and peregrine are also Annex-I listed species. The breeding locations of these species is provided in TA A8.11, Schedule-1 Breeding Birds Baseline [Confidential] [EN010162/APP/6.4.8.11].

74 No distinct parts of the Breeding Bird Study Area supported particularly notable assemblages, although areas with higher habitat heterogeneity tended to support a higher diversity and some species were more clearly associated with certain habitats. These habitat associations provide a helpful basis of categorisation for the purposes of this assessment. The assemblage has therefore been categorised into four groups to facilitate reporting in TA A8.4 Breeding Birds Baseline:

- Waterbirds;
- Raptors and Owls;
- Open Farmland Birds; and
- Hedgerow and Tree Birds.

75 These groupings inevitably mask some inter-specific variation in ecology and potential effects and so, where necessary, species-specific responses will be considered.

8.5.11 Wintering Birds

76 The term ‘wintering birds’ used here refers to the non-breeding bird assemblage during the passage and winter periods and is used to distinguish it from the non-breeding birds recorded during the breeding season. The methods and results of the wintering bird surveys are presented in TA A8.4 Wintering Birds Baseline [EN010162/APP/6.4.8.5], including Figure A8.5.1 which shows the survey field groups.

8.5.11.1 Desk Study

77 NBGRC returned 12,341 recent (2015 onwards) records of 229 species within 2 km of the Order Limits, including 2,001 records of 52 Schedule-1 species, alongside a range of other SoCC species. Of these, 17 records occurred within the Order Limits comprising 14 species: buzzard, chiffchaff, fieldfare, great spotted woodpecker, hobby, jay, kestrel, lesser spotted woodpecker, marsh tit, oystercatcher, peregrine falcon, tawny owl, and willow warbler.

8.5.11.2 Field Survey

78 A total of 47 SoCC were identified (Table A8.5.1). The species with the highest mean peak counts were Woodpigeon (mean peak = 1,783.0), Fieldfare (1,382.0), Starling (719.3), Linnet (556.8) and Redwing (532.8).

79 Eight Schedule-1 species were recorded: Barn Owl (mean peak = 0.3), Brambling (6.0), Fieldfare (1382.0), Kingfisher[36] (0.0), Merlin (1.0), Peregrine (0.3), Red Kite (2.0) and Redwing (532.8).

80 Six Annex-1 species were recorded: Golden Plover (76.3), Kingfisher, Little Egret (0.3), Merlin, Peregrine and Red Kite.

81 The number of species identified in each Field Group across the winter periods ranged from 6 to 22 (Table A8.5.2). The Field Groups with the largest number of individual birds were 38 (*n* = 3,741 individuals) and 18 (*n* = 2,203). The Field Groups with the highest density of birds were 5 (52.6 birds ha^{-1}), 18 (39.7 ha^{-1}) and 38 (30.9 ha^{-1}).

82 A total of 27 species considered not of conservation concern were recorded, but not in locally significant numbers (Table A8.5.3). Moorhen, Rook, Stock Dove and Wren (amber-listed SoCC) were recorded on at least one survey visit but were excluded from detailed survey and analysis due to their ubiquity and limited scope for adverse effects.

83 The assemblage has been categorised into seven groups to facilitate reporting and assessment:

- Waterbirds;
- Raptors and Owls;
- Gulls;
- Migrant Passerines;
- Open Farmland Birds;
- Hedgerow and Tree Birds; and
- Other birds.

8.5.12 Other Notable and Protected Species

84 TA8.9, Other Notable and Protected Species [EN010162/APP/6.4.8.9] provides further details of these species.

8.5.12.1 Fungi

85 The desk study returned no records of fungi, although these species are generally under-recorded compared with animals and plants. Given the large extent of the Order Limits, it is probable that it supports notable fungi, but these are likely to be in small, discrete areas of a limited range of higher value habitats such as ancient woodland and unimproved grassland. The dominant agricultural habitats have very limited potential to support uniquely notable fungi. Based on the desk study results and the Development proposals, including embedded mitigation which ensured the Development avoids ancient woodland and the large majority of unimproved grassland, detailed surveys for fungi have not been undertaken.

8.5.12.2 Invertebrates

86 The desk study returned 58 recent local records of Lepidoptera and Odonata, all outside of the Order Limits in the east, south-east and south. Most records were associated with the River Trent and adjacent waterbodies, with latticed heath moth (LBAP and SPI) records from a private

[36] An identification of Kingfisher was made in October, as this falls outside of the period used for mean peak calculation (November – February) the mean peak is calculated as 0.0.

garden and a single record from an arable field. Small red-eyed damselfly (LBAP) was the most frequently recorded invertebrate species, most commonly recorded within large waterbodies adjacent to the River Trent.

87 Given the large extent of the Order Limits, it is probable that it supports notable invertebrates, but these are likely to be in small, discrete areas of a limited range of higher value habitats such as ancient woodland, watercourses and ponds. The dominant agricultural habitats have very limited potential to support uniquely notable invertebrates. Based on the desk study results and the Development proposals, including embedded mitigation which ensure the Development avoids ancient woodland and wide areas around the main watercourse, as well the south-eastern areas closest to the River Trent, detailed surveys for invertebrates have not been undertaken.

8.5.12.3 Amphibians

88 The desk study returned 18 recent records of common toad (LBAP and SPI species) and three records of palmate newt (LBAP species), none of which were within the Order Limits. Common frog and common toad have been recorded in several waterbodies during baseline studies. Based on the desk study records and Development proposals, including embedded mitigation to ensure the Development largely avoids effects on freshwater habitats, detailed amphibian surveys, other than for great crested newts, have not been undertaken.

8.5.12.4 Reptiles

89 The desk study returned four recent records of grass snake (SPI and LBAP) and no records of other reptile species; the records originate from the banks of the River Trent, outside the Order Limits. Grass snake has not been recorded in the baseline studies of the nearest, adjacent cumulative developments (Section 8.9.6).

90 High-value reptile habitats are somewhat limited compared to the predominant and less suitable agricultural land-use, and typically include less-disturbed grassland and scrub around freshwater habitats. The Study Area is unlikely to support a notable reptile assemblage including rarer species (i.e., adder and common lizard) due to the lack of suitable habitats, but it assumed that a low-density grass snake population is present in favourable habitats, typically the margins of freshwater habitats or relatively undisturbed grassland. Targeted reptile surveys (with a focus on grass snake) in these habitats did not record any reptiles and there have been no incidental observations of reptiles during extensive ecological surveys of other features throughout the Study Area.

8.5.12.5 Fish

91 The desk study returned 32 recent records of four SPI and/or LBAP priorities: European eel, bullhead (also Annex II species), spined loach and brown/sea trout. Most records were associated with River Trent and the River Greet. Of the 16 records associated with watercourses directly linked to the Order Limits, most were from The Beck, the largest watercourse within the Order Limits, and European eel was the most frequently recorded, plus one record of brown trout and two of bullhead. River lamprey, sea lamprey and Atlantic salmon have been recorded in the wider catchment. Fish

surveys have not been undertaken but the presence of fish has been assumed in all suitable watercourses, thereby providing a realistic worst-case scenario. Surveys would not qualitatively alter the conclusions of this assessment or the approach to mitigation provided in the Outline CEMP (TA A5.3 [EN010162/APP/6.4.5.3]).

92 Embedded mitigation includes the following key measures to safeguard freshwater habitats and their associated fish species:

- 10 m construction exclusion buffers from the edge of watercourses and waterbodies, reduced to 5 m for small, artificial field drains;
- HDD cables under the most sensitive watercourses i.e., those most likely to support fish;
- Burying and insulating cables to a sufficient depth to minimise in-channel EMFs; and
- The Outline CEMP (TA A5.3 [EN010162/APP/6.4.5.3]), which includes a wide range of measures to safeguard water resources and fish.

8.5.12.6 Other Mammals

93 The desk study returned 111 records of brown hare and the species has been observed frequently in agricultural fields throughout the Study Area at all times of year.

94 The desk study also returned 127 records of hedgehog (LBAP, SPI), widespread across the Study Area; seven records of polecat (LBAP, SPI, LWS-qualifying species), outside the Order Limits; and two records of harvest mouse (LBAP, SPI, LWS-qualifying species), outside the Order Limits.

95 The desk study also returned records of a range common and widespread mammal species (e.g. roe deer) which are not considered to be of conservation concern or strictly legally protected for conservation purposes.

96 Based on the desk study results, the distribution of available habitats, and the Development proposals, including embedded mitigation such as mammal gates in fences and limits to nighttime working (included in the CEcMP as part of the Outline CEMP (TA A5.3 [EN010162/APP/6.4.5.3]), detailed surveys of these species have not been undertaken.

8.5.12.7 Invasive Non-native Animal Species

97 The desk study returned 163 records of invasive non-native species all of which are outside the Order Limits. Animals include zebra mussel, Chinese mitten crab, American mink and muntjac deer; the latter two have also been recorded during field surveys.

8.5.13 Predicted Future Baseline

98 This section considers potential changes to the baseline conditions described above that might occur over the duration of the Development, as well as changes that might occur in the absence of the Development. The changes are considered over the short, medium and long term, corresponding, respectively, to the periods up to the start of and including construction (assessed as 2027 to 2029), to the end of operation (assessed as 2069) and upon decommissioning (assessed as 2070). These dates are estimates but slight changes to them would not alter the conclusions below.

99 Habitat loss, particularly through the intensification of agriculture, and climate change are the two key drivers of historic and current declines of many species and habitats of conservation concern in the UK[37]. With relatively few exceptions, the current trend is for these declines to continue. Defra's species abundance indicator statistics[38] show that by 2022, the index of change in relative abundance of all species and priority species in England declined, respectively, to around 69% and 21% of their 1970 values.

100 Agricultural policy, agri-environment funding, market forces, technology and land ownership are key drivers of past and future agricultural land management. Historical mapping, aerial imagery and farm records suggests that the current land use, including both agriculture and semi-natural habitats, have changed relatively little over the last 20–30 years. It is unlikely that this will change markedly in the future, in the absence of the Development, and so it is assumed that the overall proportions of agricultural land and semi-natural habitats will be maintained. However, farming methods and the balance of crop types and extent of agri-environmental interventions may change, as they have done in previous decades, in response to various factors. These changes have a profound effect on the wildlife supported in farmed landscapes.

101 Most species are strongly associated with certain habitats for critical life stages and so it is reasonable to assume that their distributions and populations will be influenced by land use change. It is likely that the methods of farming will have a greater impact than land use itself, as modern practices such as winter cereals and pesticide development have shown. How such practices will change in the future cannot be predicted with any certainty. For example, policy changes such as the Environment Act 2021 set out measures to drive environmental improvements, but a funding shortfall for agri-environmental payments may fail to deliver nature and climate targets[39]. It will be assumed, therefore, that current farming practices will continue over the long term.

102 The future baseline needs to be considered in relation to climate change, as set out in Chapter 15, Climate Change [EN010162/APP/6.2.15]. Climate change is affecting the phenology, distribution and populations of many species and the ways in which these changes might interact with each other and the Development are extremely difficult to predict with certainty. Furthermore, the uncertainties in climate models at the local scale, as well as the difficulties in predicting how species and ecosystems respond to climate change, makes a meaningful assessment of the Development under future climate change scenarios beyond the scope of this chapter.

103 Therefore, except for features for which evidence to the contrary is clear, the assessment is undertaken under the assumption that there will be no long-term changes in the baseline as a result of climate change.

[37] Burns, F. et al. (2023). State of Nature 2023. The State of Nature partnership, Available at: www.stateofnature.org.uk [accessed 28/04/2025]
[38] UK Government. Available at: https://www.gov.uk/government/statistics/indicators-of-species-abundance-in-england/indicators-of-species-abundance-in-england [accessed on 28/04/2025]
[39] Rayment, M. (2024). For farming, nature and climate. Investing in the UK's natural infrastructure to achieve Net Zero and nature's recovery on land. RSPB, National Trust and The Wildlife Trusts.

104 Diseases are a major threat to native plant species and are likely to increase in severity and incidence in response to climate change[40]. Dutch elm disease caused the widespread loss of elms from the landscape, and the current outbreak of ash dieback is causing the rapid and widespread loss of ash trees, with dramatic effects on woodland ecosystems. These diseases and future pathogens are predicted to cause further degradation of woodland resources over the medium and long term, in some cases leading to local extinction of species.

105 Many animal species are highly mobile and susceptible to inter-annual variation driven by prevailing conditions (e.g., weather and land use). Consequently, the distribution and abundance of species may change in the short term.

106 These changes are unlikely to qualitatively alter the conclusions of the assessment or the general approach to mitigation, but may influence decisions about short-term and localised effects, such as the need for and scope of protected species licensing during construction.

8.5.14 Important Ecological Features

107 The baseline studies suggest that the Order Limits and its surrounds support habitats and species that are typical of the lowland agricultural landscape of Nottinghamshire, itself representative of the wider region. These habitats and species include features that are classified as conservation priorities or are legally protected, including statutory and non-statutory designated sites. With relatively few exceptions, most of these features are unlikely to be uniquely dependent on the area within the Order Limits and would be expected to be present in the wider landscape.

108 Barbastelle bats are associated with the mature woodlands surrounding the Order Limits and are a species of particular local conservation interest given that they represent the northerly limit of their UK distribution and that there is relatively little information about their local ecology.

109 Based on the analysis of baseline data, as summarised above, the Important Ecological Features have been identified as set out in Table 8.7. Features scoped out of further assessment are summarised in Table 8.8.

[40] UK Government Forest Research Website. Available at: https://www.forestresearch.gov.uk/climate-change/resources/factsheets/ [accessed 16/10/2024]

Table 8.7 Summary of Important Ecological Features

Feature	Value	Rationale
Birklands and Bilhaugh SAC	International	7.0 km north-west of the Order Limits. Qualifying features include old acidophilous oak woods. Smaller areas of dry heath. Habitats support rich invertebrate and fungal assemblages. Lacks clear ecological connectivity with the Order Limits but demands a high evidence threshold in assessment.
Sherwood Forest ppSPA	International	4.5 km west and north-west of the Order Limits. This site/designation has no formal recognition but for the purposes of this assessment, and in line with Natural England's 'risk-based approach'[41], will be considered in the same way as pSPA and SPA. Lacks clear ecological connectivity with the Order Limits but demands a high evidence threshold in assessment.
Eakring and Maplebeck Meadows SSSI	National	Bordering and partly within the adopted highway within the Order Limits. Designated and protected by the WCA. Adjacent to the Order Limits. Notified features include sensitive species (breeding birds) and habitats (species-rich grassland) which are within the ZoI. Potential hydrological connectivity via surface and ground water.
Mather Wood SSSI	National	Bordering the Order Limits. Designated and legally protected by the WCA. Adjacent to the Order Limits. Notified features include sensitive habitats (ancient woodland) which are within the ZoI. Potential hydrological connectivity via surface and ground water.
Laxton Sykes SSSI	National	0.3 km north-west of the Order Limits. Designated and legally protected by the WCA. 300 m from the Order Limits. Notified features include habitats (species-rich grassland). Potential direct hydrological connectivity via a stream.

[41] Natural England (2014). Advice Note to Local Planning Authorities regarding the consideration of likely effects on the breeding population of nightjar and woodlark in the Sherwood Forest region.

Feature	Value	Rationale
Sherwood Forest NNR	National	7.0 km north-west of the Order Limits. Designated and protected by the National Parks and Access to the Countryside Act 1949. Southern half is part of the Birklands and Bilhaugh SAC supporting ancient woodland/trees and diversity of rare invertebrates. The northern half of Sherwood Forest NNR is part of Sherwood Forest ppSPA, supporting notable breeding birds. Effects to the ecological elements of this site are assessed indirectly through the assessment of effects on Birklands and Bilhaugh SAC and Sherwood Forest ppSPA.
LWS	County	LWS are of at least County-level importance for their flora and/or fauna[32]. Protected by local planning policies. Given their notified interest (mostly botanical), the 16 LWS within or bordering the Order Limits (see TA A8.2: Ecology and Biodiversity Designated Sites Baseline [EN010162/APP/6.4.8.2]) are those most likely to be within the ZoI. In addition, Kersall Grassland LWS and Hunt's Meadow LWS have direct connectivity with Eakring and Maplebeck Meadows SSSI and are so are scoped into the assessment. Similarly, Coppice, Mather and Lady Woods have direct connectivity with Mather Wood SSSI and are scoped into the assessment.
Lowland Mixed Woodland	County	HPI. LBAP. Includes a variety of woodland types, several of which are subject to local HAPs. Ancient woodland is an 'irreplaceable' habitat under BNG guidance but is outside the Order Limits. Limited and patchily distributed resource. Some of these woodlands include Ancient and Veteran trees or trees subject to TPOs.
Native Hedgerow	Local	HPI and LBAP priority (and HAP). Widespread and comprising various types including both species-poor and species-rich, and with and without trees.
Ponds	Local	HPI. LBAP (and HAP). Declining habitat that is a limited resource and patchily distributed.
Rivers and Streams	Local	HPI. LBAP (and HAPs). Extensive network, but most are canalised ditches. The Beck, Moorhouse Beck, and Pingley Dyke are the larger, more natural watercourses.

Feature	Value	Rationale
Breeding Birds	Regional	SPI. LBAP. LWS-qualifying species. Schedule 1 WCA. Order Limits supported a reasonably diverse assemblage which was characteristic of the habitats and region. The assemblage included common and widespread species of Local value, as well as rarer and scarcer species which, due to their abundance, could be of Regional value.
Wintering Birds	District	SPI. LBAP. LWS-qualifying species. Order Limits supported a reasonably diverse assemblage which was characteristic of the habitats and region. Few notable aggregations or features (i.e., waterbodies) likely to support them. The assemblage included common and widespread species of Local value and relatively few instances of notable aggregations
Bats	Regional	SPI. LBAP. LWS-qualifying species. European Protected Species. Schedule 5 WCA. Assemblage was characteristic of the habitats and region and included rare and scarce species.
Great Crested Newt	County	SPI. LBAP. LWS-qualifying species. European Protected Species. Schedule 5 WCA. Low density population.
Grass snake	Local	SPI. LBAP. LWS-qualifying species. Schedule 5 (partial) WCA. No records from within the Study Area and not recorded during surveys. Probable low density population associated with riparian habitat.
Otter	County	SPI. LBAP. LWS-qualifying species. Schedule 5 WCA. European Protected Species. Recorded throughout the network of larger watercourses. Assumed present in all suitable watercourses.
Water Vole	County	SPI. LBAP. LWS-qualifying species. Schedule 5 WCA. Low density population closely associated with a limited number of watercourses.
Badger	Site	Legally protected by the Protection of Badgers Act 1992, but not otherwise considered a conservation priority.
Fish	Local	SPI. LBAP. LWS-qualifying species. Eel and lamprey assumed present in some watercourses. Bullhead and brown trout may also be present.

Table 8.8 Summary of Features Scoped Out of Further Assessment

Feature	Value	Rationale
All LNR	County	None are designated as SSSI or LWS, suggesting the LNRs are largely of amenity value. The ecological features are unlikely to be functionally linked to, or have clear ecological connectivity with, the Order Limits. Outside the likely ZoI.
All other SSSI	National	The notified features are very unlikely to be functionally linked to, or have clear ecological connectivity with, the Order Limits. They are separated by large distances, intervening agricultural land, or potential hydrological connections do not exist or will be safeguarded by embedded measures. Outside SSSI IRZ or of a development type not triggering consultation.
All other Local (non-statutory) Sites	District or County	The cited features are very unlikely to be functionally linked to, or have clear ecological connectivity with, the Order Limits. They are separated by large distances, intervening agricultural land, or potential hydrological connections do not exist or will be safeguarded by embedded measures.
Wood-pasture and Parkland	Local	HPI. LBAP. A composite habitat comprising a mosaic of woodland and grassland. Area in Order Limits is arable land (rather than pasture) and all associated trees and woodland will be retained.
Arable Field Margins	Site	HPI. LBAP. Arable field margins of most types (as listed in the UKBAP definition) are common in the agricultural landscape covered by the Order Limits, although their type and location varies between years. The value of arable field margins is in the context of modern intensive agricultural landscapes where they provide refuge for many species. Arable field margins are transient habitats and determined by prevailing agricultural land-use drivers and, unlike other semi-natural habitats, are generally not limited in the landscape.

Other habitats	Site	Habitats that are common and widespread, not subject to substantive losses/disturbance (including through embedded mitigation), or otherwise not recognised to be of conservation concern. The measures in TA A5.1, Outline LEMP [EN010162/APP/6.4.5.1] will deliver a net gain in habitat value (e.g. arable to grassland), as demonstrated in TA A8.13, BNG Assessment [EN010162/APP/6.4.8.13]. Notable plant species present in these habitats, such as Shepherd's Needle associated with Mainwood Farm Arable LWS, are unlikely to be uniquely dependent on a particular part of the prevailing arable landscape or are otherwise associated with habitats that will be retained.
White-clawed crayfish	Regional	SPI. LBAP. LWS-qualifying species. European Protected Species. Schedule 5 WCA. Absent from the Study Area and therefore scoped out.
Fungi	Local to Regional	SPI. LBAP. LWS-qualifying species. Scoped out. Higher value fungi habitats are limited in extent and will be retained.
Invertebrates	Local to Regional	SPI. LBAP. LWS-qualifying species. Scoped out. Higher value invertebrate habitats are limited in extent and will be retained or enhanced to provide demonstrable benefits[42].
Other mammals	Site	SPI. LBAP. LWS-qualifying species. Effective embedded mitigation is set out in TA A5.3, Outline CEMP [EN010162/APP/6.4.5.3] and TA A5.1, Outline LEMP [EN010162/APP/6.4.5.1] will provide long-term net benefits, as observed at other solar developments[42].
Invasive Species	n/a	Schedule 9 WCA. Threat to native wildlife. Illegal to cause to grow in the wild, such as by spreading during construction. Effective embedded mitigation is set out in TA A5.3, Outline CEMP [EN010162/APP/6.4.5.3].
Other	Site	Features not included in this above table are considered to be absent from the ZoI of the Development, extremely unlikely to be adversely affected by the Development, or of Site value, and so are scoped out of further assessment.

[42] Solar Energy UK (2024). Solar Habitat 2024: Ecological Trends on Solar Farms in the UK.

8.6 DEVELOPMENT DESIGN

110 Ecological and other environmental features have been considered as part of the design process for the Development to help avoid and reduce potential adverse effects during construction and operation. These 'embedded' mitigation measures have been considered as part of the Development when determining its potential effects. In instances where the embedded mitigation is not sufficient to avoid significant adverse effects, further mitigation and compensation is proposed.

8.6.1 Avoidance of High-value Features

111 The vast majority of the Development will be in arable land, recognised to be a habitat of very limited ecological value, notwithstanding its importance to some species. This has greatly reduced the range and magnitude of potential adverse ecological effects.

112 Construction exclusion buffers have been included in the Development design. These are areas around sensitive ecological features within which no or restricted Development activities will take place. In most cases, these buffers will be sufficient to avoid or greatly reduce adverse effects on the target features. Where it is not possible to exclude works from such areas, further studies, detailed assessment and mitigation have been or will be undertaken. The exclusion buffers include the following:

- Watercourses and waterbodies: 10 m from the edge of main watercourses, 5 m from the edge of small field ditches;
- Trees: 15 m from stem centre;
- Woodland and Ancient Woodland: 15 m from mapped boundaries; and
- Designated sites: 15 m from boundary.

113 Horizontal Directional Drilling (HDD), with appropriate safeguards, will be used to avoid the cable works directly affecting the most sensitive features, notably woodlands, watercourses and LWS, thereby avoiding or reducing effects on both the habitats and the species they support. The locations of HDD watercourse crossings are shown in Figure A5.3.1 in TA A5.3 Outline CEMP [EN010162/APP/6.4.5.3].

8.6.2 Programme

114 The start date of construction within the year of commencement is anticipated to be 2027 but this is not definite. Regardless, the large extent and phasing of the Development provides flexibility to carry out otherwise potentially harmful activities at less sensitive times. The phasing of construction over a period of 24 months will also reduce the overall magnitude and extent of effects arising from several otherwise concurrent operations.

115 The maximum 40-year operational lifespan of the Development will provide a long period of certainty about land-use change and is 10 years longer than the 30-year period required for BNG as applied in Town and Country Planning Act applications (and which is not a statutory requirement for the Development). Agricultural land-use is subject to short-term changes within years (e.g., sowing and harvesting) and between years (e.g., crop rotation), as well as longer-term changes in prevailing crop preferences and

management driven by market forces and policies. These changes provide challenging, unpredictable conditions for many species and reduce the carrying capacity of the landscape. For example, the density and reproductive success of open farmland birds varies considerably among different crop types and cropping regimes. The long period of certainty over a large area, combined with the widespread cessation of agriculture (see below), has the potential to benefit many features of the local ecosystem.

8.6.3 Reduction in Arable Farming

116 The Order Limits have an area of 1,765 of which 1,482 ha (84%) is arable land, and of this arable land, 142 ha will be retained (a 90% reduction). Despite the widespread adoption of agricultural good practice across the Order Limits, the majority of intensively cultivated arable land is a very low-value habitat to wildlife and experiences operations that directly harm wildlife.

117 The State of Nature[43] report, an independent and comprehensive review of species trends in the UK, states that *"Intensive management of agricultural land, largely driven by policies and incentives since WWII, has been identified as the most significant factor driving species population change in the UK".* The combination of technological advancements, use of agro-chemicals and changing agricultural policy has reduced the capacity of farmed landscapes to support wildlife, resulting in widespread biodiversity loss in terrestrial and freshwater ecosystems. The State of our Rivers Report[44] estimates that nearly two thirds of river stretches fail Water Framework Directive health status due to agriculture and rural land management. The cessation of large areas of intensive arable farming, as a result of conversion to grassland around the solar PV, will therefore reduce these effects.

118 The quantity of fertilisers, herbicides and pesticides applied to the land will be greatly reduced and will decrease, albeit at potentially reduced levels, or to comply with legal obligations, such as treating invasive non-native plant species.

119 Arable land is subject to regular and frequent disturbance from ploughing, tilling, spraying and harvesting which can directly affect ecological features. Examples of incidental adverse effects arising from these activities include damage to tree roots, deposition of dust on sensitive vegetation, noise and vibration disturbance of sensitive animals, and direct harm and killing of animals, notably ground-nesting birds. The reduction in agricultural operations will reduce these effects.

120 Arable land is associated with high levels of soil erosion and run-off compared with other land uses, and its conversion to grassland and other semi-natural habitats will reduce these impacts with benefits for soil health, water quality and freshwater ecosystems (see also Section 9.5, Chapter 9 Water Resources [EN010162/APP/6.2.9]).

121 The reduction in arable farming across a large area and over a long duration has the potential to benefit most features of the local ecosystem including its

[43] Burns, F. et al. (2023) State of Nature 2023.
[44] The Rivers Trust (2024). The State of our Rivers Report.

habitats, species, soil and water quality, which in turn will increase its resilience to climate change (see Section 8.5.13).

8.6.4 Watercourse Crossings

122 Watercourse crossings will take one of several forms depending on the nature of works, habitat sensitivity, and other environmental and technical design considerations. HDD will be the default option for watercourse crossings by cables and is the least invasive, most sensitive method, although it may not be suitable or necessary in some locations, such as for small field drains, for which open trenching is proposed.

123 Access tracks will take one of the following forms, which are listed in order of least to most impact and are likely to be appropriate, respectively, for the most to least sensitive features:

- Single-span structures that do not interfere with the channel (banksides, bed or water column);
- Span structures with in-stream supports or pre-cast structures with natural bed; and
- Closed culverts with artificial invert.

124 Further details of watercourse crossings and associated design principles and mitigation are provided in Chapter 9 Water Resources [EN010162/APP/6.2.9] and Section A5.3.13 Crossings Schedule of the Outline CEMP (TA A5.3, [EN010162/APP/6.4.5.3]).

8.6.5 Lighting

125 A ‘dark sky’ policy will be adopted and all lighting will be designed with reference to the Institute of Lighting Engineers guidance to reduce obtrusive light[45] and impacts to bats[46]. No continuous, full-time overnight lighting is proposed during any stage of the Development and the lighting specification will provide only the minimum required for operations. For example, motion-activated or time-limited lighting will be installed and will be designed to minimise light spill beyond the Development. Additional details are provided in Volume 2, Chapter 5 Development Description [EN010162/APP/6.2.5] and the Outline CEMP (TA A5.3 [EN010162/APP/6.4.5.3]). The sensitive lighting design will reduce potential disturbance to nocturnal and sensitive crepuscular and nocturnal species including bats, badger, otter, birds and invertebrates.

8.6.6 Wildlife Movement

126 All perimeter fencing will include a means to allow terrestrial animal species up to the size of adult badgers to move freely within their home ranges and to disperse without impediment. This will reduce potential barrier effects on badger, otter and brown hare. All other terrestrial species of conservation concern are sufficiently small that they will be able to pass through the fencing without impediment. New fences may change the movements of larger mammals (e.g. roe deer), none of which are species of conservation concern, but the fences will be mostly inset from existing boundary features

[45] Institute of Lighting Engineers (2021). Guidance Note GN01/21 The Reduction of Obtrusive Light.
[46] Institute of Lighting Engineers (2023). Guidance Note GN08/23 Bats and Artificial Lighting at Night.

(fences and hedgerows) and therefore will leave frequent, wide corridors unimpeded, and so their overall patterns of movements will be largely unchanged.

8.6.7 Passing Places

127 New passing places on public roads are needed for reasons of safety and have been minimised in both number and size throughout the Order Limits. The locations were also screened for potential ecological effects and, if necessary, moved to less sensitive locations.

8.6.8 Construction Environmental Management Plan

128 The Outline CEMP (TA A5.3, [EN010162/APP/6.4.5.3]) sets out measures to avoid or reduce the risk of adverse environmental effects during construction. It includes several sections that address potential ecological effects.

8.6.8.1 Pollution Prevention

129 Good-practice methods to prevent and control pollution of surface and ground water are now well established in the construction industry and demonstrably effective so it reasonable to consider them as embedded mitigation. These measures are described in the Pollution Prevention Plan (PPP) (Section A5.3.9 of the Outline CEMP]. Consequently, it can be assumed that adverse ecological effects arising from the spillages of fuels and chemicals, silt runoff from ground works, and airborne dust will be minimised. Further details about waterborne pollutants are provided in the Volume 2, Chapter 9 Water Resources [EN010162/APP/6.2.9] which concludes that there will be no significant adverse effects on hydrological receptors.

8.6.8.2 Construction Ecological Management Plan

130 The CEcMP (Section A5.3.11 of the Outline CEMP, TA A5.3 [EN010162/APP/6.4.5.3]) sets out measures to avoid and reduce potential adverse ecological effects that cannot be achieved through the other measures in the Outline CEMP. Reasonable avoidance measures are recognised to be a proportionate approach to safeguarding sensitive features and in many cases can avoid the need for protected species mitigation licenses or other forms of applied mitigation.

131 Key prescriptions of the CEcMP will include:

- Pre-commencement and pre-construction surveys to update relevant parts of the baseline to inform mitigation and licensing requirements;
- Defining exclusion zones to safeguard sensitive ecological features;
- Specifying the timing and location of works to safeguard sensitive ecological features;
- Other reasonable avoidance measures proportionate to identified risks;
- Providing specialist ecological advice and support (e.g., Ecological Clerk of Works, ECoW); and
- Applying for and complying with Natural England protected species licences.

8.6.8.3 *Micrositing*

132 The Work Areas (Work no.s 1–8) defined in Volume 2, Chapter 5 Development Description [EN010162/APP/6.2.5] are the maximum possible extents for specified works and thus include areas in which works may not take place thereby providing flexibility during construction to avoid localised or unexpected sensitive features by micrositing works. Wherever possible, the separation between work activities and known sensitive ecological features will be maximised within a Work Area.

8.6.8.4 *Environmental Clerk of Works*

133 The appointment of an Environmental Clerk of Works (EnvCoW) is now routine on major developments and is specified in Section A5.3.3 of the Outline CEMP. The EnvCoW will be responsible for monitoring and reporting on compliance with planning consents, environmental permits, legislation and mitigation. The role therefore provides a mechanism to support the Development in delivering its obligations. Other environmental specialists will be appointed, as required, to provide advice and support, and will report to the EnvCoW.

8.6.8.5 *Soil Management*

134 Soil Management Plans will be prepared, based on TA A17.2, Outline Soil Management Plan [EN010162/APP/6.4.17.2], as described in more detail in Volume 2, Chapter 17, Agricultural Land [EN010162/APP/6.2.17]. The plans will reduce the degradation of soils and conserve their biodiversity and ecosystem services.

8.6.8.6 *Biosecurity*

135 Biosecurity protocols are specified in the CEcMP (Section A5.3.11.12 of the Outline CEMP, TA A5.3 [EN010162/APP/6.4.5.3]) to prevent the spread of invasive non-native plant species. If necessary, specialist contractors will be appointed to manage invasive non-native plant species in a legally compliant manner. Potential effects from invasive non-native species are therefore scoped out of the assessment.

8.6.8.7 *Landscape and Ecology Management Plan*

136 The State of Nature report[37] identifies key conservation responses required to halt and reverse declines in species and the Outline LEMP (TA A5.1, [EN010162/APP/6.4.5.1]) adopts several of these, most notably nature-friendly farming and ecosystem restoration.

137 In 2020, the government committed to protecting 30% of the UK's land by 2030 (‘30by30’). Through the Outline LEMP and BNG, the Development will contribute to this by protecting a large area from loss of or damage to important biodiversity values through long-term ownership or long-term management agreements, as well as contributing to local policies such as the emerging Nottinghamshire and Nottingham Local Nature Recovery Strategy (LNRS)[47].

138 The Outline LEMP sets out habitat management and monitoring prescriptions for the lifetime of the Development, from pre-construction until

[47] Nottinghamshire and Nottingham Nature Recovery Strategy. Available at: https://nottsnaturerecovery.co.uk/ [accessed on 26/05/2025]

the end of operation, but excluding decommissioning. The Outline LEMP is an overarching document and will be supported by more detailed plans for certain features. It will be instrumental in delivering landscape mitigation, ecological mitigation, compensation and enhancement (including BNG), and nature-based flood management by setting out the measures required to implement, manage (including remediation) and monitor a wide range of interventions. These, in turn, will increase the resilience of the local ecosystem to climate change.

139 The Outline LEMP includes the following key elements:

- Habitat restoration and enhancement – to improve the condition of habitats, such as gapping up hedgerows, and increasing their value to other IEFs;
- Habitat creation – creating new habitats of greater value than those they replace, for the purposes of either compensation or enhancement;
- Landscape connectivity – the above measures will improve landscape connectivity for a range of ecological features, notably woodlands and riparian corridors and the wildlife they support;
- Visual screening – creating or modifying habitats to provide visual screening of Development features;
- Flood management – natural flood management solutions; and
- Species mitigation – compensation and enhancement for a range of IEFs, including habitat creation and enhancement and features such as bird and bat boxes.

8.6.8.8 Licenses and Authorisations

140 For the avoidance of doubt, licences and authorisations will be obtained from the relevant authorities to facilitate works that would otherwise be unlawful. The licences will ensure that works are legally compliant and subject to the highest level of scrutiny.

8.6.8.9 Noise

141 Measures to reduce noise disturbance to residential receptors include controls on working hours, equipment selection and operation, screening and other good practice. These measures will also reduce potential disturbance effects on noise-sensitive animal species. Further details are provided in the Volume 2, Chapter 12, Noise and Vibration [EN010162/APP/6.2.12] and in the Outline CEMP (TA A5.3, [EN010162/APP/6.4.5.3]).

8.6.8.10 Hydrology

142 The Development includes a number of design and mitigation features that will avoid and reduce adverse effects on ground and surface water flows. Further details are provided in the Volume 2, Chapter 9, Water Resources [EN010162/APP/6.2.9] and the Outline CEMP (TA A5.3, [EN010162/APP/6.4.5.3]).

8.6.9 Operational Environmental Management Plan

143 TA A5.5 Outline OEMP [EN010162/APP/6.4.5.5] sets out measures to avoid or reduce the risk of adverse environmental impacts during the operation of

the Development. It includes several sections that address potential ecological effects.

8.6.10 Decommissioning and Restoration Plan

144 TA A5.6: Outline DRP [EN010162/APP/6.4.5.6] sets out measures to avoid or reduce the risk of adverse environmental impacts during the decommissioning of the Development. It includes several sections that address potential ecological effects, including a commitment to prepare a Decommissioning Environmental Management Plan (DEMP), comparable in scope to the Outline CEMP.

8.7 LIKELY EFFECTS

145 The Development has the potential to result in a range of ecological effects during its construction, operation and decommissioning. Note that habitats have two distinct properties which are assessed separately:

- The biophysical properties that contribute to their overall defining character. The effects on these properties will be assessed for individual habitats; and
- The function that a habitat provides for an animal species, such as for nesting and foraging. The effects on these properties are assessed for individual species.

8.7.1 Permanent Habitat Loss

146 The potentially permanent infrastructure associated with substations, access tracks and some Development-created habitats will result in the permanent loss of habitats, which is generally an adverse effect. The majority of permanent habitat loss will be of agricultural land, mostly arable. Habitat loss reduces the overall extent of a habitat and its component species and may increase isolation between areas of the same habitat. By extension, habitat loss reduces the resources on which animals depend for foraging, breeding and dispersal.

147 Habitat loss also includes the creation of new habitats by converting one habitat, typically a low-value habitat such as agricultural land, into another, higher-value habitat (e.g. woodland). This type of habitat loss is generally beneficial and is termed habitat creation.

8.7.2 Temporary Habitat Loss and Disturbance

148 Development activities during construction, operation and decommissioning may cause temporary and reversible effects such that the original condition of a habitat can be readily restored to the same or better condition. These effects are generally adverse. The majority of temporary habitat loss will be of arable land, but smaller areas of other habitats may be affected. A typical example is cable trenches in farmland which will be reinstated upon completion of the works during construction. Vehicle emissions, dust and the transfer of sediment to surface waters are included in this category because they can directly and indirectly adversely affect plants. Temporary habitat loss directly affects plant species and reduces the resources on which animals depend for foraging, breeding and dispersal.

8.7.3 Habitat Fragmentation

149 Increased habitat fragmentation (an adverse effect) may result from permanent or temporary habitat loss or from new barriers created by infrastructure. Decreased habitat fragmentation (a beneficial effect) may result from habitat creation and enhancement, particularly at a landscape scale. Habitat fragmentation affects the ability of species to move or disperse through the landscape.

8.7.4 Habitat Change

150 The structure and composition of habitats will change during the operation of the Development. Some of these changes are relatively simple and predicable, such as the growth of a tree, whereas others are more complex and uncertain, such as the development of grasslands.

151 Many of these changes will be actively managed rather than driven by wholly natural (e.g., successional) processes, but these changes will influence the communities associated with the habitats. Consequently, not only will habitat condition change over time, but many animal species dependent on certain habitats will change in response. Habitat changes may be adverse or beneficial for either a habitat or the wildlife it supports.

8.7.5 Direct Harm to Animals

152 Direct harm to animals is an adverse effect which typically results from the movement and activities of plant and machinery during construction. Vegetation clearance and invasive ground works are the main sources of impacts and thus can affect animals when they are both above and below ground. This also applies to the places of shelter or rest used by animals, such as bat roosts in trees. Pollution from chemicals, fuels, silt and other substances may also directly harm animals. Direct harm could constitute a legal offence for some legally protected species.

153 There is limited evidence about the risks posed to birds and bats in the UK from colliding with solar PV panels[48,49], although given the prevalence of solar PV developments in the UK and northern Europe it is unlikely that widespread effects would have gone unnoticed or unreported. The landscape context of the Development and ecological requirements of the species recorded, as well as the adoption of landscape-scale habitat management for these species, suggests that bird and bat collisions will be very limited and not significant, and so are scoped out of the assessment.

8.7.6 Direct Disturbance of Animals

154 Construction will last approximately 24 months and will be a source of disturbance to sensitive species, typically from the movement and activities of plant and machinery generating visual, noise and vibration impacts. The distance over which animals respond to disturbance varies considerably depending on species, biology (e.g., life stage), landscape context (e.g., the

[48] Harrison et al. (2017). Evidence review of the impact of solar farms on birds, bats and general ecology (NEER012). Natural England.
[49] Taylor et al. (2019). Potential ecological impact of ground-mounted photovoltaic solar panels.

presence of natural screening) and the characteristics of the disturbance. Disturbance could constitute a legal offence for some protected species.

155 Electromagnetic fields from underground cabling below watercourses have the potential to disturb sensitive fish species and create barriers to their movements.

156 Other operational disturbance will be minimal, restricted to infrequent, short vehicle and personnel movements for the purposes of maintenance and monitoring. This disturbance is likely to be below current background levels and covered by the Outline OEMP (TA A5.5, [EN010162/APP/6.4.5.5]) and so is excluded from the assessment.

8.7.7 Attraction and Deterrence of Animals

157 Novel structures in the landscape may deter or attract certain animal species via a range of behavioural cues in response to, for example, polarised light and reflected light. Responses to solar PV modules have been speculated to occur in invertebrates, birds and bats but the evidence supporting these claims is inconclusive or otherwise not applicable to solar PV in the UK. A technical assessment of Glint and Glare, in relation to human receptors, is provided in TA A16.1 [EN010162/APP/6.4.16.1]. Potential adverse ecological effects are extremely unlikely and are scoped out of this assessment.

8.7.8 Changes to Prey Abundance and Distribution

158 Populations of predatory species are strongly positively related to the abundance of their principal prey, therefore changes in the abundance of prey as a result of the Development may cause indirect (beneficial or adverse) effects on their predators. Prey abundance is influenced by habitat quality and availability as well as anthropogenic influences such as pesticides and pollution.

8.8 ASSESSMENT OF LIKELY EFFECTS

8.8.1 Development Scenarios Assessed

159 The assessment is based on the parameters and Work Areas defined in Volume 2, Chapter 5 Development Description [EN010162/APP/6.2.5] and takes into account the Development design mitigation described above. A realistic worst-case scenario (Section 8.1.1) is assessed whilst recognising the range of parameters in the Development design. Where appropriate, the assumptions about realistic worst-case scenarios for IEFs are clearly stated.

8.8.2 Birklands and Bilhaugh SAC

160 There are no clear ecological pathways between the Development and Birklands and Bilhaugh SAC. The qualifying features (habitats and plants) are extremely unlikely to be functionally linked to the Order Limits. There are no direct hydrological links and the intervening distance (7.0 km) and agricultural landscape limit the potential for effect pathways, which are further limited by the characteristics of the Development. The Order Limits are not in the IRZ for the SAC. The construction, operation and decommissioning of the Development are extremely unlikely to undermine

the conservation objectives or integrity of the SAC. Effects will therefore be **not significant**.

8.8.3 Sherwood Forest ppSPA

161 This site has no formal recognition but for the purposes of this assessment, and in line with Natural England's Scoping response, it will be considered in the same way as other SPAs. However, it should be recognised that a thorough assessment is made difficult by the lack of information that would normally be available for a full SPA (e.g., conservation objectives) and data (e.g., population estimates) underlying the possible designation.

162 The two potential qualifying features, breeding European nightjar and woodlark, are very closely associated with woodland and heathland habitats. In Nottinghamshire, these species are almost exclusively associated with these habitats in the area of the ppSPA[50]. The species have not been recorded during the breeding bird surveys and the Order Limits do not include sufficiently extensive or well-connected (to the ppSPA) areas of suitable breeding habitats (woodland and heathland).

163 Given the restricted distribution of these species and their specialist habitat requirements, it is extremely unlikely that they will depend on or utilise the Order Limits, such that it is not considered to be functionally linked. There are no direct hydrological links and the intervening distance (4.5 km) and agricultural landscape limit the potential for effect pathways to the birds or their habitats, which are further limited by the characteristics of the Development. The construction, operation and decommissioning of the Development are extremely unlikely to adversely affect the potential qualifying features of the ppSPA. Effects will therefore be **not significant**.

8.8.4 Eakring and Maplebeck Meadows SSSI

164 The 1.5 km southern boundary of Eakring and Maplebeck Meadows SSSI borders and is partly within the adopted highway within the Order Limits. It is unclear how the boundary of the SSSI relates to the highway boundary or underlying map data. The SSSI is notified for its species-rich neutral grassland developed on damp, occasional wet soils. It also supports a breeding bird assemblage associated with wetter terrestrial habitats. In assessing the potential effects on the SSSI, the assessment considers the effects on its notified features and how these could undermine the integrity of the designation.

165 The potential effects of the Development would be adjacent to (or further from) the SSSI and include permanent habitat loss, temporary habitat loss and disturbance, habitat fragmentation, habitat change, and direct disturbance of animals.

8.8.4.1 Construction

166 No works will take place within the SSSI or on its boundary and so there will be no permanent or temporary habitat loss. The SSSI boundary abuts the unclassified road and so its features will be subject to a degree of baseline disturbance from traffic, road maintenance and hedgerow maintenance.

[50] Reece, J., Crouch, N., Parkin, D., du Feu, Chris and Ellis, B. (2019) The Birds of Nottinghamshire.

167 The nearest construction activities to the SSSI include the construction of new passing places (Work no. 8: Access Works) at five locations on the southern boundary of the minor road bordering the SSSI. Passing places are needed for reasons of safety and have been minimised in both number and size throughout the Order Limits, particularly in the vicinity of the SSSI. The passing places will be in the southern verge of the road, thereby maximising separation from the SSSI. The passing place at this location will be approximately 1 m wide and 15 m long. The Outline CEMP (TA A5.3 [EN010162/APP/6.4.5.3]) will mitigate potential effects from hydrological pathways and dust pollution and so potential effects will be negligible.

168 The construction of these passing places will take place over a short time period of approximately 2–3 days between September and February (i.e., outside the breeding bird season, as specified in the Outline CEMP), so will not disturb breeding birds.

169 The next nearest infrastructure (Work no. 1: Solar PV) is located approximately 500 m to the south, separated by a minor road and arable fields, and is on the other side of a hill, thereby reducing disturbance pathways. A small stream, Hagley's Dumble, provides potential hydrological connectivity from this Work area, as does The Beck from the Work no. 1, solar PV, 1 km upstream. Cable crossings of these upstream watercourses will use HDD as set out in Section A5.3.13 Crossings Schedule of the Outline CEMP. HDD will avoid in-channel disturbance and the Outline CEMP includes a range of additional safeguards from potential pollution impacts. Potential effects associated with these works will be negligible.

170 The frequency of traffic movements along the minor road adjacent to the SSSI is predicted (in Volume 2, Chapter 14 Traffic and Access, Section 14.7 and Table 14.15 [EN010162/APP/6.2.14] to increase from a base Annual Average Daily Traffic (AADT) flow total of 1,035 to a value of 1,171 during construction (and from 14 to 28 for Heavy Goods Vehicles, HGVs). These increases are considerably below the threshold[51,52] increases of 200 HGVs or 1000 cars requiring assessment of air quality effects on designated sites and so the effects of air quality on the SSSI have been scoped out of further assessment.

171 Potential effects arising during construction will be **not significant**.

8.8.4.2 Operation

172 No further construction activities are proposed during operation and so there are no other pathways for ecological effects from these activities. The creation and enhancement of 74 ha of grassland habitats around The Beck, c. 500 m downstream of the SSSI (as specified TA A5.1 Outline LEMP [EN010162/APP/6.4.5.1] will improve landscape connectivity and help to reduce disturbance. Combined with Eakring Meadows LWS, Hunt's Meadow LWS and Kersall Grassland LWS, which are situated between the SSSI and this area of habitat management, a larger and better-connected network of wildlife sites will be created. In turn, this may increase the resilience of the

[51] Holman *et al.* (2020). A guide to the assessment of air quality impacts on designated nature conservation sites – version 1.1. Institute of Air Quality Management.
[52] National Highways (2024). Design Manual for Roads and Bridges: LA 105 Air Quality (vertical barriers) version 0.0.1.

SSSI to external factors (such as climate change) and support its notified features by providing additional resources (e.g. for foraging birds). These low-magnitude beneficial effects may be significant at the Site level, which is not significant in EIA terms. **No significant effects** are predicted.

8.8.4.3 Decommissioning

173 Effects arising during decommissioning are likely to be similar in character, albeit of lower magnitude (i.e. negligible), to those during construction and subject to similar environmental controls through the Outline DRP (TA A5.6 [EN010162/APP/6.4.5.6]). It is assumed that the decommissioning phase, and its potential ecological effects, will be appropriately mitigated in line with the prevailing baseline conditions, guidance and policies such that they are acceptable. **No significant effects** are predicted.

8.8.4.4 Mitigation

174 The design and embedded measures have minimised and mitigated adverse effects, and enhancement is proposed that provides a net beneficial effect.

8.8.4.5 Residual Effects

175 The residual effects remain as assessed in Sections 8.8.4.1 to 8.8.4.3.

8.8.5 Mather Wood SSSI

176 Mather Wood SSSI is 40 m from the Order Limits. It notified for its ash-oak-maple wood and the plant species which make up its canopy, understorey and ground flora. Mather Wood is also an Ancient and Semi-Natural Woodland and forms part of the Coppice, Mather and Lady Wood LWS.

177 The potential effects of the Development would be adjacent to (or further from) the SSSI and include permanent habitat loss, temporary habitat loss and disturbance, habitat fragmentation, and habitat change.

8.8.5.1 Construction

178 No works will take place within or on the boundary of the SSSI and so there will be no permanent or temporary habitat loss. The nearest works are to the north of SSSI and separated by a shallow depression/valley, thereby limiting hydrological connectivity. The nearest works are associated with Work no. 3: Mitigation/Enhancement (diverse grassland surrounding solar PV), 40 m from the north-west corner of the SSSI; Work no. 1. Solar PV is a further 17 m distant, and therefore separated from the SSSI by 57 m. The works associated with the solar PV will take place over a large area of arable land, but in the vicinity of the SSSI will occur over a short duration and, with the implementation of the Outline CEMP (TA A5.3 [EN010162/APP/6.4.5.3]) and other embedded mitigation, have negligible potential to adversely affect the notified features of the SSSI.

179 The cable corridor (Work no. 2) is 40 m to the north of the SSSI, separated by a watercourse and hedgerow, and in this area passes through farmland (grassland and arable). This distance exceeds the minimum 15 m required to avoid root damage to trees[53]. The cable works are sufficiently distant and restricted in duration and extent that pathways for ecological effects on

[53] UK Government. Available from: https://www.gov.uk/guidance/ancient-woodland-ancient-trees-and-veteran-trees-advice-for-making-planning-decisions [accessed 25/07/2024]

woodland flora are very limited. Furthermore, the work area will be fully reinstated to it baseline condition during construction. The Outline CEMP will further reduce the likelihood of effects, including form dust and those mediated by hydrological pathways, such that they will be negligible.

180 The extent of temporary hedgerow losses associated with the cabling in the above area is approximately 72 m. The loss of hedgerows could reduce connectivity (thereby increasing habitat fragmentation) between the SSSI and surrounding woodlands, although it is unlikely that the notified features of the SSSI are strongly dependent on these connections. Furthermore, these temporary losses will be reinstated during the construction phase in the same or better condition, and so adverse effects would be localised, temporary and low magnitude.

181 Potential effects arising during construction will be **not significant**.

8.8.5.2 Operation

182 No further construction activities are proposed during operation. Emergency or unplanned repairs of the cable would probably necessitate small-scale works over a short timeframe which would generate impacts of a lower magnitude than during construction. The Outline OEMP (TA A5.5 [EN010162/APP/6.4.5.5]), which includes many of the same measures as the Outline CEMP, will mitigate potential effects from these operations. The Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]) will deliver habitat creation and enhancements that will improve the landscape-scale connectivity between the SSSI and other woodlands and designated sites through a variety of habitats. For example, woodland creation and hedgerow planting, nearby and throughout the Order Limits, will increase the amount of wooded landscape features whilst also providing direct connectivity between such features, including designated sites and areas of ancient woodland.

183 There are no other pathways for ecological effects and **no significant effects** are predicted.

8.8.5.3 Decommissioning

184 Effects arising during decommissioning are likely to be similar in character, albeit of lower magnitude, to those during construction and subject to similar environmental controls through the Outline DRP (TA A5.6 [EN010162/APP/6.4.5.6]). It is assumed that the decommissioning phase, and its potential ecological effects, will be appropriately mitigated in line with the prevailing baseline conditions, guidance and policies such that they are acceptable. **No significant effects** are predicted.

8.8.5.4 Mitigation

185 The design and embedded measures have minimised and mitigated adverse effects, and enhancement is proposed that provides a net beneficial effect.

8.8.5.5 Residual Effects

186 The residual effects remain as predicted in Sections 8.8.5.1 to 8.8.5.3.

8.8.6 Laxton Sykes SSSI

187 Laxton Sykes SSSI is 300 m from the Order Limits and is notified for its species-rich neutral grassland. In assessing the potential effects on the

SSSI, the assessment considers the effects on its notified features and how these might undermine the integrity of the designated site.

188 The potential effects of the Development include temporary habitat loss and disturbance, habitat fragmentation, and habitat change.

8.8.6.1 Construction

189 No works will take place within or on the boundary of the SSSI and therefore there will be no direct habitat loss or disturbance of its notified features. A small stream flows northwards from the Order Limits into the southern arm of the SSSI thereby providing direct hydrological connectivity over a distance of 650 m. The potential effects, therefore, include those mediated by surface waters, such as changes to the water regime and pollution. The measures in the Outline CEMP (TA A5.3 [EN010162/APP/6.4.5.3]) dealing with pollution prevention and hydrology will mitigate potential adverse effects mediated by surface water (as confirmed in Chapter 9, Water Resources [EN010162/APP/6.2.9]). Furthermore, the cable crossings of the upstream watercourse (as set out in the watercourse crossing inventory in Section A5.3.13 Crossings Schedule of the Outline CEMP; TA A5.3 [EN010162/APP/6.4.5.3]) will use HDD to avoid in-channel disturbance.

190 The next nearest works are 350 m upslope to the east and include mitigation, solar PV and access which will take place in, and are separated by, arable land. The nature of the works, combined with the receiving and intervening habitats, suggest that there is very limited potential for adverse effects.

191 No other effects are considered likely. Adverse effects will be of negligible magnitude and **not significant**.

8.8.6.2 Operation

192 No further construction activities are proposed during operation. Routine maintenance and repairs will comprise small-scale works over short timeframes which would generate impacts of a lower magnitude than during construction. These works will be controlled by the Outline OEMP (TA A5.5 [EN010162/APP/6.4.5.5]) which will include many of the same measures as the CEMP to mitigate potential effects.

193 The upstream Work no. 1: Solar PV will not change surface water flows and so direct hydrological effects are not predicted (Volume 2, Chapter 9 Water Resources [EN010162/APP/6.2.9]. There are no other pathways for ecological effects. **No significant effects** are predicted.

8.8.6.3 Decommissioning

194 Impacts arising during decommissioning are likely to be similar in character, albeit of lower magnitude, to those during construction and subject to similar environmental controls through the DRP. It is assumed that the decommissioning phase, and its potential ecological effects, will be appropriately mitigated in line with the prevailing baseline conditions, guidance and policies such that they are acceptable. **No significant effects** are predicted.

8.8.6.4 Mitigation

195 The design and embedded measures have minimised and mitigated adverse effects.

8.8.6.5 Residual Effects

196 The residual effects remain as predicted in Sections 8.8.6.1 to 8.8.6.3.

8.8.7 Local Wildlife Sites

197 In assessing the potential effects on the LWS, the assessment considers the effects on their cited features and how these might undermine the integrity of the designated sites.

198 The potential effects of the Development include permanent habitat loss, temporary habitat loss and disturbance, habitat fragmentation (increase and decrease), habitat change (adverse and beneficial), direct harm to animals, and direct disturbance of animals.

8.8.7.1 Construction

199 All of the main built infrastructure (Work No.s. 1, 4, 5a, 5b, 6, and 7) has been separated by a minimum of 15 m from LWS. Consequently, the only Work Areas that border or include LWS are: Work no. 2: Cables; Work no. 3: Mitigation/Enhancement; and Work no. 8: Access Works.

200 Work no. 2, Cables, and Work no. 8, Access Works, involve construction activities, the most likely effects of which include habitat loss and disturbance and direct harm to ecological features, including components of the LWS. Works associated with Work no. 3 will be complementary to the LWS.

201 Work no. 2: Cables intersects three LWS but in each location the cable will pass underneath the LWS by HDD (Section A5.3.13 of TA A5.3 Outline CEMP [EN010162/APP/6.4.5.3]), thereby avoiding habitat loss and disturbance.

202 Upon completion of construction works associated with Work no. 2: Cables, these areas will be reinstated to their former condition or otherwise used for mitigation and enhancement in line with the specifications for Work no. 3: Mitigation/Enhancement.

203 With the full implementation of the measures set out in the Outline CEMP (TA A5.3 [EN010162/APP/6.4.5.3]), Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]) and AIA (TA A8.12 [EN010162/APP/6.4.5.12]), adverse effects will be of negligible magnitude and **not significant.**

8.8.7.2 Operation

204 No further construction activities are proposed during operation. Routine maintenance and emergency or unplanned repairs would necessitate small-scale works over a short timeframe which would generate impacts of a lower magnitude than during construction. These works will be controlled by the Outline OEMP (TA A5.5 [EN010162/APP/6.4.5.5]) which will include many of the same measures as the Outline CEMP to mitigate potential effects.

205 Changes to surface and ground water flows are not predicted (Volume 2, Chapter 9 Water Resources [EN010162/APP/6.2.9]) and so there will be no long-term hydrological effects.

206 Habitat changes implemented through the Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]) will provide widespread beneficial ecological effects and some of these will be designed specifically to benefit LWS, for example by creating habitats, such as ecotones and woodland, that extend, buffer and connect them. The transition from arable to grassland over a large area will also provide a general improvement in landscape-scale connectivity between all designated sites.

207 There are no other pathways for ecological effects. Overall, the operational phase has the potential to generate **significant beneficial** effects at the Local scale for LWS (see Table 8.9 for the details for individual LWS).

8.8.7.3 Decommissioning

208 Impacts arising during decommissioning are likely to be similar in character, albeit of lower magnitude, to those during construction and subject to similar environmental controls through the Outline DRP (TA A5.6: [EN010162/APP/6.4.5.6]). It is assumed that the decommissioning phase, and its potential ecological effects, will be appropriately mitigated in line with the prevailing baseline conditions, guidance and policies such that they are acceptable. **No significant** effects are predicted.

8.8.7.4 Mitigation

209 The design and embedded measures have minimised and mitigated adverse effects, and enhancement is proposed that provides a net beneficial effect.

8.8.7.5 Residual Effects

210 The residual effects remain as predicted in Sections 8.8.7.1 to 8.8.7.3.

Table 8.9: Likely effects on LWS

Site Name	Description	Work Areas	Mitigation and Enhancement
Onsite			
Carlton Wood	A mature, mainly deciduous, plantation on an historical woodland site with a number of fungi species.	The roadside margins of the two parcels are within the Order Limits (Work no. 8: Access) but these areas are the extent of the canopies rather than ground features (stems). No access works are proposed in these areas. The other boundaries of the LWS are surrounded by Work no. 3: Mitigation/Enhancement. Work no.	No additional mitigation necessary. Surrounding Work no. 3: Mitigation/Enhancement includes diverse grassland and complementary ecotone and woodland.
Hagley's Plantation	A mature broadleaved wood of botanical value, providing habitat for birds and mammals.	Mostly outside the Order Limits but the northerly strip (0.4 km) of Hagley's Plantation is within Work no. 3: Mitigation/Enhancement.	No additional mitigation necessary. Work no. 3: Mitigation/Enhancement to include creation of 15–40 m diverse grassland corridor/buffer linking into more expansive grassland areas.
Lake Plantation	A mature broadleaved plantation around Ossington Lake.	Western boundary is bordered by Work no. 8 Access, but no access works are proposed on the boundary. The 60 m-wide cable route (Work no. 2 Cables) passes through the northwestern part of the LWS.	The cable route will pass under the LWS using HDD to avoid adverse effects. Work no. 3: Mitigation/Enhancement, on the other side of the minor road, to include woodland creation, improving connectivity between the LWS and other woodlands.
Kersall Grassland	A damp grassland with characteristic species.	Outside the Order Limits. Nearest work area is Work no. 3: Mitigation/Enhancement (<0.1 km east).	No additional mitigation necessary. Work no. 3: Mitigation/Enhancement to include the creation/enhancement 78 ha of habitats (grassland, trees and scrapes) around The Beck near Maplebeck.

Site Name	Description	Work Areas	Mitigation and Enhancement
Hunt's Meadow	A species-rich damp meadow	Outside the Order Limits. Nearest work area is Work no. 3: Mitigation/Enhancement (<0.1 km east).	No additional mitigation necessary. Work no. 3: Mitigation/Enhancement to include the creation/enhancement 78 ha of habitats (grassland, trees and scrapes) around The Beck near Maplebeck.
Kneesall Dumble	A section of wooded dumble of botanical note.	Surrounded by Work no. 3: Mitigation/Enhancement, except for 60 m-wide section of Work no. 2, Cables, running through its centre. Illustrative design shows a track following the centre of the cable route.	The cable route will pass under the LWS using HDD (as specified in Section A5.3.13 of the Outline CEMP; TA A5.3 [EN010162/APP/6.4.5.3]) to avoid adverse effects. The access track will use an existing farm vehicle crossing point. Surrounding Work no. 3: Mitigation/Enhancement includes diverse grassland and complementary ecotone.
Kneesall Green Verge	An herb-rich grassland community on a damp roadside verge.	25 m southern section is within Work no. 2: Cables, which is 60 m wide at this point. Work no. 3: Mitigation/Enhancement borders 90 m of the southern section.	Detailed design to include cabling works only outside the LWS, except for works in the carriageway which need no additional mitigation, or HDD under the LWS (as described in Section A5.3.13 in the Outline CEMP; TA A5.3 [EN010162/APP/6.4.5.3]). Work no. 3: Mitigation/Enhancement to include complementary diverse grassland adjacent.
Maplebeck Viewpoint Verges	A roadside verge with notable flora.	Work no. 2: Cables (60 m wide) crosses the LWS. The remainder of the LWS is bordered, on each side of the road, by 375 m of Work no. Work no. 3: Mitigation/Enhancement.	The cable route will pass under the LWS using HDD to avoid adverse effects (as specified in Section A5.3.13 of the Outline CEMP; TA A5.3 [EN010162/APP/6.4.5.3])

Site Name	Description	Work Areas	Mitigation and Enhancement
Moorhouse Lane Drain	A drain with a notable plant community.	Wholly within by Work no. 3: Mitigation/Enhancement.	No additional mitigation necessary. Work no. 3: Mitigation/Enhancement to include the creation and enhancement of 22 ha of riparian habitats, including diverse grassland and wildlife scrapes.
Wood Lane Grassland	A notable neutral grassland with valuable scrub community.	Wholly within Work no. 3: Mitigation/Enhancement	No additional mitigation necessary. Continued management of LWS. Work no. 3: Mitigation/Enhancement to include the creation/enhancement 78 ha of habitats (grassland, trees and scrapes) around The Beck near Maplebeck.
Bordering			
Cheveral Wood	A sizeable mature deciduous woodland with varied flora and a pond supporting amphibians.	Bordered exclusively along its 1.6 km northern boundary by a minimum 15 m strip of Work no. 3: Mitigation/Enhancement which separates the wood from Work no. 1: Solar PV.	No additional mitigation necessary. Work no. 3: Mitigation/Enhancement to include 3.6 ha of grassland creation/enhancement to the west. 800 x 30 m woodland/riparian corridor to be created between Cheveral Wood LWS and Spring Wood LWS.
Coppice, Mather & Lady Woods	A rich and varied deciduous woodland on damp clay soils of botanical and zoological interest.	Work no. 2: Cables is 30 m at its closest. 25 m strip of Work no. 3: Mitigation/Enhancement is 40 m from the north-west corner, beyond which is a large area of Work no. 1 Solar PV.	No additional mitigation necessary. See also Mather Woods SSSI. Reinstatement of Work no. 2: Cables upon completion.

Site Name	Description	Work Areas	Mitigation and Enhancement
Eakring Meadows	An important sequence of wet meadows and scrub of considerable botanical interest.	1.5 km border with a minor road which is in Work no. 8: Access Works, within which five passing places are proposed; see also Eakring and Maplebeck Meadows SSSI.	No additional mitigation necessary. See also Eakring and Maplebeck Meadows SSSI. Work no. 3: Mitigation/Enhancement (450 m south-east) to include the creation/enhancement of 78 ha of habitats (grassland, trees and scrapes) around The Beck near Maplebeck, thereby increasing landscape connectivity.
High Wood, Laxton	An old woodland site containing a notable remnant ground flora.	Bordered by a 15 m strip of Work no. 3: Mitigation/Enhancement along 315 m of its south-eastern boundary, beyond which is Work no. 1: Solar PV.	No additional mitigation necessary. Work no. 3: Mitigation/Enhancement to include the creation of diverse grassland and hedgerows.
Laxton Wood Roadside Verge	An interesting verge with an unusual mixture of woodland and grassland herbs.	Bordered for 1.6 km by a minimum 15 m strip of Work no. 3: Mitigation/Enhancement, separating the LWS from Work no. 1: Solar PV and larger areas of mitigation/enhancement.	No additional mitigation necessary. Work no. 3: Mitigation/Enhancement to include diverse grassland and ecotones.
Muskham Wood	Strip of deciduous woodland dominated by ash, with a number of plant species indicative of ancient woodland.	Sections of the north and south bounded Work no.by Work no. 3: Mitigation/Enhancement.	No additional mitigation necessary. Work no. 3: Mitigation/Enhancement to include diverse grassland.

Site Name	Description	Work Areas	Mitigation and Enhancement
North Wood	A rather disturbed but notable mature deciduous woodland.	Bordered almost entirely by Work no. 3: Mitigation/Enhancement, separating it from Work no. 1: Solar PV. Eastern extent abuts a minor road (Work no. 8: Access).	No additional mitigation necessary. No access works proposed. Work no. 3: Mitigation/Enhancement to include 4.6 ha of woodland creation to the west and the remainder as diverse grassland and ecotones.
River Trent – Kelham	A section of the River Trent of interest for water beetles.	Almost completely separated from the Order Limits except at its very eastern extent, where it borders Work no. 3: Mitigation/Enhancement.	No additional mitigation necessary. Work no. 3: Mitigation/Enhancement to include 48 ha of arable and grassland along the northern side of the River Trent corridor.
Spring Wood, Kelham	A characteristic Mercia Mudstone woodland with a diverse ground flora.	Bordered only by Work no. 3: Mitigation/Enhancement. Work no. 2 Cables is the next nearest work area, 225 m north.	No additional mitigation necessary. Work no. 3: Mitigation/Enhancement to include 800 x 30 m woodland/riparian corridor to be created between Spring Wood LWS and Cheveral Wood LWS.

8.8.8 Habitats and Vegetation

211 The vast majority of construction activities will take place in agricultural, predominantly arable, habitats of limited ecological value. This section relates only to habitats identified as IEFs outwith designated sites and with the potential to be affected by these works: Broadleaved Woodland, Native Hedgerows, Rivers and Streams, and Ponds.

212 Prior to the application of mitigation, the potential adverse effects of the Development include permanent habitat loss, temporary habitat loss and disturbance, and habitat fragmentation. The potential beneficial effects of the Development include habitat change and a reduction in habitat fragmentation.

8.8.8.1 Construction

213 The Development design has maximised the retention and protection of these habitats, principally by excluding them from the Order Limits or by the application of buffers (Section 8.6.1) within which works will be excluded as far as possible. The Outline CEMP (TA A5.3 [EN010162/APP/6.4.5.3]), Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]) and AIA (TA A8.12 [EN010162/APP/6.4.8.12]) will provide additional mitigation for most of the likely effects across most of the Order Limits. However, works within these buffers, as well as direct (permanent and temporary) habitat losses, will not be entirely avoided.

214 The extent of loss and the sensitivity or value of the habitat are the principal determinants of the significance of the effect. Consequently, wherever possible, further design work and micrositing during works (as specified in the Outline CEMP) will minimise the extent of losses and limit them to features of lower value or condition.

215 The most likely impacts to important habitats relate to Work no. 2: Cables, Work no. 8: Access Works and internal access points, internal tracks, cabling and fences (various Work no.s) where a range of other technical and environmental constraints limit alternative design options. In these instances, avoiding a valued habitat, particularly hedgerows and watercourses which present long, linear barriers, may not be possible.

216 Potential effects on hedgerows have been greatly reduced by including 5 m exclusion buffers into the Development design (Section 8.6.1). Some hedgerow losses will occur and Figure 5.4, Illustrative Layout [EN010162/APP/6.3.5.4], and access drawings (Appendix D and Appendix E, TA 6.4.14.1 Transport Statement [EN010162/APP/6.4.14.1] provide sufficient detail to estimate these. For the purposes of estimating a reasonable worst case scenario, access points, cabling, fences, and internal tracks have each been assumed to create their own, mutually exclusive loss where they cross the same hedgerow. However, the losses are likely to greatly exceed the eventual, as-built losses because:

- Multiple features will be aligned so they create only one gap. For example, cables will be laid under new tracks or through fence gaps;
- Existing hedgerow gaps and gateways will be used;
- Some fence crossings will not be needed and many can be created without causing losses; and

- Some hedgerows will be avoided as an incidental benefit of HDD for other purposes (e.g., to avoid watercourse crossings and roads).

217 The total length of permanent losses is estimated to be up to 1,308 m (of which 287 m is species-rich). The total length of temporary losses – hedgerows that will be reinstated or replanted (as set out in the Outline CEMP and Outline LEMP) – is estimated to be up to 1,908 m (of which 324 m is species-rich. Retained hedgerows will be protected from construction activities. These losses are small in the context of the total (147 km) hedgerow resource in the baseline and constitute an adverse, permanent or temporary, effect at the Site level. Hedgerow creation and enhancement is proposed (see Section 8.8.8.2) to compensate losses and increase the hedgerow resource.

218 There are approximately 13,400 trees within 15 m of the Order Limits. Potential effects on woodland and trees have been greatly reduced by including 15 m exclusion buffers into the Development design (Section 8.6.1). For all but the largest trees, which have the largest Root Protection Area (RPA), these buffers will greatly exceed the typical RPA as defined by BS 5837:2012[28] needed to safeguard them. Additional design work has specified HDD to avoid woodlands (as described in the crossings schedule in Section A5.3.13 in TAA5.3 Outline CEMP [EN010162/APP/6.4.5.3]).

219 Nonetheless, some individual trees are in areas of potentially impactful works, principally the main cable route (Work no. 2 Cables) and new access points. Accordingly, these areas were subject to a more detailed AIA (TA A8.12 [EN010162/APP/6.4.8.12]). The AIA identifies trees with the potential to be affected by construction and specifies methods to safeguard them during works. Of the 451 trees and tree groups surveyed, comprising over 2,410 trees, it is estimated that up to 98 trees may need to be felled, but all other trees will be retained and protected during construction. There will be no loss of or harm to ancient woodland or veteran trees. Although the magnitude of effect on an individual tree could be very high and permanent, the overall effect on the woodland and tree resource is low and constitutes an adverse effect at the Site level. Tree and woodland creation and enhancement is proposed (see Section 8.8.8.2) to compensate for the losses and create a net increase the resource.

220 Potential effects on watercourses and waterbodies have been greatly reduced by including 10 m exclusion buffers into the Development design (Section 8.6.1), reduced to 5 m for artificial field drains. Anticipated watercourse crossings are described in Section A5.3.13 of the CEMP (TA A5.3 [EN010162/APP/6.4.5.3]). The illustrative design (ES Figure 5.4 [EN010162/APP/6.3.5.4]) shows 33 track/road crossings (assumed new, as a worst-case) and 34 fence crossings of watercourses. There will be no other works within or above the watercourse channels. Given the 46 km of watercourse and ditch habitats, this represents a negligible effect.

221 Watercourse crossing design is outlined in Section 9.5 of Volume 2, Chapter 9, Water Resources [EN010162/APP/6.2.9]; the chapter concludes that effects on watercourses, ditches and near-surface water from chemical pollution, erosion and sedimentation, run-off, and impediments to flow, will be negligible.

222 The effects of construction on habitats will be **not significant**.

8.8.8.2 Operation

223 No further construction activities are proposed during operation. Routine maintenance and emergency or unplanned repairs would necessitate small-scale works over a short timeframe which would generate impacts of a lower magnitude than during construction. Potential effects from these works will be controlled by the measures in the Outline OEMP (TA A5.5 [EN010162/APP/6.4.5.5]) which will include many of the same measures as the Outline CEMP to mitigate potential effects.

224 Significant changes to surface and ground water flows are not predicted (see Volume 2, Chapter 9, Water Resources [EN010162/APP/6.2.9]) and so there will be no long-term hydrological effects on habitats.

225 Habitat change through the habitat creation and enhancement set out in the Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]) will provide long-term beneficial effects by increasing the extent and condition of habitats, reducing disturbance to retained habitats (for example by creating ecotones along woodland edges and reducing agricultural run-off), and improving landscape connectivity between woodlands and along riparian corridors. Enhancements to watercourses will be achieved through adjacent land management.

226 The BNG Assessment (TA A8.13, [EN010162/APP/6.4.8.13]) quantifies these beneficial changes, which range from low to medium magnitude, and demonstrates a net gain in units for habitat (+60.7%), hedgerows (+26.5%) and watercourses (+11.05%). There will be an increase of 31 ha of broadleaved woodland (excluding other trees and woodland types), 50 km of species-rich hedgerows, and the creation of two new ponds and several scrapes, as well as an increase in watercourse quality and habitat connectivity. In addition to these IEFs, the Outline LEMP includes the creation of 22 ha of ecotone, 8.5 ha of wood pasture, and over 1,400 ha of diverse grassland. There are no other pathways for ecological effects on habitats. Overall, the operational phase will have a **significant beneficial effect** on habitats at the Local scale.

8.8.8.3 Decommissioning

227 Decommissioning works are likely to be similar in character to those described during construction and subject to similar environmental controls. However, it is recognised that the extent and value of habitats will have increased over the operational period. Woodland, hedgerows and trees created for the Development will be retained at the end of the operational period, but it is likely that most other habitats in Works No. 1–3 will be returned to their former condition. Work no.s. 4–8 may be retained and so there would be no additional change in habitats associated with them. The habitat losses represent a return to the predicted future baseline (Section 8.5.13) which is assumed to be approximately similar to the current baseline albeit with some areas of higher value habitat types retained.

228 The decommissioning phase, and its potential ecological effects, will be assessed and appropriately mitigated through the Outline DRP (A5.6: EN010162/APP/6.4.5.6]) in line with the prevailing guidance and policies of the time such that they are acceptable. No significant adverse effects are

predicted. The retention of some higher value habitats may provide beneficial effects at a Site scale, which would be **not significant** in EIA terms.

8.8.8.4 Mitigation

229 The design and embedded measures have minimised and mitigated adverse effects, and enhancement is proposed that provides a net beneficial effect.

8.8.8.5 Residual Effects

230 The residual effects remain as predicted in Sections 8.8.8.1 to 8.8.8.3.

8.8.9 Fish

8.8.9.1 Construction

231 The Outline CEMP [EN010162/APP/6.4.5.3] includes a range of measures to avoid and reduce potential adverse effects on watercourses and their communities. However, some works will be required in or near watercourses in which fish may be present. Principally, watercourse crossings associated with cabling, fences and access will include works in watercourses and their riparian zones.

232 Cable crossings will utilise HDD for the most sensitive watercourse crossings, including those most likely to support fish, which tend to be the larger and more natural channels.

233 The specification of all watercourse crossings (Section 8.6.48.6.3) will be determined at the detailed design stage and with regard to the potential effects on fish. New access track crossings will be by clear-span bridge crossings wherever possible and culverts will only be used where a bridging solution is not feasible (i.e., for smaller field drains and ditches) and where the risk to fish is minimal. Section A5.3.13 in the Outline CEMP provides details of the watercourse crossings.

234 All types of watercourse crossings will be subject to a range of mitigation measures specified in the Outline CEMP to safeguard the freshwater environment and fish. Volume 2, Chapter 9 Water Resources [EN010162/APP/6.2.9] concludes that effects on watercourses, ditches and near-surface water from chemical pollution, erosion and sedimentation, run-off, and impediments to flow, will be negligible.

235 The adverse effects of construction on fish will be low magnitude and limited in both extent (to the Site level) and duration. These effects will be **not significant**.

8.8.9.2 Operation

236 Electrical cables emit electromagnetic fields (EMF) which, if located underneath or near watercourses, could disturb fish, particularly eels. It is likely that underground cabling would affect relatively few watercourses supporting eels, but where it is required could cause behavioural changes and a create a potential barrier to fish movements. The significance of this effect will be determined by the strength of the in-channel EMF and the sensitivity of the fish species. TA A8.15 Electromagnetic Fields and Fish [EN010162/APP/6.4.8.15] provides information about EMF from underground cables and the potential behavioural responses of fish.

237 Cables will be both buried underground and insulated, the two main ways to limit the extent of their EMF. The specification of the different cables and their methods of installation will be determined by the detailed design following consent. The specification will include both the insulation and depth to which the cables will be buried such that in-channel exposure to EMF will not exceed thresholds likely to cause behavioural responses in fish.

238 The embedded mitigation includes a range of measures that will benefit the freshwater environment and therefore fish, particularly improved water quality due to reduced disturbance and run-off of pollutants. The Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]) includes additional measures that will indirectly benefit fish, such as the creation of disturbance-free riparian corridors consisting of habitat creation and enhancements, providing large buffers from agricultural operations.

239 No further construction activities are proposed during operation. Routine maintenance and repairs will most likely comprise small-scale daytime works and so would generate impacts of a lower magnitude than during construction. Potential effects from these works will be controlled by the measures in the Outline OEMP (TA A5.5 [EN010162/APP/6.4.5.5]) which will include many of the same measures as the Outline CEMP to mitigate potential effects.

240 No adverse effects are predicted. Beneficial effects will be at the Site level, and therefore **not significant** in EIA terms.

8.8.9.3 Decommissioning

241 Decommissioning works are likely to be similar in character to those described during construction and subject to similar environmental controls through the Outline DRP (TA A5.6: EN010162/APP/6.4.5.6]). Many habitats and environmental conditions that have improved over the operational period may be returned to their baseline condition which will represent a neutral effect. It is assumed that the decommissioning phase, and its potential ecological effects, will be appropriately mitigated in line with the prevailing baseline conditions, guidance and policies such that they are acceptable. **No significant effects** are predicted.

8.8.9.4 Mitigation

242 The design and embedded measures have minimised and mitigated adverse effects, and enhancement is proposed that provides a net beneficial effect.

8.8.9.5 Residual Effects

243 The residual effects remain as predicted in Sections 8.8.9.1 to 8.8.9.3.

8.8.10 Great Crested Newt

8.8.10.1 Great crested newt is present as a scattered, low-density population. Prior to the application of mitigation, the potential likely significant adverse effects of the Development include permanent habitat loss, temporary habitat loss and disturbance, habitat fragmentation, and direct harm to animals. Some of these effects may also constitute legal offences. The potential beneficial effects of the Development include habitat change (i.e., creation and enhancement), reduced disturbance, and reduced habitat fragmentation.

8.8.10.2 Construction

244 Five ponds within 250 m of the Order Limits supported great crested newts and all are outside the Order Limits. No waterbodies will be lost and the Outline CEMP (TA A5.3 [EN010162/APP/6.4.5.3]) will safeguard all waterbodies during construction. There will be negligible loss of high-value terrestrial habitats within 250 m of the ponds supporting great crested newts. The nearest works (38 m) to the three ponds west of Maplebeck, all of which are located in woodlands surrounded by arable land, are associated with Work no. 1: Solar PV and Work no. 3 Mitigation/Enhancement. These works will take place in arable land in which the likelihood of encountering and potentially harming great crested newts is very low. The arable land has a long history of baseline disturbance from arable farming and this will cease during construction, providing a long-term benefit.

245 The northern offsite pond is located in Eakring and Maplebeck Meadows SSSI. Effects to the SSSI are assessed in Section 8.8.4 and conclude that habitats and vegetation will not be adversely affected. The nearest works are associated with the creation of five new passing places on the unclassified road bordering the SSSI, but due to their very restricted extent, the potential effects on great crested newt from these works can be mitigated with reasonable avoidance measures.

246 The southern offsite pond is in Cheveral Wood and separated by 70 m from the nearest construction activities (Work no. 1: Solar PV), which will take place wholly in arable land. Intervening habitats include woodland and a 25 m wide strip of Work no. 3: Mitigation/Enhancement, which extends northwards for 575 m (c. 4.0 ha). As above, the effects and risks associated with works in arable land are relatively limited.

247 The Outline CEMP and CEcMP (Section A5.3.11 of the Outline CEMP) include measures to safeguard ponds and great crested newts, including pre-commencement surveys of all ponds and reasonable avoidance measures that are proportionate to the risks in different parts of the Order Limits. Such measures include restricting works to habitats of very low value, timing works to avoid sensitive periods, limiting the duration of works, and supervision of works by an ECoW. The Development includes a range of other measures that will directly and indirectly benefit great crested newts, some of which will occur during construction (e.g., reduced anthropogenic disturbance).

248 No significant adverse effects are predicted. Beneficial effects will be at the Site level, and therefore **not significant** in EIA terms.

8.8.10.3 Operation

249 No further construction activities are proposed during operation. Routine maintenance and emergency or unplanned repairs would necessitate small-scale works over a short timeframe, which would generate impacts of a lower magnitude than during construction. The replacement of PV modules during the operational phase will not involve any new ground works (habitat loss) but the works risk harming great crested newts that may be active in the grassland. As during construction, it is anticipated that the risks from these works can be adequately mitigated through similar reasonable avoidance measures. Potential effects from these works will be controlled by the measures in the Outline OEMP (TA A5.5 [EN010162/APP/6.4.5.5]) which will include many of the same measures as the Outline CEMP to mitigate potential effects.

250 Habitat creation and enhancement set out in the Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]), and as evidenced by BNG, will provide long-term beneficial effects for great crested newts by creating new ponds, increasing the extent and condition of terrestrial habitats, and improving landscape connectivity (i.e., reducing fragmentation) between ponds. There are no other pathways for ecological effects.

251 **No significant adverse** effects are predicted. Beneficial effects will be at the Site level, and therefore **not significant** in EIA terms.

8.8.10.4 Decommissioning

252 Decommissioning works are likely to be similar in character to those described during construction and subject to similar environmental controls through the Outline DRP (TA A5.6 [EN010162/APP/6.4.5.6]). However, the extent and value of habitats to great crested newts will have increased over the operational period. It is probable that some valuable habitats (e.g., hedgerows and woodland) will be retained at the end of the operational period, but it is likely that many habitats in Work No.s. 1–3 will be returned to their former condition. Work No.s. 4–8 may be retained and so there would be no additional change in habitats associated with them.

253 Habitat losses would represent a return to the predicted future baseline which is assumed to be approximately similar to the current baseline albeit with some areas of higher value habitat types retained. It is assumed that the decommissioning phase, and its potential ecological effects, will be appropriately mitigated in line with the prevailing guidance and policies of the time such that they are acceptable and similar to those predicted during construction. **No significant effects** are predicted.

8.8.10.5 Mitigation

254 The design and embedded measures have minimised and mitigated adverse effects, and enhancement is proposed that provides a net beneficial effect.

8.8.10.6 Residual Effects

255 The residual effects remain as predicted in Sections 8.8.10.2 to 8.8.10.4.

8.8.11 Grass Snake

256 Prior to the application of mitigation, the potential adverse effects of the Development include permanent habitat loss, temporary habitat loss and disturbance, habitat fragmentation, and direct harm to animals. Some of these effects may also constitute legal offences. The potential beneficial effects of the Development include habitat change (i.e., creation and enhancement) and reduced habitat fragmentation.

8.8.11.1 Construction

257 The Development design includes minimum 10 m buffers of watercourses which includes much of the riparian habitats with the greatest potential to support grass snake. Construction and its associated habitat losses in these areas is limited and mostly temporary. The Outline CEMP (TA A5.3 [EN010162/APP/6.4.5.3]) and CEcMP (section A5.3.11 of the Outline CEMP) include measures to safeguard reptiles, including reasonable avoidance measures that are proportionate to the risks in different parts of the Order Limits. Such measures include pre-construction searches and sympathetic vegetation management to deter reptiles from work areas and minimise the risk of harm. The Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]) includes a range of measures that will directly and indirectly benefit grass snake, some of which will occur at the start of construction (e.g., reduced anthropogenic disturbance). **No significant effects** are predicted.

8.8.11.2 Operation

258 No further construction activities are proposed during operation. Routine maintenance and emergency or unplanned repairs would necessitate small-scale works over a short timeframe which would generate impacts of a lower magnitude than during construction. These works will be controlled by the Outline OEMP (TA A5.5 [EN010162/APP/6.4.5.5]) which will include many of the same measures as the Outline CEMP to mitigate potential effects.

259 Habitat creation and enhancement set out in the LEMP will provide long-term beneficial effects by creating and enhancing riparian habitats, and increasing the extent, condition and connectivity of terrestrial habitats of value to reptiles. There are no other pathways for ecological effects. No significant adverse effects are predicted. Beneficial effects will be at the Site level, and therefore **not significant** in EIA terms.

8.8.11.3 Decommissioning

260 Decommissioning works are likely to be similar in character to those described during construction and subject to similar environmental controls through the Outline DRP (TA A5.6: [EN010162/APP/6.4.5.6]). However, the extent and value of habitats to reptiles will have increased over the operational period. Some valuable habitats (e.g., hedgerows and woodland) will be retained at the end of the operational period, but it is likely that many habitats in Work no.s. 1–3 will be returned to their former condition. Work no.s. 4–8 may be retained and so there would be no additional change in habitats associated with them.

261 Habitat losses would represent a return to the predicted future baseline (Section 8.5.13) which is assumed to be approximately similar to the current

baseline albeit with some areas of higher value habitat types retained. It is assumed that the decommissioning phase, and its potential ecological effects, will be appropriately mitigated in line with the prevailing guidance and policies of the time such that they are acceptable. **No significant effects** are predicted.

8.8.11.4 Mitigation

262 The design and embedded measures have minimised and mitigated adverse effects, and enhancement is proposed that provides a net beneficial effect.

8.8.11.5 Residual Effects

263 The residual effects remain as predicted in Sections 8.8.11.1 to 8.8.11.3.

8.8.12 Bats

264 All bat species are considered in this assessment. Generalisations are made of the whole assemblage, but species-specific effects are considered, where necessary.

265 Prior to the application of mitigation, the potential adverse effects of the Development include permanent habitat loss, temporary habitat loss and disturbance, habitat fragmentation, direct harm to animals, and direct disturbance of animals. Some of these effects may also constitute legal offences. The potential beneficial effects of the Development include habitat change (i.e., creation and enhancement) and changes to prey abundance.

8.8.12.1 Construction

266 The design, through responding to the identification of constraints, and the CEcMP (Section A5.3.11 of TA A5.3 Outline CEMP [EN010162/APP/6.4.5.3]) includes reasonable avoidance measures which will, in most cases, avoid adverse effects. Principally, trees and woodland with the potential to support roosting bats will be retained wherever possible and potentially harmful and disturbing works will be avoided or reduced by enforcing suitable exclusion buffers (typically defined by the root protection area, RPA) from construction works. The AIA identified 98 trees that may need to be removed to facilitate the Development, of which 16 were assessed to have potential to support roosting bats. If works to these trees are required, there is the potential for localised low magnitude adverse effects. In such cases, the CEcMP specifies additional steps that will be taken to reduce harm and disturbance including, if necessary, carrying out works under licence from Natural England.

267 The Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]) includes the provision of bat boxes and roosting structures and their specification (type, number and location) will be determined by the detailed design and the results of pre-commencement and pre-construction surveys.

268 The Order Limits are sufficiently large that they could encroach on, or include substantial parts of, the core sustenance zones[54] of all bat species recorded, which are up to 6 km radius from a roost. However, habitat loss during construction will mainly affect arable land of very limited value to

[54] Bat Conservation Trust (2020). Core Sustenance Zones and habitats of importance for designing Biodiversity Net Gain for bats. Bat Conservation Trust, London.

foraging and commuting bats[55]. Furthermore, the phasing of construction and the Outline LEMP will initially retain large areas of arable habitat and, later, large areas of grassland under panels, such that the effects of habitat loss will be further reduced. Higher value foraging and commuting habitats[56] – freshwater, woodland, grassland and linear features such as hedgerows – will be largely retained or compensatory planting and enhancements will provide a net gain in these beneficial habitats.

269 Works at any time will be relatively localised and will take place during daylight hours. Night-time lighting will be limited to that required for operational Health and Safety and designed in line with good practice[57] (TA A5.3 Outline CEMP [EN010162/APP/6.4.5.3]). Disturbance of active bats will therefore be spatially and temporally restricted. Assuming a two-year construction programme, approximately 10 months of construction will take place in winter when bats are generally hibernating and inactive, thereby reducing the disturbance of active bats.

270 Construction has the potential to cause generally negligible or low magnitude, temporary adverse effects at the Site level, which will be **not significant** in EIA terms.

8.8.12.2 Operation

271 Recent studies[58,59] suggest that bats may be displaced from or avoid solar PV developments, but these observational studies lack critical experimental and statistical elements, particularly the large number of uncontrolled variables and a lack of pre-invention baseline controls (e.g. Before–After Control-Impact (BACI) experimental design), which undermines their conclusions and application.

272 The results from the baseline bat surveys have allowed the Development to be designed sensitively, including both its built elements and the habitat management in the Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]), which include large areas of undeveloped habitats within and amongst the solar PV area. The embedded mitigation (e.g., reduction in widespread pesticide application) and Outline LEMP include a range of measures to benefit biodiversity, many of which are aligned with the key principles of habitat management for bats[54,60], including the creation of woodland, hedgerows and low-input grasslands. These features also contribute to landscape connectivity and reducing disturbance to retained and off-site woodland habitats. Despite inter-specific variation in habitat requirements and

[55] Collins, J. (ed.) (2023). Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition). The Bat Conservation Trust, London.
[56] Entwhistle, A. C. et al. (2001) Habitat management for bats: A guide for land managers, landowners and their advisors. JNCC.
[57] Institute of Lighting Engineers (2023) Guidance Note 08/23:Bats and Artificial Lighting.
[58] Szabadi, K. L. et al. (2023) The use of solar farms by bats in mosaic landscapes: Implications for conservation. Global Ecology and Conservation 44.
[59] Tinsley, E. et al. (2023). Renewable energies and biodiversity: Impact of ground- mounted solar photovoltaic sites on bat activity. Journal of Applied Ecology 60 pp 1752–1762.
[60] Reason, P.F. & Wray, S. (2023). UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats. Chartered Institute of Ecology and Environmental Management.

ecologies, these measures are likely to benefit all bat species, albeit to varying degrees.

273 Lighting will be installed throughout the Development, most likely at the substations and BESS. However, full-time night-time lighting is not proposed and all lighting will be designed in line with good practice[57].

274 No further construction activities are proposed during operation. Routine maintenance and repairs will most likely comprise small-scale daytime works and so would generate impacts of a lower magnitude than during construction. These works will be controlled by the Outline OEMP (TA A5.5 [EN010162/APP/6.4.5.5]) which will include many of the same measures as the Outline CEMP (and CEcMP) to mitigate potential effects.

275 **No significant adverse effects** are predicted. Beneficial effects will be at the Site level, and therefore **not significant** in EIA terms.

8.8.12.3 Decommissioning

276 Decommissioning works are likely to be similar in character to those described during construction and subject to similar environmental controls through the Outline DRP (TA A5.6 [EN010162/APP/6.4.5.6]). Many habitats and environmental conditions that have improved over the operational period to benefit bats will be returned to their baseline condition which will represent a neutral effect. It is assumed that the decommissioning phase, and its potential ecological effects, will be appropriately mitigated in line with the prevailing baseline conditions, guidance and policies such that they are acceptable. **No significant effects** are predicted.

8.8.12.4 Mitigation

277 The design and embedded measures have minimised and mitigated adverse effects, and enhancement is proposed that provides a net beneficial effect.

8.8.12.5 Residual Effects

278 The effects remain as predicted in Sections 8.8.12.1 to 8.8.12.3.

8.8.13 Otter and Water Vole

279 Prior to the application of mitigation, the potential adverse effects of the Development include temporary habitat loss and disturbance, habitat fragmentation, habitat change, direct harm to animals, direct disturbance of animals. Some of these effects may also constitute legal offences. The potential beneficial effects of the Development include habitat change (i.e., creation and enhancement), reduced disturbance, reduced predation, and changes to prey abundance.

8.8.13.1 Construction

280 The Development design includes 10 m buffers from watercourses and the Outline CEMP (TA A5.3 [EN010162/APP/6.4.5.3]) and CEcMP (Section A5.3.11 of the Outline CEMP) include a range of measures to avoid and reduce potential adverse effects and the likelihood of legal offences. However, some works, principally watercourse crossings associated with cabling, access and fences, will be required within these buffers and watercourses in which evidence of otter and water vole has been recorded.

Such works have the potential to cause habitat loss and directly harm and disturb the species and could constitute legal offences.

281 The cable route (Work no. 2) makes two crossings of watercourses in which evidence of water vole has been recorded and makes an additional five crossings of watercourses with potential to support water vole but in which no evidence was confirmed. The cable route (Work no. 2) makes five crossings of watercourses in which otter has been recorded and makes an additional four crossings of watercourses with potential to support otter but in which no evidence was confirmed. A single-span access will be constructed across the upper reaches of Moorhouse Beck (supporting both species).

282 The cable will be installed under all but one of these watercourses crossing by HDD. The remaining watercourse, a small field drain connected to Pingley Dyke, will be crossed by an open trench. This watercourse's potential to support water vole and otter is based on its connectivity to Pingley Dyke, which supports the species, but no evidence was confirmed.

283 The locations of access and cable crossings of watercourses within the solar PV work area (Work no. 1) will be decided at detailed design stage, subject to the limitations set out in the crossings schedule (Section A5.3.13 in TA A5.3 Outline CEMP [EN010162/APP/6.4.5.3]). All types of watercourse crossings will be subject to a range of mitigation measures specified in the Outline CEMP to safeguard these species and their habitats. Volume 2, Chapter 9 Water Resources [EN010162/APP/6.2.9] concludes that effects on watercourses, ditches and near-surface water from chemical pollution, erosion and sedimentation, run-off, and impediments to flow, will be negligible. Nonetheless, works near to or in sensitive watercourses have the potential to directly harm or disturb the species and may constitute a legal offence. The Outline CEMP summarises proportionate mitigation to reduce and avoid potential adverse effects arising from habitat loss and direct harm and disturbance, including, if necessary, carrying out works under licence from Natural England.

284 Construction has the potential to cause generally negligible or low magnitude, temporary adverse effects at the Site level, which will be **not significant** in EIA terms. **No significant effects** are predicted.

8.8.13.2 Operation

285 The embedded mitigation includes a range of measures that will benefit otter, such as reduced anthropogenic disturbance and improved water quality. The Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]) includes additional measures that will directly benefit otter and water vole, such as enhanced riparian corridors. The Outline LEMP has been and will be developed over its lifetime in consultation with the Nottinghamshire Wildlife Trust so that it contributes to the Nottinghamshire Water Vole Recovery Project.

286 No further construction activities are proposed during operation. Routine maintenance and repairs will most likely comprise small-scale daytime works and so would generate impacts of a lower magnitude than during construction. These works will be controlled by the Outline OEMP (TA A5.5 [EN010162/APP/6.4.5.5]) which will include many of the same measures as the Outline CEMP to mitigate potential effects. **No significant adverse**

effects are predicted. Beneficial effects will be at the Site level, and therefore **not significant** in EIA terms.

8.8.13.3 Decommissioning

287 Decommissioning works are likely to be similar in character to those described during construction and subject to similar environmental controls through the Outline DRP (TA A5.6 [EN010162/APP/6.4.5.6]). However, the watercourse crossings (by cables and access tracks) created during consultation will, in most cases, be retained, thereby reducing decommissioning effects.

288 Many habitats and environmental conditions that have improved over the operational period to benefit otter and water vole will be returned to their baseline conditions which will represent a neutral effect. It is assumed that the decommissioning phase, and its potential ecological effects, will be appropriately mitigated in line with the prevailing baseline conditions, guidance and policies such that they are acceptable. **No significant effects** are predicted.

8.8.13.4 Mitigation

289 The design and embedded measures have minimised and mitigated adverse effects, and enhancement is proposed that provides a net beneficial effect.

8.8.13.5 Residual Effects

290 The residual effects remain as predicted in Sections 8.8.13.1 to 8.8.13.3.

8.8.14 Badger

291 Badger is not a species of conservation concern and so potential effects on badger are assessed only in terms of their potential to cause legal offences, principally damaging or destroying setts, disturbance of badgers in a sett, and harming badgers.

8.8.14.1 Construction

292 Badger setts have been recorded almost exclusively in hedgerows, woodland edges and other field boundaries, habitats that will be largely retained by the Development. Invasive ground works associated with various works areas have the greatest potential to affect the species, but since most work areas are defined by field boundaries, and activities in the work areas are generally offset from the field boundaries and predominantly in arable land (a habitat with a high level of disturbance), likely effects have been greatly reduced.

293 Badgers are highly mobile and there is a high probability that the current baseline, in terms of the location and status of setts, will have changed by the time of construction. Pre-commencement surveys and pre-construction surveys will provide an up-to-date baseline to inform mitigation. Section A5.3.11.7.3 of the CEMP (TA A5.3 [EN010162/APP/6.4.5.3]) sets out the survey requirements and provides an approach to mitigation which will ensure that works are legally compliant. There will be a presumption to retain badger setts and licensed sett closures will be considered only where no practical alternative exists. Based on the Development design, it is likely that all setts can be retained.

294 **No significant effects** are predicted.

8.8.14.2 Operation

295 No further construction activities are proposed during operation. Routine maintenance and emergency or unplanned repairs works will be controlled by an OEMP which will include many of the same measures as the CEMP to mitigate potential adverse effects and legal offences. **No significant effects** are predicted.

8.8.14.3 Decommissioning

296 Decommissioning works are likely to be similar in character to those described during construction and subject to similar environmental controls through the Outline DRP (TA A5.6 [EN010162/APP/6.4.5.6]). It is assumed that the decommissioning phase, and its potential ecological effects, will be appropriately mitigated in line with the prevailing baseline conditions, guidance and policies such that they are acceptable**. No significant effects** are predicted.

8.8.14.4 Mitigation

297 The design and embedded measures have minimised and mitigated adverse effects.

8.8.14.5 Residual Effects

298 The residual effects remain as predicted in Sections 8.8.14.1 to 8.8.14.3.

8.8.15 Breeding Birds

299 Prior to the application of mitigation, the potential adverse effects of the Development include temporary habitat loss and disturbance, habitat fragmentation, habitat change, direct harm to animals, direct disturbance of animals. Some of these effects may also constitute legal offences. The potential beneficial effects of the Development include habitat change (i.e., creation and enhancement), reduced disturbance, and changes to prey abundance.

8.8.15.1 Construction

300 Construction activities, notably vegetation clearance and ground works, in the bird breeding season (March to August inclusive) have the potential to directly harm birds and their nests in up to three breeding seasons (across a 24-month construction period). The vast majority of works will be in agricultural habitats (mostly arable), but smaller, discrete areas of hedgerow, trees, grassland and watercourses will be affected. Open farmland species will be most obviously affected, although the effects on these species may be less than those arising from the (baseline) spring and summer harvesting of crops which is recognised to be a major cause of declines in skylark[61]. Section A5.3.11.6.3 of the Outline CEMP (TA A5.3 [EN010162/APP/6.4.5.3] specifies measures to safeguard birds from harm during construction.

301 Construction activities may cause visual and noise disturbance to breeding birds. These types of disturbance have the potential to affect all species at

[61] Donald, P. F. et al. (2002). Survival rates, causes of failure and productivity of Skylark Alauda arvensis nests on lowland farmland. Ibis 144: 652–664.

distances up to 500 m for some highly sensitive species (e.g., peregrine), although most species are sensitive only over shorter distances. The CEcMP specifies measures to safeguard Schedule-1 birds from disturbance during construction, including pre-construction surveys and work exclusion zones. It is reasonable to assume that the breeding bird assemblage is tolerant of a degree of regular and frequent disturbance associated with agricultural operations. Nonetheless, construction disturbance has the potential to displace and dissuade breeding birds. The phasing of the construction, during which a maximum of approximately one half of the Work Areas (approximately one quarter of the Order Limits) will undergo construction at any one time, will leave most of the Site free from sources of disturbance, thereby providing habitat into which birds can be displaced. Furthermore, the phasing of the Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]) will allow compensatory habitats for birds, including artificial nest boxes, to be created before construction activities begin. This will provide higher quality habitat into which birds can be displaced and provide conditions to improve the productivity of the unaffected birds. Consequently, the effects of disturbance will be localised and temporary.

302 Loss of non-arable habitats (e.g., woodland, hedgerows, grassland and scrub) important to the majority of the species in the assemblage will be very limited in the context of the Order Limits and many will be temporary losses, likely to be reinstated or enhanced in time for the following breeding season, giving rise to short-term, reversible effects. Furthermore, the phasing of construction will limit these losses to localised areas whilst leaving the majority of habitats in the Order Limits unaffected. The phasing of the Outline LEMP will provide new and enhanced habitats during construction which will further reduce the effects of habitat loss at this stage. The Outline LEMP will deliver compensation and enhancement of habitats to provide an overall gain in habitat quality, extent and availability, as demonstrated by the BNG Assessment (TA A8.13, [EN010162/APP/6.4.8.13]); see also Section 8.8.8.2).

303 Habitat loss will mostly affect the open farmland assemblage. There is limited evidence to suggest that skylarks continue to nest in solar developments, although research is ongoing. Despite the potential of solar PV developments to displace skylarks, there is evidence[42] that they provide foraging habitats that could boost the productivity of birds in nearby and surrounding habitats outside the solar PV areas. Assuming total displacement of skylarks from Work no. 1: Solar PV, as well as from Work no. 4: Intermediate Substations and Work no.s 5a: BESS and 5b: 400 kV Substation, 178 territories would be lost. This is likely to overestimate losses due to the potential of the landscape to support a higher density of territories because of the additional resources provided by 551 ha of arable and grassland habitat creation and enhancement (in Work no.3 Mitigation/Enhancement) focusing on birds, much of which will be created at the start of construction. It may be further overestimated due to the retention of large areas of undeveloped grassland in Work no. 1 Solar PV due to various constraints, such as under powerlines and areas around subsurface archaeological sensitivities. For example, the solar PV modules in the

illustrative design have a combined area of 440 ha, which is 42% of the total area (1,025 ha) of Work no. 1 Solar PV.

304 Yellow wagtail (13 territories within the Order Limits) has a higher tolerance for structures than skylark and is likely to persist reasonably well in the grassland associated with the solar PV. Grey partridge (11 territories within the Order Limits) nests mostly in the margins and hedgerows around the fields in which it forages, and so both its nesting and foraging habitats will be retained in PV areas. Lapwing (three territories within the Order Limits, two outside) is unlikely to nest or forage amongst solar panels, although all three are within or adjacent to the undeveloped areas of mitigation/enhancement in the south-east of the Order Limits. Corn bunting (three territories within the Order Limits) also appears reasonably tolerant of solar PV and may even thrive[62].

305 The effects of habitat loss need to be assessed in the context of the baseline conditions. Skylark populations in farmland are declining due to modern agricultural practices which reduce breeding productivity and increase mortality. Skylarks can raise up to four clutches (but more typically three) in a breeding season and the number of broods successfully fledged in a year is a strong indicator of a sustainable population, with two to three broods typically needed to sustain a population[63]. Skylarks nest at low density in winter-sown cereals, possibly as few as 0.1 territories per hectare[64], where they may be limited to a single brood[63], driven largely by the unfavourable timing of sowing and harvesting, the latter also reducing survivorship. The BBS results suggest skylark is nesting at a density of 0.13 per ha within the Order Limits. Only about one in four nests survive in farmland over a season and a nest in cereals may raise only 1.2 chicks per nesting attempt. Consequently, despite the widespread occurrence of the species in the landscape, it is likely that the intensive agricultural habitats in the Order Limits support a sink population; that is, a population with a higher death rate than birth rate which may be declining or relies on immigration to sustain it.

306 The potential adverse effects of habitat loss on the open farmland assemblage were recognised at an early stage in the Development, resulting in the retention and establishment of large areas of undeveloped land to provide mitigation and compensation sufficient to address potential adverse effects. The phasing of construction and the Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]) will allow compensatory habitat for open farmland birds to be created before construction activities begin and to continue to be created throughout the programme of construction such that habitat losses are compensated in a proportionate and timely manner. Consequently, the effects of habitat loss during construction will be localised (Site level), temporary and reversible over the short term, due to the mitigation

[62] Copping, J. P., et al. (2025) Solar farm management influences breeding bird responses in an arable-dominated landscape Bird Study 1–6
[63] Royal Society for the Protection of Birds (undated). Land management for wildlife: Skylark *Alauda arvensis* Available at: https://www.rspb.org.uk/helping-nature/what-we-do/influence-government-and-business/farming/advice-for-farmers-helping-bird-species/skylark-advice-for-farmers [accessed on 10/10/2024]
[64] Donald, P. F. & Vickery, J. A (2000). The importance of cereal fields to breeding and wintering skylarks *Alauda arvensis* in UK. *In* Aebischer, N. J., et al. (eds) (2000). *Ecology and Conservation of Lowland Farmland Birds*. British Ornithologists' Union.

implemented before and during construction, which link directly to the measures outlined during operation, below. **No significant effects** are predicted.

8.8.15.2 Operation

307 The Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]) includes measures to improve the carrying capacity of the habitats within the Order Limits. (summarised in Table 8.10). This is achieved by addressing three main factors:

- Density of breeding territories. All other variables being equal, a higher density of territories in a smaller area will sustain the same population as a lower density population in a larger area. Evidence shows that the density of skylark breeding territories in arable land can be increased from 0.13 per ha to 0.4–0.5 per ha with a range of beneficial measures[65].
- Foraging resources. A year-round supply of food is critical to the survival of adults and chicks. The winter food supply influences the number of adults surviving to breed in the nest season. The summer food supply influences both adult and chick survival. Evidence shows that improving foraging resources can boost skylark populations[66].
- Mortality. Adults, chicks and nests in farmland are susceptible to an elevated risk of mortality from predators and agricultural operations. Reducing the factors that contribute to mortality increases productivity.

308 The total area of larger grassland areas and arable land (Table 8.10), habitats with a high degree of conservation management for birds, is 363 ha which could support up to 181 skylark territories (assuming up to 0.5 territories per hectare). These territories will also benefit from higher productivity and reduced mortality, thereby increasing their potential to support the local population. In addition, the solar PV grassland (999 ha) provides a very large foraging resource for the surrounding local population and is likely to increase their territorial density and individual productivity. The beneficial effects will be compounded year on year during the operational phase until such a time that the population reaches a stable, higher population reflecting the higher carrying capacity of the landscape. This population may thereafter act as a source for nearby sink populations.

309 A recent attempt to quantify skylark mitigation[67] provides a helpful framework for decision-making but makes some assumptions which limit its application. The open farmland assemblage mitigation strategy for the Development is embedded in the Outline LEMP and informed by the ecology of skylark but applies to the rest of the open farmland assemblage. The three main components of the strategy are the extensive grassland under the PV panels (999 ha), new and retained diverse grassland habitats 407 ha), and arable

[65] Schmnidt, J. et al. (2017). Effect of Sky Lark plots and additional tramlines on territory densities of the Sky *Lark Alauda arvensis* in an intensively managed agricultural landscape. Bird Study 65(1): 1–11.
[66] Conservation Evidence Website. Available at: https://www.conservationevidence.com/ [accessed on 16/10/2024]
[67] Fox, H. (2022). Blithe Spirit: Are Skylarks Being Overlooked in Impact Assessment? In Practice 17: 47–51. CIEEM

land (144 ha) with a high degree of conservation management for birds. Despite inter-specific variation in habitat requirements and ecologies, these measures are likely to compensate for the loss of open farmland habitats and benefit the remainder of the breeding assemblage, albeit to varying degrees.

310 Recent research by the RSPB and University of Cambridge[62] suggests that UK solar farms managed for nature, exemplified by the measures in the LEMP, provide benefits for birds, including many SoCC. The study concludes that:

> *Whilst careful planning is needed to ensure solar farms are sited in suitable areas, if managed with biodiversity in mind then their impact can be beneficial and could provide relief from the effects of agricultural intensification on biodiversity in the surrounding landscape.*

311 Barn owls and raptors are likely to benefit from the Development due to the increase in prey associated with grassland and large, undisturbed areas in which to forage. Barn owl boxes will be erected before construction in consultation with local specialists. The Barn Owl Trust (2024)[68] states:

> *In the UK, large solar PV systems are almost always ground-mounted. These present a negligible collision risk and do not electrocute, dazzle or burn Barn Owls. In fact, solar PV 'farms' have the potential to be of great benefit to Barn Owls as the array frameworks are typically at a height from which Barn Owls can perch-hunt.*

312 Parts of the Order Limits are located within designated Airfield Safeguarding Areas (ASAs) that protect RAF Syerston MoD Aerodrome to the south and Retford (Gamston) Airport to the north. These ASAs are critical for maintaining the safety and operational efficiency of the airfields by minimising risks such as bird strikes. The Civil Aviation Authority (CAA)[69] concludes that '*Whilst solar farms (PV arrays) have the potential to provide some attractants (perches, shelter, and recesses for breeding), peer-reviewed research suggests that "PV arrays would not increase hazards associated with bird-aircraft collisions"'.* Furthermore, the LEMP does not include any habitats, such as large waterbodies, which would be expected to attract large aggregations of high-risk bird species.

313 No further construction activities are proposed during operation. Routine maintenance and repairs will most likely comprise small-scale daytime works and so would generate impacts of a lower magnitude than during construction. These works will be controlled by the Outline OEMP (TA A5.5 [EN010162/APP/6.4.5.5]) which will include many of the same measures as the Outline CEMP to mitigate potential effects.

314 The effects on the skylark population are likely to be beneficial at the Site level, which is **not significant** in EIA terms. The effects on the remainder of the breeding bird assemblage will be beneficial and **significant** at the Local scale.

[68] Barn Owl Trust. Ground-mounted solar panels and Barn Owls. Available at: https://www.barnowltrust.org.uk/barn-owls-ground-mounted-solar-panels/ [accessed on 27/05/2025]
[69] CAA (2024) Aerodrome Safeguarding Advice Note 3: Wildlife Hazards Around Aerodromes.

Table 8.10 Mitigation for the Open Farmland Bird Community

Intervention	Description	Extent
Work no. 1 Solar PV		
Solar PV grassland	Permanent grassland in solar PV areas will provide a foraging and nesting resource.	999 ha
Work no. 3 Mitigation/Enhancement		
Grassland	Diverse grassland supporting breeding birds and other wildlife.	407 ha (including 221 ha of large and/or contiguous fields)
Arable land	Arable land with a high level of conservation management for birds. In rotation with winter stubbles (a source of winter food) and fallow land (nesting and foraging habitat).	14 ha
	Skylark plots to provide foraging habitat.	2 x 16 m^2 plots per hectare
	Lapwing plots to provide nesting and foraging habitat.	1 x 1–2 ha plot in large fields
	Wild bird crop to provide autumn and winter food for a range of species.	>6 m strip (0.4–1.0 ha)
	Raised banks with grass cover to provide habitat for invertebrates and a food source for other wildlife, notably birds.	3–5 m bunded grass strip in centre of fields
	Supplementary winter feed will be provided weekly (December to April) during construction only.	4 tonnes across eight locations, 25 kg per location per week.

8.8.15.3 Decommissioning

315 Decommissioning works are likely to be similar in character to those described during construction and subject to similar environmental controls through the Outline DRP (TA A5.6 [EN010162/APP/6.4.5.6]). Many habitats and environmental conditions that have improved over the operational period to benefit breeding birds will be returned to their baseline conditions which will represent a neutral effect. It is assumed that the decommissioning phase, and its potential ecological effects, will be appropriately mitigated in line with the prevailing baseline conditions, guidance and policies such that they are acceptable. **No significant effects** are predicted.

8.8.15.4 Mitigation

316 The design and embedded measures have minimised and mitigated adverse effects, and enhancement is proposed that provides a net beneficial effect.

8.8.15.5 Residual Effects

317 The residual effects remain as predicted in Sections 8.8.15.1 to 8.8.15.3.

8.8.16 Wintering Birds

318 Prior to the application of mitigation, the potential adverse effects of the Development include permanent habitat loss, temporary habitat loss and disturbance, habitat fragmentation, habitat change, and disturbance of animals. The potential beneficial effects of the Development include habitat change (i.e., creation and enhancement).

8.8.16.1 Construction

319 Habitat loss has the potential to reduce resources for wintering birds in up to three seasons (across a 24-month construction period). This effect is most pronounced for species reliant on open farmland habitats because arable land will be subject to the greatest loss and disturbance. It is also relevant to species associated with non-arable habitats such as hedgerows, although losses of these habitats is limited. However, it is unlikely that wintering and passage birds show strong fidelity to specific parts of the Order Limits given the wide availability of agricultural land in the landscape. Consequently, a high degree of displacement can be expected without detriment to the birds.

320 The River Trent and the adjacent flooded gravel pits and lagoons provide a locally important resource for wintering and passage water birds, but the Order Limits contain no significant waterbodies that attracted large, frequent or notable aggregations. Solar PV and major infrastructure works are not proposed in the southeastern part of the Order Limits, the area nearest the River Trent corridor, in which some of the relatively notable winter assemblages were observed.

321 The phasing of construction will limit habitat losses to localised areas whilst leaving other parts of the Order Limits largely unaffected. The phasing of the Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]) will align with the construction programme to provide new and enhanced habitats, including supplementary feeding, during construction, which will further reduce the effects of habitat loss at this stage. The retention or prompt reinstatement, as well as the long-term enhancement and creation of, non-arable habitats, as specified in the Outline LEMP, will ensure that the effects of habitat loss are short-term and reversible. The effects of habitat loss will be not significant.

322 Construction activities have the potential to disturb wintering birds. The Outline CEMP (TA A5.3 [EN010162/APP/6.4.5.3]) includes a range of measures to reduce noise and visual disturbance. As with habitat loss, the phasing of construction and the Outline LEMP, combined with the readily available habitats in the wider landscape, provide sufficient opportunities for displacement into unaffected areas. Potential effects are likely to be short-term and reversible at the Local scale, and therefore **not significant**.

8.8.16.2 Operation

323 The embedded mitigation includes measures that will benefit wintering birds, particularly reduced anthropogenic disturbance. The Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]) includes specific measures to mitigate for effects on breeding and wintering birds, notably the sensitive management of retained agricultural land and the creation of scrapes and overwinter food sources. Despite inter-specific variation in habitat requirements and ecologies, these measures are likely to benefit all bird species, albeit to varying degrees, at the Site level.

324 New cabling will be underground. There will be no significant increase in collision risk from overhead cables.

325 Parts of the Order Limits are located within designated Airfield Safeguarding Areas (ASAs) that protect RAF Syerston MoD Aerodrome to the south and Retford (Gamston) Airport to the north. These ASAs are critical for maintaining the safety and operational efficiency of the airfields by minimising risks such as bird strikes. The Civil Aviation Authority (CAA)[70] concludes that '*Whilst solar farms (PV arrays) have the potential to provide some attractants (perches, shelter, and recesses for breeding), peer-reviewed research suggests that "PV arrays would not increase hazards associated with bird-aircraft collisions"'.* Furthermore, the LEMP does not include any habitats, such as large waterbodies, which would be expected to attracted large aggregations of high-risk bird species.

326 No further construction activities are proposed during operation. Routine maintenance and repairs will most likely comprise small-scale daytime works and so would generate impacts of a lower magnitude than during construction. These works will be controlled by the Outline OEMP (TA A5.5 [EN010162/APP/6.4.5.5]) which will include many of the same measures as the Outline CEMP to mitigate potential effects. **No significant effects** are predicted.

8.8.16.3 Decommissioning

327 Decommissioning works are likely to be similar in character to those described during construction and subject to similar environmental controls through the Outline DRP (TA A5.6 [EN010162/APP/6.4.5.6]). Many habitats and environmental conditions that have improved over the operational period to benefit wintering birds will be returned to their baseline conditions which will represent a neutral effect. It is assumed that the decommissioning phase, and its potential ecological effects, will be appropriately mitigated in line with the prevailing baseline conditions, guidance and policies such that they are acceptable. **No significant effects** are predicted.

8.8.16.4 Mitigation

328 The design and embedded measures have minimised and mitigated adverse effects, and enhancement is proposed that provides a net beneficial effect.

8.8.16.5 Residual Effects

329 The residual effects remain as predicted in Sections 8.8.16.1 to 8.8.16.3.

[70] CAA (2024) Aerodrome Safeguarding Advice Note 3: Wildlife Hazards Around Aerodromes.

8.9 CUMULATIVE EFFECTS ASSESSMENT

330 An assessment of cumulative effects has been made with reference to the methods in Chapter 2, EIA [EN010162/APP/6.2.2].

331 The design of the Development has minimised and avoided many potential adverse ecological effects. The implementation of additional mitigation for the few potential significant adverse effects identified will result in no significant adverse residual effects. The Development also includes a range of embedded measures and enhancements that will provide beneficial effects, some of which will result in significant beneficial effects. However, it is possible that some effects falling below the threshold for significance for the Development could, in combination with similar effects from other schemes, result in effects that are significant. This assessment of cumulative effects is concerned with identifying potential adverse effects arising from spatially and temporally overlapping impacts, principally during the construction and operation phases when they can be more accurately predicted.

332 The study areas for the Development (Table 8.1) extend beyond the Order Limits and generally align with the ZoI for features. The conservation status of a habitat or species can be viewed at multiple scales, from very local to national or even international. Despite its large extent, the Development has relatively few pathways for spatially extensive adverse impacts and none have been identified exceeding the Site scale.

333 Nonetheless, a distance of 5 km has been defined as a precautionary maximum likely ZoI relevant to most ecological features, which could therefore interact with other developments with similar zones of influence at a distance of up to 10 km.

334 TA A2.1, Cumulative Effects Assessment Stages 1 and 2 [EN010162/APP/6.4.2.1] identifies the shortlist of developments within 10 km to be considered in stages 3 (information gathering) and 4 (assessment) of the cumulative effects assessment process.

8.9.1 Information Gathering

335 This shortlist in TA A2.1 has been further refined for this chapter based on a review of the key ecology and biodiversity planning documents submitted for the developments. Table 8.11 summarises the IEFs, as identified for the Development, and whether or not they have been scoped into the assessment for a cumulative scheme. Habitats are excluded from the table due to their diversity which precludes them being summarised into a single category. The table does not indicate the likelihood of cumulative effects. Developments for which there is sufficient confidence in their effects should be considered as part of the baseline, and this is set out in Table 8.11.

Table 8.11 Summary of IEF information from cumulative developments[71]

Development[72]	Notes	Designated Sites	Fish	Great Crested Newt	Grass Snake	Bats	Otter	Water Vole	Breeding Birds	Wintering Birds
A46 bypass [TR010065]	Ecological effects largely around existing A46 corridor, east of the River Trent.	Y	Y	N	Y	Y	Y	Y	Y	Y
Staythorpe BESS [22/01840/FULM]	Considered as part of the baseline in this chapter. 'As built' landscape designs incorporated in the baseline (see TA A8.3 Habitats and Vegetation Baseline [EN010162/APP/6.4.8.3]).									
Staythorpe BESS connection [24/01261/FULM]	Considered as part of the baseline in this chapter. 'As built' landscape designs incorporated into the baseline (see TA A8.3 Habitats and Vegetation Baseline [EN010162/APP/6.4.8.3]).									
SSE BESS [23/00317/FULM]	EcIA has been redacted, therefore no ecological information available.									
SSE BESS cable [23/00810/FULM]	Mostly HDD or within footprint of other developments. No ecological information submitted. Likely negligible effects, therefore scoped out.									

[71] 'Y' denotes an IEF, as identified for the Development, that has been scoped into the assessment for a scheme. 'N' denotes an IEF that has not been scoped into the assessment for a scheme.
[72] Developments shown in bold are within 50 m of the Development Order Limits.

Development[72]	Notes	Designated Sites	Fish	Great Crested Newt	Grass Snake	Bats	Otter	Water Vole	Breeding Birds	Wintering Birds
Winkburn Solar [20/02501/FULM]	1.2 km south, separated by The Wink.	N	N	Y	N	Y	N	N	Y	N
Muskham Solar [22/00976/FULM]	Borders a 500 m section of mitigation and solar PV.	Y	N	N	N	Y	N	N	Y	Y
Knapthorpe Solar [22/00975/FULM]	Borders a 200 m section of solar PV and crosses the access route.	Y	N	N	N	Y	N	N	Y	Y
Kelham Solar [23/01837/FULM]	Borders 500 m of the eastern side of the BESS	N	N	N	N	Y	N	N	Y	Y
Foxholes Solar [22/01983/FULM]	Separated by 20 m along a c. 800 m section of the cable route.	N	N	N	N	Y	N	N	Y	Y
Tuxford Road Solar [21/01577/FULM]	Separated by the A1 and East Coast Main Line. 1.0 km from nearest Development infrastructure	N	N	N	N	Y	N	N	Y	Y
A46 roundabout [22/01249/FULM]	Small spatial extent and separation by River Trent and Farndon, as well as limited ecological features, preclude potential for cumulative effects									

Development[72]	Notes	Designated Sites	Fish	Great Crested Newt	Grass Snake	Bats	Otter	Water Vole	Breeding Birds	Wintering Birds
Ness Farm 1 [ES/4441]	Separated by A1 and East Coast Main Line, 2.6 km from nearest Development infrastructure.	N	N	N	N	Y	N	N	Y	Y
Ness Farm 2 [ES/4690]	Separated by A1 and East Coast Main Line, 2.4 km from nearest Development infrastructure.	N	N	N	N	Y	N	N	Y	Y
Ness Farm 3 [V/4462]	Amendments to an existing restoration plan. Limited potential for cumulative adverse effects.									
Relocation of mineral processing plants [F/4395]	Separated by A1 and East Coast Main Line, 1.7 km from nearest Development infrastructure.	N	N	N	N	Y	Y	N	Y	Y
Fosse Green Solar [EN010154]	Scoping report provides only limited information.	N	N	Y	Y	Y	Y	Y	Y	Y
Major residential (Clipstone Colliery) [23/00832/FULM]	142 dwellings, 8 km from the Development.	Y	N	Y	Y	Y	N	N	Y	N
Major residential (Dale Lane) [22/01459/FULM]	62 dwellings, 9.6 km from the Development.	N	N	N	Y	Y	N	N	Y	N

Development[72]	Notes	Designated Sites	Fish	Great Crested Newt	Grass Snake	Bats	Otter	Water Vole	Breeding Birds	Wintering Birds
Major residential (Mansfield Road) [2024/0007/OUT]	132 dwellings, 9.6 km from the Development.	N	N	N	N	N	N	N	Y	N
Major residential (Fernwood) [24/01672/RMAM]	430 dwellings, 6.7 km from the Development.	N	N	N	N	Y	Y	Y	Y	Y
One Earth Solar Farm [EN010159]	DCO (>50 MW) solar farm and BESS. 2.4 km north-east. Separated by the A1 and East Coast Main Line.	N	Y	N	Y	Y	Y	Y	Y	Y

8.9.2 Designated Sites

336 The statutory and non-statutory designated sites scoped into the assessment are generally at risk from developments in close proximity to their boundaries, hence limiting the assessment to relatively few sites. Designated sites are only noted 'Y' in Table 8.11 if one of the named designated sites identified as an IEF (in Table 8.7) has been explicitly named in a cumulative scheme.

337 Only one of the shortlisted developments borders any of the designated sites identified as an IEF. Muskham Solar Farm is adjacent to the northern boundary of Muskham Woods LWS. The ecological characteristics of these designated sites suggest that they are most sensitive to direct disturbance, the likelihood of which is extremely low from solar developments. The ecological assessment for the scheme concludes that there will be no adverse effects on the designated site. No other developments have the potential to contribute to cumulative effects on this LWS, so there is therefore no cumulative effect on this LWS.

338 Eakring and Maplebeck Meadows SSSI is adjacent to a public road and is sensitive to changes in air quality. The Development will not exceed thresholds requiring assessment of air quality effects on designated sites. However, in combination with the additional traffic generated during the construction of the other schemes, if occurring at the same time, it is possible that these thresholds could be exceeded. None of the cumulative schemes are in close proximity to (the nearest is 3.0 km to the south) or likely to be using the minor road passing the SSSI, and so have very limited potential to elevate traffic levels such that they would, in combination, adversely affect the SSSI.

339 The Development will not contribute to cumulative adverse effects on designated sites. **No significant** cumulative effects are predicted.

8.9.3 Habitats

340 The Order Limits include a wide range of habitats and many of these are present in the cumulative schemes. Ancient woodland, the only irreplaceable habitat identified, will not be adversely affected. The Development will lead to an overall benefit for habitats, hedgerows and watercourses as demonstrated by the BNG Assessment (TA A8.13 [EN010162/APP/6.4.8.13]). BNG, habitat management plans and restoration plans will also be implemented for most cumulative schemes thereby securing similar overall improvements for habitats.

341 The Development will not contribute to adverse effects on habitats. It will add to any beneficial effects the other developments may have, or will off-set any adverse effects they may have**. No significant** cumulative effects are predicted.

8.9.4 Fish

342 Fish have only been scoped into two cumulative schemes, the A46 bypass and One Earth Solar Farm. The Environmental Statements for the two developments identified several potential impact pathways which could adversely affect fish over a large area and multiple watercourses in the River

Trent catchment, but a variety of mitigation has been proposed and no significant adverse effects are predicted. The potential effects of the Development are of a much lower magnitude than both cumulative developments, and will also be effectively mitigated by well-established methods.

343 The Development will not contribute to adverse effects on fish. **No significant** cumulative effects are predicted.

8.9.5 Great Crested Newt

344 Great crested newt has been scoped into three cumulative schemes. The closest ponds supporting great crested newts in the Development and at the nearest cumulative scheme, Winkburn Solar, are separated by 2.2 km and there are no other ponds in the intervening landscape. This separation and lack of ponds suggests that the resident newt populations are unlikely to be strongly linked (e.g., as a metapopulation) and thus not susceptible to cumulative effects. Solar developments have limited pathways for adverse effects and reasonable avoidance measures for both developments will mitigate these.

345 The Development will not contribute to adverse effects on great crested newt. **No significant** cumulative effects are predicted.

8.9.6 Grass Snake

346 Grass snake has been scoped into five cumulative schemes, none of which border the Development, greatly reducing the potential for spatial overlap in effects. Reptile populations are widely distributed at low densities, with occasional hotspots of higher density and diversity, although no such locations have been identified in the cumulative schemes. Given the low density populations recorded, and the effectiveness of well-established mitigation measures to reduce adverse effects during construction, there is limited potential for cumulative adverse effects. The Development includes habitat enhancements that may benefit grass snake and these would add to any beneficial effects the other developments may have, or will off-set any adverse effects they may have**.**

347 The Development will not contribute to adverse effects on grass snake. **No significant** cumulative effects are predicted.

8.9.7 Bats

348 Bats have been scoped into most of the cumulative schemes, reflecting their widespread distribution and importance. The Development will provide long-term benefits to bats through the provision of improved habitats, and so the most likely adverse cumulative effects relate to the disturbance of bats and destruction of bat roosts during construction. Night-time works are not proposed for most Developments and so there is limited potential to contribute to cumulative disturbance of active bats. Any works to bat roosts are strictly controlled by Natural England which ensures that adequate mitigation and compensation is provided.

349 The Development will not contribute to adverse effects on bats. **No significant** cumulative effects are predicted.

8.9.8 Otter

350 Otter is a wide-ranging species which increases its potential to be affected by spatially overlapping schemes. However, the five cumulative schemes which have considered otter, none of which border the Development, are separated by large distances and major barriers (such as the A1 and East Coast Main Line) which reduces their potential to interact. Multiple schemes affecting the same watercourse have the greatest potential to create cumulative effects, but this will not occur. The adverse effects of the schemes during construction tend to be temporary and reversible and, given the wide availability of suitable watercourses, it is likely that the otter population will not be adversely affected by spatially or temporally overlapping schemes.

351 The Development will not contribute to adverse effects on otter. **No significant** cumulative effects are predicted.

8.9.9 Water Vole

352 Water vole is patchily distributed in the region and tends to occur as discrete populations, reflected by its inclusion in only four cumulative schemes, none of which border the Development. Multiple schemes affecting the same watercourse or discrete population have the greatest potential to create cumulative effects, but this will not occur. The cumulative schemes which have considered water vole are separated by large distances and major barriers which reduces their potential to interact.

353 The Development will not contribute to adverse effects on water vole. **No significant** cumulative effects are predicted.

8.9.10 Breeding Birds

354 Breeding birds have been scoped into all cumulative schemes, reflecting their ubiquity and importance. Bird populations are distributed over large areas and so cumulative schemes at large distances have the potential to contribute to cumulative effects at a population level. However, individual breeding pairs tend to be localised and territorial, suggesting that cumulative effects on individual birds and local (Site) populations are unlikely.

355 Generalising across a diversity of species and different schemes is difficult, although it is reasonable to limit the cumulative assessment to the construction phase, because the operation of the Development is predicted to benefit the breeding bird assemblage. It is extremely unlikely that any birds will be harmed during the construction of any schemes due to the widespread implementation of good practice mitigation, but some birds may be temporarily or permanently displaced.

356 The breeding bird assemblages vary considerably among the schemes and potential for cumulative adverse effects depends on the degree of spatial and temporal overlap, as well the species affected. The Development is predicted to have temporary and reversible (not significant) adverse effects during construction, mainly from displacement and habitat loss, and similar effects are predicted for the four nearest schemes, arguably those with most potential to contribute to cumulative effects. The Development and the cumulative solar schemes include mitigation for these effects and it is

reasonable to conclude that this will be effective for each scheme, even with a degree of spatial or temporal overlap.

357 The Development will not contribute to adverse effects on breeding birds. **No significant** cumulative effects are predicted.

8.9.11 Wintering Birds

358 Wintering birds have been scoped into most cumulative schemes, reflecting their ubiquity and importance. Bird populations are distributed over large areas and so cumulative schemes at large distances have the potential to contribute to cumulative effects at a population level.

359 As with breeding birds, generalising across a diversity of species and different schemes is difficult. The wintering assemblages vary considerably among the schemes and potential for cumulative adverse effects depends on the degree of spatial and temporal overlap, as well the species affected. Unlike breeding birds, the aggregations of wintering birds at the Development, and many other sites, are unlikely to be uniquely dependent on a certain location or habitat feature for the full winter period; most species move freely in the landscape during this time, suggesting that there is sufficient available habitat outside the schemes into which birds can be displaced.

360 The Development is predicted to have temporary and reversible (not significant) adverse effects during construction, mainly from displacement and habitat loss, and similar effects are predicted for the four nearest schemes, arguably those with most potential to contribute to cumulative effects. The Development and the cumulative solar schemes include mitigation for these effects and it is reasonable to conclude that this will be effective for each scheme.

361 The Development will not contribute to adverse effects on wintering birds. **No significant** cumulative effects are predicted.

8.10 SUMMARY OF LIKELY EFFECTS

362 Significant beneficial effects (in EIA terms) have been identified for Local Wildlife Sites, habitats and breeding birds. No significant (in EIA terms) adverse effects have been identified.

363 A range of potential adverse and beneficial effects have been identified, most of which are not significant in EIA terms.

364 Adverse effects that are not significant in EIA terms have been identified for some habitats (e.g., hedgerows and trees) and animals (fish, bats, otter and water vole, and breeding birds) and mostly arise from disturbance and habitat loss during the construction phase. These adverse effects tend to be short-term, reversible and low magnitude and are well mitigated by established good practice, implemented through a detailed Construction Ecological Management Plan (Section A5.3.11 of the Outline CEMP; TA A5.3 [EN010162/APP/6.4.5.3]), or by the embedded features of the Development that will allow it to be built relatively sensitively, such as the extensive use of HDD, the establishment of exclusion buffers, and the establishment of compensatory habitats before and during construction.

365 Beneficial effects that are not significant in EIA terms have been identified for a range of other features, mostly arising from habitat creation and enhancement during the operation phase. The main driver of all beneficial effects is the favourable landscape-scale management of a large area of various habitats which replace intensively farmed arable land. The totality of the retained, enhanced and created habitats in the Order Limits will create a favourable landscape-scale intervention in a comparatively depauperate agricultural landscape.

366 The creation and enhancement of habitats across the Development includes targeted interventions to benefit key landscape features such as woodlands, watercourses and Local Wildlife Sites. Ecotones around woodlands will buffer them from surrounding land use and reduce edge effects, and where these woodlands are also as LWS, reduce threats and pressures on them. The creation of 31 ha of new woodland, 22 ha of woodland ecotone, and 50 km of new species-rich hedgerows are beneficial effects, but they will also benefit retained woodland and hedgerows by reducing habitat fragmentation.

367 The riparian corridors shown in Figure A5.1.1 of the Outline LEMP (TA A5.1 [EN010162/APP/6.4.5.1]) are a combination of habitats which together create large buffers around key watercourses, including a stretch of the River Trent and wholly around Moorhouse Lane Drains LWS. These will reduce the adverse effects of sediment, pesticide, nutrient and pollution run-off from roads and agriculture – some of the main causes of poor water quality status – on the freshwater ecosystem, resulting in beneficial effects on several IEFs (LWS, habitats and plants, fish, grass snake, otter and water vole) and a wide range of other animal species, particularly macroinvertebrates which are very sensitive to water quality.

368 The riparian corridors will also expand the availability and quality of habitats available to otter, water vole and grass snake, whilst also helping to reduce disturbance to them from agricultural encroachment. These enlarged riparian habitats are an important resource for these and many other animals, including birds and bats, navigating through and foraging in the landscape. The terrestrial and freshwater habitats

369 Many of the above benefits are not readily captured by the metric used in the BNG Assessment. Indeed, some of the most beneficial but generalised effects of the Development have no influence on the metric beyond the value of their component habitat types. These effects include landscape connectivity for wildlife, buffering and connecting valuable retained habitats (e.g., ecotones around woodlands), the creation of riparian corridors, and the active management of some LWS. However, such measures make a substantial and meaningful contribution to biodiversity and to local and national policies, particularly LBAPs and the emerging Local Nature Recovery Strategy (LNRS).

370 The Outline LEMP sets out the methods for habitat management as well as ecological interventions such as bird and bat boxes. The LEMP needs to remain fit for purpose over the 40-year operational period, and in doing so needs the flexibility to accommodate changing ecological conditions, climate and policies. It will also allow for positive interventions beyond those

currently specified, where these will not be to the detriment of the current commitments. A Biodiversity Steering Group, set up by the Applicant, comprising representatives from statutory agencies and non-governmental organisations has provided, and will continue to provide advice to inform the development and function of the LEMP over its lifetime.

371 A summary of likely effects is presented in Table 8.12.

8.11 STATEMENT OF SIGNIFICANCE

372 This chapter has assessed the likely significant effects of the Development on ecology and biodiversity. The Development has been assessed as having no significant adverse effects. Significant beneficial effects are predicted for Local Wildlife Sites, habitats and breeding birds during the operation of the Development. No significant cumulative effects (beneficial or adverse) have been identified.

Table 8.12 Summary of Likely Effects

373 The assessment of effects in section 8.8 did not identify any significant adverse effects for which mitigation was required in addition to that embedded in the Development design (as described in section 8.6). Consequently, the 'Mitigation' column in Table 8.12 describes the key elements of embedded mitigation that were considered for each feature in assessing the significance of effects.

Feature	Development Phase	Mitigation Summary	Significance of Effect	Residual Significance	Cumulative Significance
LWS	Construction	Avoidance of built infrastructure (Work nos. 1, 4, 5a, 5b, 6 & 7) from all LWS. HDD cable where Work no. 3 intersects LWS. oCEMP: • Pollution Prevention Plan; • CEcMP, with explicit consideration of LWS and method statement for habitats including: ▪ ECoW supervision of works near LWS; and ▪ Fencing and buffers to separate works from LWS and their associated habitats.	Not significant	Not significant	Not significant
	Operation	oOEMP: Pollution Prevention Plan and CEcMP (with similar measures to construction phase).	Significant Beneficial	Significant Beneficial	Not significant
	Decommissioning	oDRP: Pollution Prevention Plan and CEcMP (with similar measures to construction phase).	Not significant	Not significant	Not significant
Habitats	Construction	Avoidance (including appropriate construction exclusion buffers) of most important habitats and minimising losses where this was not possible. oCEMP: • Pollution Prevention Plan; • Sensitively designed watercourse crossings; • CEcMP including method statement for habitats, e.g., fencing and buffers to separate works from sensitive retained habitats; and • Additional arboricultural studies and appropriate mitigation (e.g., RPAs).	Not significant	Not Significant	Not significant
	Operation	oLEMP: retention, creation and enhancement of habitats; bird monitoring. Biodiversity Net Gain of >10% for habitats, hedgerow and watercourses. oOEMP: Pollution Prevention Plan and CEcMP (with similar measures to construction phase).	Significant Beneficial	Significant Beneficial	Not significant
	Decommissioning	oDRP: Pollution Prevention Plan and CEcMP (with similar measures to construction phase).	Not significant	Not significant	Not significant
Breeding Birds	Construction	oCEMP: • Pollution Prevention Plan; and • CEcMP, including a method statement for breeding birds: ▪ Pre-construction nest checks; ▪ Work exclusion buffers around active nests; and ▪ Visual deterrents. oLEMP: phased creation of compensatory habitats, notably the large areas of (enhanced) arable land and grassland for open farmland birds.	Not significant	Not significant	Not significant

Feature	Development Phase	Mitigation Summary	Significance of Effect	Residual Significance	Cumulative Significance
	Operation	oLEMP: creation and enhancement of habitats, notably the large areas of (enhanced) arable land and grassland for open farmland birds. oOEMP: Pollution Prevention Plan and CEcMP (with similar measures to construction phase).	Significant Beneficial	Significant Beneficial	Not significant
	Decommissioning	oDRP: Pollution Prevention Plan and CEcMP (with similar measures to construction phase).	Not significant	Not significant	Not significant
All other IEFs	Construction	oCEMP: Pollution Prevention Plan and CEcMP, including explicit consideration of designated sites and method statements for important habitats and species including great crested newt, grass snake, badger, water vole, otter, bats, fish and invasive non-native species.	Not significant	Not significant	Not significant
	Operation	oOEMP: Pollution Prevention Plan and CEcMP (with similar measures to construction phase).	Not significant	Not significant	Not significant
	Decommissioning	oDRP: Pollution Prevention Plan and CEcMP (with similar measures to construction phase).	Not significant	Not significant	Not significant