

**Byers Gill Solar
EN010139**

6.2.6 Environmental Statement

Chapter 6 Biodiversity

Planning Act 2008

APFP Regulation 5(2)(a)

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

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6. Biodiversity

6.1. Introduction

6.1.1. This Environmental Statement (ES) chapter presents the impact assessment and likely significant effects of Byers Gill Solar (the Proposed Development) on Biodiversity.

6.1.2. The Environmental Impact Assessment (EIA) Scoping Report (ES Appendix 4.1) (Document Reference 6.4.4.1) sets out the scope of the Biodiversity assessment. In summary, the following receptors have been assessed in this ES:

- International and national statutory designated sites of ecological importance within 10 km of the Order Limits (Ramsar sites, special protection areas (SPA) and special areas of conservation (SAC);
- nationally designated sites (sites of special scientific interest (SSSIs) and nature reserves), within 2km of the Order Limits;
- non-statutory designated sites (often important in a local context) within 1 km of the Order Limits;
- a search of protected and noteworthy species within 1 km of the Order Limits;
- breeding and winter birds;
- habitats and invasive species;
- invertebrates;
- amphibians including great crested newt (GCN);
- reptiles;
- bats;
- water vole and otter;
- badger; and
- other mammal species such as brown hare and hedgehog.

6.1.3. This ES chapter aims to:

- detail the requirements of principal legislation, policy and guidance relevant to this assessment;
- specify the methodology followed for the assessment, and any associated assumptions and limitations;
- provide an evaluation of relevant important ecological receptors, including nature conservation designations, priority habitats, protected species and invasive non-native species (INNS) associated with the scheme, with each assigned a nature conservation value; and
- identify and propose measures to address the potential impacts and effects of the Proposed Development on ecology and nature conservation (collectively referred to as biodiversity within this chapter) during construction, operation and decommissioning.

- 6.1.4. This ES chapter is supported by the following appendices:
- ES Appendix 6.1 Preliminary Ecological Appraisal Report (Document Reference 6.4.6.1);
 - ES Appendix 6.2 Wintering Bird Survey Report (Document Reference 6.4.6.2);
 - ES Appendix 6.3 Breeding Bird Survey Report (Document Reference 6.4.6.3);
 - ES Appendix 6.4 Bat Static Detector Survey Report (Document Reference 6.4.6.4);
 - ES Appendix 6.5 Habitats Regulations Assessment No Significant Effects Report (Document Reference 6.4.6.5); and
 - ES Appendix 6.6 Biodiversity Net Gain Report (Document Reference 6.4.6.6).
- 6.1.5. Full details of the study areas, survey methodologies, survey dates and guidance used for each survey are available in these appendices (Appendix 6.1 to 6.4).
- 6.1.6. This ES chapter is also supported by ES Figure 6.1 Designated Sites (Document Reference 6.3.6.1) and ES Figure 6.2 UK Habitats Survey (Document Reference 6.3.6.2).
- 6.1.7. This ES Chapter should be read in combination with ES Chapter 2 The Proposed Development (Document Reference 6.2.2), ES Chapter 13 Cumulative Effects (Document Reference 6.2.13) and ES Chapter 7 Landscape and Visual (Document Reference Document Reference 6.2.7) to provide a full understanding of the context and the likely impacts of the Proposed Development.
- 6.1.8. An assessment of the impacts of the Proposed Development on hazel dormouse (*Muscardinus avellanarius*) has been scoped out of the assessment. For further information, see Section 6.3, Scoping and Consultation, of this ES Chapter.
- 6.1.9. This ES chapter and the supporting ES Appendices and ES Figures have been prepared by competent experts at RSK Biocensus. Full details of these competent experts are provided in ES Appendix 1.1 Competent Expert Evidence (Document Reference 6.4.1.1).

6.2. Legislative and policy framework

- 6.2.1. This section identifies the key legislation, planning policy and guidelines relevant to the scope and methodology for the biodiversity assessment.

Legislation

European Legislation

- 6.2.2. The following directives apply to biodiversity protection in the UK. Post-‘Brexit’, even though European Union (EU) directives no longer directly apply to the UK, the provisions therein are enshrined in both domestic legislation and international agreements. Legislation has been enacted to ensure the regulations derived from these remain in force. The following key legislation is applicable to the assessment:

- The Birds Directive in relation to Natura 2000 sites. This relates to the conservation of all species of naturally occurring birds in their wild state in the territory of the EU Member States (MSs) to which the treaty applies. Under the Birds Directive, the most suitable areas of conservation of the Annex I species are to be designated as Special Protection Areas (SPAs).
- The Habitats Directive in relation to Natura 2000 sites The Habitats Directive 1992 requires EU MSs to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of community interest, which are listed under Annex I, II, IV and/or V. Species listed under Annex IV are known as ‘European Protected Species’ (EPS).

National Legislation

- The Wildlife and Countryside Act 1981.
- The Countryside and Rights of Way Act 2000.
- The Environment Act 2021.
- The Natural Environment and Rural Communities Act (NERC) 2006.
- The Hedgerows Regulations 1997.
- The Protection of Badgers Act 1992.
- The Invasive Alien Species (Enforcement and Permitting) Order 2019.

Policy

6.2.3. Under Section 104 of the Planning Act 2008 (the Act), the Secretary of State (SoS) is directed to determine a DCO application with regard to the relevant National Policy Statement (NPS), the local impact report, matters prescribed in relation to the Proposed Development, and any other matters regarded by the SoS as important and relevant. Following their designation on 17 January 2024, there are three NPSs which are considered to be ‘relevant NPS’ under Section 104 of the Act:

- Overarching NPS for energy (NPS EN-1)
- NPS for renewable energy infrastructure (NPS EN-3)
- NPS for electricity networks infrastructure (NPS EN-5)

6.2.4. It is considered that other national and local planning policy will be regarded by the SoS as ‘important and relevant’ to the Proposed Development. A detailed account of the planning policy framework relevant to the Proposed Development is provided in the Planning Statement (Document Reference 7.1). The Policy Compliance Document (Document Reference 7.1.1) evidence how this assessment has been informed by and is in compliance with the NPSs and relevant national and local planning policies. It provides specific reference to relevant sections of the ES which address requirements set out in policy.

Guidance

- 6.2.5. The Guidelines for Ecological Impact Assessment in the UK and Ireland [1] has informed the approach taken in this assessment.

6.3. Scoping and Consultation

- 6.3.1. This section describes the scope of this Biodiversity assessment, including how the assessment has responded to the Scoping Opinion. A description of the consultation and engagement undertaken with relevant technical stakeholders to develop and agree this scope is also provided.

Scoping

- 6.3.2. The EIA Scoping Report set out the proposed scope and assessment methodologies to be employed in the EIA and is provided in ES Appendix 4.1 EIA Scoping Report (Document Reference 6.4.4.1).
- 6.3.3. In response to the EIA Scoping Report, a Scoping Opinion was received from the Planning Inspectorate (PINS) on 6 December 2022 and is provided in ES Appendix 4.2 EIA Scoping Opinion (Document Reference 6.4.4.2).
- 6.3.4. ES Appendix 4.3 EIA Scoping Opinion Response Matrix (Document Reference 6.4.4.3) contains a table that outlines all matters identified by PINS in the EIA Scoping Opinion and how these have been addressed in the ES or other DCO application documentation.

Consultation

- 6.3.5. Engagement in relation to Biodiversity has been undertaken within a number of stakeholders throughout the EIA process. The stakeholders consulted were:
- Durham County Council;
 - Darlington Borough Council;
 - Stockton-on-Tees Borough Council and
 - Natural England.
- 6.3.6. The Consultation Report (Document Reference 5.1) submitted alongside the DCO application contains a full account of the previous statutory consultation process and issues raised in feedback. Matters raised regarding the scope, methodology or mitigation considered as part of the biodiversity assessment were then subject to further discussions directly with stakeholders.
- 6.3.7. Table 6-1 provides a summary of engagement with relevant stakeholders which has also been undertaken to inform the EIA.

Table 6-1 Stakeholder engagement relating to biodiversity.

Stakeholder	Comments	Response
Durham County Council	<ul style="list-style-type: none"> ▪ Only static surveys were completed in low quality habitats transect would be expected. ▪ It is good to hear that fields used by lapwing and curlew fall outside of the footprint. ▪ Wider mitigation around farmland birds is likely to revolve around hedgerow enhancement and the creation of tussocky grassland in margins and headland especially for grey partridge. ▪ Creating a variety of habitats would be important the inclusion of wild bird seed mixes and pollen and nectar strips should not be discounted, although my personal preference is to concentrate on creating a variety of habitats (wet grassland, scrapes, tussocky grasslands etc.) rather than depending on annually sown areas. ▪ A diverse grassland beneath the panels would seem to be the way to go. ▪ Maintain a buffer of 5 – 10 m around boundary features to allow for clear zones especially where management of grassland differs from that beneath the arrays and patchworks of scrub could be included for structural diversity. 	<ul style="list-style-type: none"> ▪ Static detector surveyors were the preferred option to determine the bat species present, relative activity levels and abundance for the homogenous study area (mainly composed of arable and improved grassland habitats). No Annex II bat species were recorded. Please refer to Appendix 6.4 Bat Static Detector Survey Report. ▪ Lost hedgerows will be replanted, with gaps to be stocked up and management relaxed on others to provide enhanced foraging habitat for bats and birds and nesting habitat for birds. This will result in a hedgerow creation forecast of approximately 12km and hedgerow enhancement of approximately 29km. Please refer to ES Appendix 6.6 Biodiversity Net Gain Report and ES Chapter 7 Landscape and Visual (Document Reference 6.2.7). ▪ Eight land parcels currently used for intensive agriculture across the Order Limits to be used for biodiversity enhancement and sown with species rich wildflora meadow grassland, with the aim of increasing insect diversity to improve foraging habitat for species such as birds and bats. Please refer to ES Chapter 7 Landscape and Visual (Document Reference 6.2.7). ▪ Provision of two large fields in Panel Area F: North of Bishopton, will be maintained with low maintenance grass sward providing enhanced availability of open ground for curlew (<i>Numenius arquata</i>), lapwing (<i>Vanellus vanellus</i>) and other ground nesting birds. This area will also provide foraging habitat for bats. Please refer to ES Chapter 7 Landscape

Stakeholder	Comments	Response
		<p>and Visual (Document Reference 6.2.7).</p> <ul style="list-style-type: none"> ▪ Area underneath panels to be sown with a low maintenance grassland while between panels and to margins they will be sown with legume rich herbal ley/wildflora mixes, this aims to improve soil health and insect diversity such as pollinators to improved foraging habitat for species such as birds and bats. Please refer to ES Chapter 7 Landscape and Visual (Document Reference 6.2.7). ▪ Provision of rough grass, wildflower and game cover and winter seed source sowing within field margins with the aim of improving foraging habitat for bats and bird species. Please refer to ES Chapter 7 Landscape and Visual (Document Reference 6.2.7). ▪ Maintenance of 8m buffers (3m from hedgerows to security fencing and 5m from security fencing to Solar Cells) between Solar PV modules and hedges to retain foraging and commuting corridors. Please refer to ES Chapter 7 Landscape and Visual (Document Reference 6.2.7). ▪ The majority of trees identified as suitable bat roost trees will be protected during development by establishing a Construction Exclusion Zone (CEZ) around their Root Protection Areas (RPA). Please refer to Appendix 7.5 Arboricultural Impact Assessment (Document Reference 6.4.7.8) ▪ A total of seven trees which were identified as suitable bat roost trees will be removed by the Proposed Development. These trees will undergo pre-construction checks to determine the presence or absence of a bat roost. If a bat roost is located, a

Stakeholder	Comments	Response
		<p>bat licence will be required before the start of works.</p> <ul style="list-style-type: none"> ▪ Any trees to be removed or to have branches pruned to be checked by an ecologist prior to work, to determine the likely presence of a bird’s nest and/or bat roost.
<p>Darlington Borough Council</p>	<ul style="list-style-type: none"> ▪ Ecologist is the same individual as for County Durham – so no additional consultation received comments above are also applicable. 	
<p>Natural England</p>	<ul style="list-style-type: none"> ▪ Given the distance from the SPA, it is unlikely that the site is significantly functionally linked. However, we would recommend that mitigation land be designed to accommodate the SPA Bird that could be affected. ▪ It is not necessary to replicate the existing habitat but to create land with the appropriate habitats for the birds that will be impacted. ▪ For the area between/beneath the panels and if enough sunlight reaches the ground, we would like to see an invertebrate seed mix be used. It is less likely that the farmland bird assemblage will use the open field intensively. ▪ For wigeon and lapwing, flat areas of wet grassland would be best. ▪ Enhancement of hedgerows with wide grassland buffers around the panel areas, as these will benefit farmland bird assemblage. 	<ul style="list-style-type: none"> ▪ A habitat regulations assessment (HRA) screening has been undertaken and is included within the ES. Please refer to Appendix 6.5 Byers Gill Habitat Regulations Assessment (Document Reference 6.4.6.5). ▪ Provision of two large fields in Panel Area F: North of Bishopton, will be maintained with low maintenance grass sward providing enhanced availability of open ground for curlew and lapwing and other ground nesting birds. This area will also provide foraging habitat for bats. Please refer to ES Chapter 7 Landscape and Visual (Document Reference 6.2.7). ▪ Eight land parcels currently used for intensive agriculture across the Order Limits to be used for biodiversity enhancement and sown with species rich wildflora meadow grassland, with the aim of increasing insect diversity to improve foraging habitat for species such as birds and bats. Please refer to ES Chapter 7 Landscape and Visual (Document Reference 6.2.7). ▪ Area underneath panels to be sown with a low maintenance grassland while between panels and to margins they will be sown with legume rich herbal ley/wildflora mixes, this aims to improve soil health and insect diversity such as pollinators to improved foraging habitat for

Stakeholder	Comments	Response
		<p>species such as birds and bats. Please refer to ES Chapter 7 Landscape and Visual (Document Reference 6.2.7).</p> <ul style="list-style-type: none"> ▪ Provision of rough grass, wildflower as well as wild bird seed mix within field margins with the aim of improving foraging habitat for bats and bird species. Please refer to ES Chapter 7 Landscape and Visual (Document Reference 6.2.7). ▪ Lost hedgerows will be replanted, hedgerows with gaps to be stocked up and management relaxed on others to provide enhanced foraging habitat for bats and birds and nesting habitat for birds. This will result in a hedgerow creation forecast of approximately 12km and hedgerow enhancement of approximately 30km. Please refer to ES Appendix 6.6 Biodiversity Net Gain Report (Document Reference 6.4.6.6) and ES Chapter 7 Landscape and Visual (Document Reference 6.2.7).

6.4. Assessment Methodology

Overview of the Baseline Assessment

- 6.4.1. A background data search (BDS) was requested from the Environmental Records Information Centre for North East England. The BDS included a search for international statutory designated sites of ecological importance within 10km of the Order Limits: Ramsar sites, SACs and SPAs. A search for national statutory sites (SSSI national nature reserves (NNR) and local nature reserves (LNR) was carried out up to 2km from the Order Limits, which included consideration of SSSI impact risk zones (IRZs). The IRZs are a GIS tool developed by Natural England which define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.
- 6.4.2. A search was also made for non-statutory designated sites (often important in a local context) within 1 km of the Order Limits and included a search for legally protected or otherwise noteworthy species, which might be affected by the Proposed Development.

- 6.4.3. The Order Limits are defined as the application boundary whilst the study area is the area over which surveys were undertaken.
- 6.4.4. A Preliminary Ecological Appraisal (PEA) survey was carried out to determine the habitats within the study area and to identify the potential for protected and notable species to be present, and to recommend further species-specific surveys if required. Botanical survey encompassed a UK Habitat survey. Specific protected species surveys were undertaken following best practice guidance. Full details of the survey methodology can be found in ES Appendix 6.1 Preliminary Ecological Appraisal Report (Document Reference 6.4.6.1). The UK Habitat Survey is provided in ES Figure 6.2 UK Habitats Survey (Document Reference 6.3.6.2).
- 6.4.5. Wintering bird surveys were undertaken to determine the winter bird assemblage for the study area. Surveys were carried out between December 2021 and March 2022 inclusive by Avian Ecology Ltd. The wintering bird study area slightly deviates from the Order Limits because the survey work began before the Order Limits were finalised. It's important to note that the study area extends beyond the Order Limits, encompassing a larger geographical area. Four survey visits were carried out between November 2021 and March 2022. In their stakeholder feedback Natural England confirmed that the level of survey effort is appropriate to assess and determine the likely effects of the proposed development. Full details of the survey methodology can be found in ES Appendix 6.2 Wintering Bird Survey Report (Document Reference 6.4.6.2).
- 6.4.6. Breeding bird surveys were undertaken to determine the breeding bird assemblage for the study area. Surveys were carried out by Avian Ecology Ltd between April and July 2022 inclusive. These comprised a series of six survey visits with each visit carried out over a period of five or six days due to the size of the survey area. All bird species encountered (either visually or through their vocalisations) were recorded onto field maps using standard British Trust for Ornithology (BTO) species codes and behaviour notation [24]. Full details of the survey methodology can be found in ES Appendix 6.3 Breeding Bird Survey Report (Document Reference 6.4.6.3).
- 6.4.7. Static detector bat surveys were undertaken to identify bat species, activity levels and relative abundance of bats across the study area. A total of 20 monitoring points across the study area were surveyed each month over a five-month period (May – September) in 2022. Full spectrum Wildlife Acoustics Song Meter 4 (SM4) detectors with omnidirectional microphones were deployed with each microphone mounted at a minimum height of 2 m to maximize the probability of recording bat calls. Detectors were deployed across the study area to cover different habitat types including improved grassland, arable crop, hedgerows, streams and woodland edges. The static bat study area differs slightly from the Order Limits, as survey work commenced before the Order Limits were finalised, with two locations now out with the Order Limits. Full details of the survey methodology can be found in ES Appendix 6.4 Bat Static Detector Survey Report (Document Reference 6.4.6.4).

- 6.4.8. The Order Limits do not overlap with any red risk zone. Therefore, the approach adopted to mitigate any potential impact on great crested newts (*Triturus cristatus*) (GCN) will be through the process of a District Level Licensing (DLL) application for GCN. This approach, therefore, removes the requirement for baseline surveys.

Impact Assessment Method

- 6.4.9. This section outlines the methodology employed for assessing the likely significant effects on biodiversity from the construction, operation and decommissioning of the Proposed Development.
- 6.4.10. The impact assessment methodology detailed in this chapter has been undertaken in accordance with best practice guidance for Ecological Impact Assessment (EclA), issued by the Chartered Institute of Ecology and Environmental Management (CIEEM) entitled 'Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine' [1] as summarised below. The aims of the ecology assessment are to:
- identify relevant ecological features (e.g. designated sites, habitats, species or ecosystems) which may be impacted;
 - provide a scientifically rigorous and transparent assessment of the likely ecological impacts and resultant effects of the Proposed Development. Impacts and effects may be positive or negative.
 - facilitate scientifically rigorous and transparent determination of the consequences of the Proposed Development in terms of national, regional and local policies relevant to nature conservation and biodiversity, where the level of detail provided is proportionate to the scale of the development and the complexity of its potential impacts; and
 - set out what steps will be taken to adhere to legal requirements concerning the relevant ecological features.
- 6.4.11. The frames of reference used for this assessment, which are based on CIEEM guidelines, are as follows:
- International (i.e. Ramsar Sites, SACs and SPAs) (normally within the geographic area of Europe);
 - UK or national (Great Britain but considering the potential for certain ecological features to be more notable (of higher value) in England, with context relative to Great Britain as a whole).
 - regional;
 - county;
 - district;
 - local (i.e. within approximately 5km of the Order Limits); and
 - site.

- 6.4.12. Species populations are valued on the basis of their size and recognised status through published lists of species of conservation concern and designation of Biodiversity Action Plan (BAP) status and legal protection.
- 6.4.13. When assigning values to species populations, the following was considered: legal protection, distribution, rarity, population trends and population size. The assessment of value relies on the professional opinion and judgment of experienced ecologists.
- 6.4.14. Plant communities were assessed in terms of their intrinsic value, habitat for protected species and for species of nature conservation concern.
- 6.4.15. For European protected species there is a requirement that a Proposed Development should not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.
- 6.4.16. In line with CIEEM guidelines, the terminology used within the EclA draws a clear distinction between the terms 'impact' and 'effect'. For the purposes of this EclA these terms are as follows:
- Impact – actions resulting in changes to an ecological feature. For example, construction activities of the development removing hedgerows; and
 - Effect – outcome resulting from the impact acting on the conservation status or structure and function of an ecological feature, e.g., the effects on a population of bats as a result of the loss of a bat roost.
- 6.4.17. When describing potential impacts (and where relevant the resultant effects) consideration is given to the following characteristics likely to influence this;
- Positive – a change that improves the quality of the environment e.g., by increasing species diversity, extending habitats or improving water quality. This may also include halting or slowing an existing decline in the quality of the environment;
 - Negative – a change that reduces the quality of the environment e.g. destruction of habitat, removal of foraging habitat, habitat fragmentation and pollution;
 - Spatial extent – the spatial or geographical areas or distance over which the impact or effect may occur under a suitably representative range of conditions (e.g. noise transmission under water);
 - Magnitude – refers to size, amount, intensity and volume. It should be quantified if possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area, the percentage decline to a species population;
 - Duration – the time over which an impact is expected to last prior to recovery or replacement of the resource or feature. Consideration has been given to how this duration relates to relevant ecological characterises such as species lifecycle;
 - Time and frequency – the consideration of the point at which the impact occurs in relation to critical life-stages or seasons; and
 - Reversibility – is the impact temporary or permanent. A temporary impact is one from which recovery is possible or for which effective mitigation is both possible

and enforceable. A permanent effect is one from which recovery is either not possible or cannot be achieved within a reasonable timescale. i.e. the 40-year lifespan of the Proposed Development.

- 6.4.18. For each ecological feature only those characteristics relevant to understanding the ecological effect of the Proposed Development and determining the significance are described. The determination of the significance of effects has been made based on the predicted effect on the structure and function, or conservation status, of relevant ecological features, as follows:
- not significant - no effect on structure and function, or conservation status; and
 - significant - structure and function or conservation status is affected.
- 6.4.19. CIEEM best practice guidance does not recommend that significance is defined as ‘major’, ‘moderate’ or ‘minor’ due to the complexities of ecological processes but requires a clear statement as to whether or not an effect is significant and at what geographical scale, for example significant at the national level.
- 6.4.20. Whilst CIEEM guidelines recommend the avoidance of the use of the matrix approach for categorisation (major, moderate and minor), in order to provide consistency of terminology used within other ES Chapters, the findings of the CIEEM assessment have been translated into the classification of effects scale, as outlined in Table 6-2. For example, a significant effect at the international level under the CIEEM guidance would equate to a ‘Major’ significant effect using the standard EIA assessment methodology. Converted effects of ‘Major’ and ‘Moderate’ are considered significant in the context of the EIA Regulations [1].

Table 6-2 Relating CIEEM Assessment Terms to those used in other EIA Chapters

Significance of impact at Geographical using CIEEM methodology	Conversion of Significance to EIA regulations methodology
International level	Major
National level	Major
Regional level	Moderate
County level	Moderate
District level	Moderate
Local level	Minor
Site Level	Minor

Biodiversity Net Gain

- 6.4.21. The primary aims of Biodiversity Net Gain (BNG) are to secure a measurable improvement in habitat for biodiversity, to minimise biodiversity losses and to help to restore ecological networks whilst streamlining development processes.
- 6.4.22. A mandatory 10% net gain requirement for Nationally Significant Infrastructure Projects (NSIPs) is legislated through the Environment Act 2021 [2] and is expected to become mandatory in November 2025.
- 6.4.23. Biodiversity metrics provide a measure of overall biodiversity value based in habitat type, area, condition and distinctiveness. The current approved metric is Defra's Biodiversity Metric 4.0 [3]. Biodiversity was calculated pre and post development. The change in biodiversity units indicates either a net loss, a net gain or no change in biodiversity. The BNG assessment is presented in ES Appendix 6.6 Biodiversity Net Gain Report (Document Reference 6.4.6.6).

6.5. Assessment Assumptions and Limitations

- 6.5.1. Specific assumptions and limitations relevant to each survey, including how any limitations have been overcome, are included in the relevant technical reports in ES Appendices 6.1 to 6.4 (Document Reference 6.4.6.1 to 6.4.6.4).
- 6.5.2. There are no survey constraints that present significant limitations or data gaps with the baseline data collected. Consequently, the Biodiversity baseline and assessment presented in this ES chapter is considered to be adequately robust.

6.6. Study Area

- 6.6.1. The study area denotes the full spatial context used to assess each ecological feature under investigation. The study area for the ecological surveys is defined by the Order Limits which encompassed land within the application boundary outlined by the red line boundary including all infrastructure, cables and solar PV module areas. Subsequent amendments to the Order Limits resulted in the study area extending beyond its initial boundaries for both wintering and breeding bird surveys.
- 6.6.2. A description of the Proposed Development is provided in ES Chapter 2 The Proposed Development (Document Reference 6.2.2).
- 6.6.3. All designated sites, sensitive habitats and species of importance that occur within the relevant ecological zone of influence of the Proposed Development were considered in this assessment. The extent of this zone varies according to the ecological receptor in question but in the majority of cases it is taken to be the Order Limits.

6.7. Baseline Conditions

Existing conditions

6.7.1. This section provides a description of existing conditions in the study area.

International and Statutory Designated Sites

6.7.2. There are four internationally designated sites within 10 km of the Order Limits. These are as follows:

- Teesmouth and Cleveland Coast SPA;
- Teesmouth and Cleveland Coast Ramsar;
- Teesmouth and Cleveland Coast proposed Ramsar; and
- Thrislington SAC.

6.7.3. There are six statutory designated sites within 2 km of the Order Limits. These are as follows:

- Briarcroft Pasture SSSI;
- Hardwick Dene and Elm Tree Woods LNR;
- Newton Ketton Meadow SSSI;
- Redcar Field SSSI;
- Whitton Bridge Pasture SSSI; and
- Stillington Forest Park LNR.

6.7.4. Site designation details are summarised in Table 6-3 . The location of these designated sites is shown in ES Figure 6.1 Designated Sites (Document Reference 6.3.6.1).

Table 6-3 International and stator Sites within 10 km of the Order Limits (2 km for SSSIs and LNRs)

Site Name	Description	Value	Approximate Distance (km) from Proposed Development
Teesmouth and Cleveland Coast SPA	The SPA comprises of intertidal habitats on and around the Tees estuary providing feeding and roosting opportunities for important number of waterbirds in winter and during passage periods. Freshwater and brackish pools also support breeding avocet during summer. Qualifying species under annex I include Ruff (<i>Philomachus pugnax</i>), Pied Avocet (<i>Recurvirostra avosetta</i>), Little Tern (<i>Sterna albifrons</i>), Common Tern (<i>Sterna hirundo</i>), and Sandwich Tern (<i>Sterna sandvicensis</i>). Red Knot (<i>Calidris canutus</i>) is listed as an annex II qualifying species. Also includes an assemblage criterion of over 20,000 waterbirds.	International	5.4

Site Name	Description	Value	Approximate Distance (km) from Proposed Development
Teesmouth and Cleveland Coast Ramsar & proposed Ramsar	The Ramsar site is a wetland of international importance, comprising intertidal habitats. The site qualifies under Ramsar criterion 5 and 6 as it is regularly used by over 20,000 waterbirds in any season and by 1% or more of the biogeographic populations of the following bird species, in any season; red knot (<i>Calidris canutus</i>), common redshank (<i>Tringa tetanus</i>) and Sandwich tern (<i>Thalasseus sandvicensis</i>). A proposed Ramsar is an expansion to the existing designation boundary.	International	5.4 (proposed Ramsar) 7.2 (Ramsar)
Thrislington special area of conservation SAC	Thrislington is a small site which contains the largest of the few surviving stands of <i>Sesleria albicans</i> – <i>Scabiosa columbaria</i> grassland.	International	10
Briarcroft Pasture SSSI	Briarcroft Pasture is nationally important for its areas of species rich unimproved neutral grassland.	National	1.9
Whitton Bridge Pasture SSSI	A nationally important site for its areas of species-rich unimproved neutral grassland.	National	0.7
Redcar Field SSSI	The site supports a range of fen vegetation types not found at any other site in County Durham.	National	0.4
Newton Ketton Meadow SSSI	The site is one of the few surviving unimproved hay meadows in the coastal plain between the Rivers Tyne and Tees.	National	0.1
Hardwick Dene & Elm Tree Woods LNR	The site consists of four distinct sections – two steep sided wooded valleys, separated by a roughly triangular area of grassland, and a further area of herb-rich, unimproved grassland.	National	1.3
Stillington Forest Park LNR	The site was reclaimed from a former slag heap and developed to benefit both wildlife and visitors. It is managed as a wildflower meadow. There are several ponds and wetland and woodland areas. At the north of the site is a dense woodland consisting of mature Hawthorn (<i>Crataegus monogyna</i>) and Ash (<i>Fraxinus excelsior</i>) trees.	National	0.9

Non-statutory Designated Sites

6.7.5. There are two non-statutory designated sites within 1 km of the Order Limits. These are as follows:

- Carr House Pond Local Wildlife Site (LWS); and

- Wynyard Woodland Park Stockton LWS.

6.7.6. Non-statutory designation site details are summarised in. The location of these sites is shown in ES Figure 6.1 Designated Sites (Document Reference 6.3.6.1).

Table 6-4 Non-statutory Designated Sites within 1 km of the Order Limits

Site Name	Description	Value	Approximate Distance (km) from Proposed Development
Carr House Pond LWS	The Site is important with regards to its neutral grassland habitat.	Local	0 (Immediately adjacent to the Order Limits)
Wynyard Woodland Park Stockton LWS	The Site is important with regards to the presence of great crested newts, harvest mouse (<i>Micromys minutus</i>), neutral grassland and neutral grassland mosaic habitat.	Local	0 (Immediately adjacent to Order Limits)

Species Records

- 6.7.7. The BDS, obtained in March 2022 from Environmental Records Information Centre (ERIC) Northeast, returned 82 records of legally protected species and an additional 1,181 records of noteworthy species recorded from places within 1 km of the Order Limits. Noteworthy species include species of principal importance that are listed under Section 41 of the NERC Act 2006. 49 records are of amphibians, 930 are birds, one is a fish, 92 are invertebrates, 185 are mammals (of these, 40 are bats) and six are plants.
- 6.7.8. A full list of species returned from the desk study can be reviewed in the ES Appendix 6.1 Preliminary Ecological Appraisal Report (Document Reference 6.4.6.1). Records pertaining to wintering and breeding birds are detailed in ES Appendix 6.2 Wintering Bird Survey Report (Document Reference 6.4.6.2) and ES Appendix 6.3 Breeding Bird Survey Report (Document Reference 6.4.6.3), respectively.

Habitats

- 6.7.9. The Proposed Development is 490 ha in size, of which the majority is comprised of arable fields and modified grassland which are delineated by hedgerows, though some are also marked by fences, ditches, watercourses and lines of trees. Full details of the habitats and botanical species recorded can be seen in ES Appendix 6.1 Preliminary Ecological Appraisal Report (Document Reference 6.4.6.1) with ES Figure 6.2 UK Habitats Survey (Document Reference 6.3.6.2) showing the UK habitats recorded within the Order Limits.
- 6.7.10. The study area is comprised of the following habitats:
- other neutral grassland (UK habitat code g3c);

- modified grassland (UK habitat code g4);
- woodland (UK habitat code w1);
- lines of trees (UK habitat code w1g6);
- hedgerows (UK habitat code h2);
- dense scrub (UK habitat code h3);
- fen, marsh and swamp (UK habitat code f2f);
- arable and horticulture (UK habitat code c1);
- built-up areas and gardens (UK habitat code u1);
- standing open water (UK habitat code r1a6); and
- rivers and streams (UK habitat code r2).

- 6.7.11. The vast majority of the habitats across the study area were species-poor and had little intrinsic botanical value. All of the habitats are also common and widespread in the surrounding landscape. However, most of the hedgerows, ponds, areas of woodland and watercourses (particularly Byers' Gill and Bishopton Beck) qualify as local BAP priority habitats and/or habitats of principal importance, being listed under Section 41 of the NERC Act 2006.
- 6.7.12. The arable and grassland habitats within the study area are considered to be of negligible botanical importance and of Local value only.
- 6.7.13. While most of the grassland around the study area has been agriculturally improved there are several areas of less intensively managed grassland, although still relatively species - poor. The largest two areas are within Panel Area F: North of Bishopton (c.1 ha) by Bishopton Beck and a c.1.3 ha area of grassland within Panel Area A: Brafferton, located around a tributary to the River Skerne. Other areas are rank, rough grassland with tall herbs found on the borders or corners of fields. Semi-improved grassland within the Order Limits is considered to be of Local value.
- 6.7.14. Woodland within the study area was found along roads, watercourses or along field boundaries. Three significant areas of woodland are present along roads; one dominated by Field Maple (*Acer campestre*) on a bank down from Aycliffe Lane to the west, another with several native tree species along Kirk Hill Road in between Redmarshall and Carlton, and a large strip of Ash (*Faxinus excelsior*) and Sycamore (*Acer pseudoplatanus*) woodland along Letch Lane to the east of the study area. Areas of woodland along watercourses were often much larger and mature. The most significant of these are large areas of woodland around Byers' Gill and along Bishopton Beck. There were also some smaller areas of wet woodland dominated by Hybrid Crack-willow. These were most notably found along Little Stainton Beck, the east of Byers Gill, and along eastern sections of Bishopton Beck. These areas of woodland within the Order Limits are considered to be of at least County value as part of a wider mosaic of habitats along the watercourses.

- 6.7.15. Most of the scrub across the entire study area was very similar, comprising a small range of woody species, most commonly Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Bramble (*Rubus fruticosus*) and Dog-rose (*Rosa canina*), with more occasional species being Elder (*Sambucus nigra*) and Gorse (*Ulex europaeus*). There are occasionally young trees within the scrub, most commonly Ash. The ground flora is usually very species-poor and likely to be sparse for most of the year. Dense scrub habitat within the study area was considered to be of Local value.
- 6.7.16. The habitats within the study area are delineated by hedgerows, and lines of trees. Almost all of the hedges qualify as priority habitats, comprising mostly native species, though they are also almost all species-poor. Even the most species-rich hedges recorded are not particularly diverse. A small proportion of field boundaries around the study area are marked by lines of trees. Almost all of these are outgrown hedges which dominated by hawthorn. As hedgerows and treeline habitats within the Order Limits are species poor with sections of more diverse hedgerows present not particularly rich, they are considered to be of Local value.
- 6.7.17. There are several watercourses around the study area. Given the limited size of most of these watercourses and the shading from adjacent scrub, the aquatic and marginal vegetation was limited. The most species-rich watercourse was a tributary of the river Skerne and the long, northern stretch of Bishopton Beck where Himalayan balsam (*Impatiens glandulifera*) was also present. The watercourses within the study area are considered to be of at least County value due to the wet woodland and other diversity of habitats they support.
- 6.7.18. The ponds within the study area may qualify as a priority habitat depending on the species that use it, but do not have significant botanical value. The majority of the ponds within the study area have little to no macrophytes/aquatic vegetation and have little other ecological value. Furthermore, they are not stand-alone habitats within the wider area, as similar habitats can be found within the surrounding areas. Therefore, these ponds do not fulfil the criteria of a priority habitat and are considered to be of low ecological significance and of Local value.
- 6.7.19. There is only one area of swamp vegetation within the study area, which is a large, seasonally wet pond along the cable route south of Carlton, due to the small extent of this habitat it is considered to be of Local value.
- 6.7.20. The only non-native invasive species identified within the study area was Himalayan balsam, found along Bishopton Beck and Brafferton.
- 6.7.21. All of the plant species recorded around the study area were relatively common and widespread in the local area. No species are present on the red list for England [5] except for Common Valerian (*Valeriana officinalis*), one of the relatively common species on the England red list listed as near-threatened, likely due to a loss of suitable habitat.

- 6.7.22. Full details and methodology of habitat surveys are presented in ES Appendix 6.1 Preliminary Ecological Appraisal Report (Document Reference 6.4.6.1).

Wintering Bird Surveys

- 6.7.23. Wintering waterfowl such as pink footed geese (*Anser brachyrhynchus*) and wigeon (*Anas penelope*) were associated with areas of open water within the study area. However, ongoing design iterations have subsequently removed these areas from the Proposed Development.
- 6.7.24. Other wintering bird populations were recorded within pasture and arable fields which provided a range of foraging opportunities, this was reflected in the diversity of bird species recorded. Whilst hedgerows separating fields were not of significant value for wintering birds, they were used by low numbers of a diverse range of species, including various species that have undergone significant national decline. Species recorded in hedgerows included little owl (*Athene noctua*), tree sparrow (*Passer montanus*), willow tit (*Poecile montanus*) and yellowhammer (*Emberiza citrinella*).
- 6.7.25. No wintering bird species recorded are listed as individual cited interest features of the Teesmouth and Cleveland Coast SPA or Ramsar site and no effects on the individual cited interest features are envisaged. However, the SPA and Ramsar do list a waterfowl assemblage of more than 20,000 individuals as a cited interest feature, and wintering waterfowl and waders recorded such as mallard (*Anas platyrhynchos*), wigeon and lapwing (*Vanellus vanellus*) recorded may form part of this waterfowl assemblage. Given the avoidance of Panel Areas close to large expanses of open water and the large expanse of additional agricultural land available close to the SPA and Ramsar site, no loss of functionally linked land would occur and no significant effects are envisaged. This potential impact has been considered through a HRA screening exercise. Full details for the HRA are present in ES Appendix 6.5 Habitats Regulations Assessment No Significant Effects Report (Document Reference 6.4.6.5).
- 6.7.26. Regarding individual species, wintering populations of seven species were assessed as being of potential county importance: specifically great crested grebe (*Podiceps cristatus*), grey partridge (*Perdix perdix*), herring gull (*Larus argentatus*), linnet (*Linaria cannabina*), pink-footed goose, stock dove (*Columba oenas*) and wigeon. A further three species (common gull (*Larus canus*), starling (*Sturnus vulgaris*) and tree sparrow) were potentially present in numbers of District importance.
- 6.7.27. Full details and methodology of the wintering bird surveys are presented in ES Appendix 6.2 Wintering Bird Survey Report (Document Reference 6.4.6.2).

Breeding Bird Surveys

- 6.7.28. During the breeding bird surveys a total of 66 species were recorded during the 2022 field surveys, of which 31 bird species were confirmed or considered likely to be breeding within the study area.

- 6.7.29. The open field habitat was considered important for ground nesting bird species including two curlew (*Numenius arquata*) breeding territories, and up to five pairs of lapwing and 19 pairs of skylark (*Alauda arvensis*). Hedgerows and other field boundaries supported a diverse assemblage of other nesting bird species including up to 12 pairs of tree sparrow and up to 19 pairs of yellowhammer (*Emberiza citrinella*), 2-3 pairs of reed bunting (*Emberiza schoeniclus*) and yellow wagtail (*Motacilla flava*).
- 6.7.30. No breeding species recorded are listed as interest features of the Teesmouth and Cleveland Coast SPA or Ramsar site and therefore no impacts on the SPA or Ramsar are envisaged.
- 6.7.31. Based on the numbers of these species recorded within the study area, populations of skylark, tree sparrow and yellowhammer were assessed as being of up to county level importance, whilst populations of grey partridge, lapwing, curlew, and reed bunting were assessed as being of up to District level importance.
- 6.7.32. Full details and methodology of the breeding bird surveys are presented in ES Appendix 6.3 Breeding Bird Survey Report (Document Reference 6.4.6.3).

Invertebrates

- 6.7.33. The BDS returned protected butterfly species such as the large tortoiseshell (*Aglais polychlora*) and white-letter hairstreak (*Satyrion w-album*) and a range of notable invertebrates within 1 km of the Order Limits, which were predominantly associated with statutory and non-statutory designated sites.
- 6.7.34. The field margins and woodlands are likely to support an invertebrate assemblage typical of farmland landscapes. It is not considered likely that the invertebrate assemblage would be of particular importance. The invertebrate assemblage is valued importance at the Local level only.
- 6.7.35. Full details on invertebrate are presented in ES Appendix 6.1 Preliminary Ecological Appraisal Report (Document Reference 6.4.6.1).

Amphibians including Great Crested Newts

- 6.7.36. As stated in the baseline information no field surveys for great crested newt (GCN) have been undertaken as the district level licensing approach removes this requirement. However, the BDS revealed 49 records of four different amphibians within 1 km of the Order Limits boundary including 9 GCN, 10 common toad (*Bufo bufo*), 18 smooth newt (*Lissotriton vulgaris*) and 12 common frog (*Rana temporaria*). No records of GCN were returned by the BDS within the past 10 years with the most recent record from 2012.
- 6.7.37. A total of five ponds were recorded within the Order Limits with four of these ponds considered to have potential suitability for GCN. Adjacent to the Order Limits four ponds were recorded with three of these ponds considered to have potential suitability for GCN. A search of OS mapping located 23 ponds within 250 m of the Order Limits.

The majority of terrestrial habitat within the Panel Areas and along the cable corridor were seen as unsuitable for GCN.

- 6.7.38. In the absence of survey information, there is potential for GCN to be present within these waterbodies and they are therefore assumed to be present.
- 6.7.39. Given the results of the BDS, suitable ponds for GCN within and adjacent to the Proposed Development, it is therefore considered that the Order Limits is of Local value only for GCN.
- 6.7.40. Full details on GCN are presented in ES Appendix 6.1 Preliminary Ecological Appraisal Report (Document Reference 6.4.6.1).

Reptiles

- 6.7.41. No records of reptiles were returned from the BDS. Suitable habitat to support reptiles were recorded within the study area, such as: long grass around field margins, rough and tussock grassland, areas of woodland and tall ruderal and scrub around field margins. A few potential hibernacula sites were also recorded within the study area which were large brash, log or stone piles and an area with dead wood.
- 6.7.42. The study area is largely unsuitable for reptiles given that the majority of the land is arable land and improved grassland, which is suboptimal for reptiles. There is some potential for reptiles to be present in the field margins, with some potential hibernacula features recorded and it is therefore assumed that they are present on a precautionary basis. Given the limited habitat present for reptiles, it is considered that the Order Limits is of Local value only for reptiles.
- 6.7.43. Full details on reptiles are presented in ES Appendix 6.1 Preliminary Ecological Appraisal Report (Document Reference 6.4.6.1).

Bats

- 6.7.44. The BDS returned records of the following bat species within 1 km of the Order Limits:
- noctule bat (*Nyctalus noctule*) (2 records);
 - Daubenton's bat (*Myotis daubentonii*) (4 records);
 - whiskered bat (*Myotis mystacinus*) (1 record);
 - common pipistrelle bat (*Pipistrellus pipistrellus*) (18 records);
 - soprano pipistrelle (*Pipistrellus pygmaeus*) (1 record);
 - Nathusius's Pipistrelle (*Pipistrellus nathusii*) (1 record); and
 - 4 records of unidentified pipistrelles, 4 unidentified *Myotis* species and 5 unidentified bats.
- 6.7.45. During the ground-level tree assessment, a total of 527 trees (or groups of trees) were identified throughout the Order Limits with bat roost potential, ranging from low to

high suitability. Of the trees identified, 60 were recorded as having low suitability, 416 were recorded as having moderate suitability and 51 were recorded as having high suitability to support roosting bats. Most of the trees identified were located on woodland edges, within field margins or along roadside hedgerows.

- 6.7.46. A road bridge consisting of a single arch also offered moderate suitability for bats by way of cracks in the brickwork.
- 6.7.47. The species assemblage recorded during static detector surveys which were carried out across the study area were as follows; common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Daubenton's bat, Natterer's bat, Brandt's bat (*Myotis brandti*), whiskered bat, noctule, brown long-eared bat (*Plecotus auritus*), *Myotis* spp. and *Nyctalus* spp. A total of 222,698 bat registrations were recorded for the study area with a mean registration rate of 38.58 bat registrations per hour (B/h). The majority of bat activity was from common pipistrelle (71.8%) and soprano pipistrelle (13.7%) bats which accounted for 86% of all bat activity.
- 6.7.48. Habitats of high value for commuting and foraging bats were shown to be the network of hedgerows across the study area and small pockets of woodland. These areas support invertebrate activity and provide a roosting network for bats.
- 6.7.49. The importance of the bat assemblage recorded within the study area was assessed based on the species recorded, local species distribution (BDS) and regional distributions. When taking these factors into consideration the species assemblage for the Order Limits was assessed as being of local value.
- 6.7.50. The value of habitats across the Order Limits for commuting and foraging Nathusius' pipistrelle is assessed as being of County value based on the low number of registrations recorded across the study area and the regional populations of this species with a restricted distribution in the north of England and due to a near threatened conservation status.
- 6.7.51. The value of habitats across the Order Limits for commuting and foraging common pipistrelle, soprano pipistrelle, *Myotis* spp., brown long-eared bat and noctule bats is assessed as being of Local value due to the favourable conservation status of these species and their widespread distribution.
- 6.7.52. Full details and methodology of static bat surveys are presented in ES Appendix 6.4 Bat Static Detector Survey Report (Document Reference 6.4.6.4).

Water Vole and Otter

- 6.7.53. Only one record of water vole (*Arvicola amphibius*) and 14 records of otter (*Lutra lutra*) were returned from the BDS. The water vole record was recorded in 2000 and was located near Dene Beck. The closest otter record was within the Order Limits near to Bishopton Beck with the most recent record from 2019 at the River Skerne.

- 6.7.54. Certain areas of the streams surveyed within the study area had some suitability to support water vole, with a flowing drain at Letch Beck offering suitable riparian habitat for Water Vole. However, the majority of habitat available was limited and sub optimal given the shallow depth of water and lack of in stream channel vegetation. Due to limited habitat available and fragmentation of good quality suitable habitat, it is unlikely that water voles are present within the surveyed waterways. In addition, the design of the Proposed Development in most cases would maintain a suitable buffer from watercourses.
- 6.7.55. Given the limited habitat present for Water Vole and the absence of signs to indicate presence such as burrows or droppings, it is considered that the Order Limits is of Local value for water vole.
- 6.7.56. The waterways throughout the study area may be used by commuting and foraging otters, likely using the smaller Becks on site for commuting between ponds and larger rivers. The terrestrial habitat within the study area was mostly unsuitable, providing little opportunity for laying up spots, couches or holts and minimal spraint or other evidence was recorded during the survey. The design of the Proposed Development in most cases would maintain a suitable buffer from watercourses.
- 6.7.57. Given the limited habitat present for otter and the absence of holts, couches or resting sites, it is considered that the Order Limits is of Local value for otter.
- 6.7.58. Full details and methodology on otters is presented in ES Appendix 6.1 Preliminary Ecological Appraisal Report (Document Reference 6.4.6.1).

Badger

- 6.7.59. In total, 18 records of badger were returned during the BDS, with the closest being a record northeast of the Order Limits from 2009.
- 6.7.60. Numerous badger setts, latrines, snuffle holes, prints, foraging signs and paths were observed throughout the study area. A total of 12 setts were recorded including: two main setts, one annex sett, four subsidiary setts, three outlier setts and two potential setts. Setts were mainly recorded along field boundaries and within woodland. Several fresh latrines were recorded providing evidence of recent badger activity. Additionally, badger hairs were found on barbed wire along mammal paths across the study area.
- 6.7.61. Given the BDS return, setts and signs recorded, and habitats present for badger within the study area, it is considered that the Order Limits is of Local value for badger.
- 6.7.62. The methodology on badgers is presented in ES Appendix 6.1 Preliminary Ecological Appraisal Report (Document Reference 6.4.6.1) with survey results shown as a confidential appendix which can be provided upon request to relevant project staff, relevant councils, Natural England and the Badger Trust.

Other Species

- 6.7.63. Several brown hares (*Lepus europaeus*) were seen within the study area and there is suitable habitat for them throughout. Hares favour a mosaic of arable fields, grassland and woodland edges, which are all present within the Order Limits. In addition, there are over 45 records of brown hares within 1 km of the Order Limits; demonstrating that the Order Limits and the wider area is highly suitable habitat for hares and supports a good number of the species. It is considered that the Order Limits is of Local value for brown hare.
- 6.7.64. The survey did not record the presence of any other animals of nature conservation importance; however, habitats within the Order Limits were considered suitable for European hedgehog (*Erinaceus europaeus*). 65 records of hedgehogs within 1 km of the Order Limits were identified during the BDS. Hedgehogs occupy a range of lowland habitats with enough cover to allow nesting; they are common in parks in urban and suburban environments, farmland and gardens. Scrub, hedgerows, and grassland on the site provide suitable foraging habitat for hedgehogs. There may be opportunities for hedgehogs to hibernate in log piles, root plates or dense scrub and it is likely that they are present. It is considered that the Order Limits is of Local value for hedgehog.
- 6.7.65. In addition to the above both red deer (*Cervus elaphus*) and muntjac (*Muntiacus reevesi*) have been observed anecdotally within the Order Limits but no formal surveys have been undertaken.
- 6.7.66. Full details and methodology of other species are presented in ES Appendix 6.1 Preliminary Ecological Appraisal Report (Document Reference 6.4.6.1).

Summary of Important Ecological Features

- 6.7.67. The important ecological features relevant to the Proposed Development are summarised on Table 6-5. Based on CIEEM guidelines [1] and using professional judgement. Features of Local Importance i.e. less than district importance, are not considered further in the assessment process, unless legislation requires their consideration. However, the protected status of species occurring at a local level such as bats and badger have been considered and appropriate mitigation measures embedded into the Proposed Development to minimise impacts.

Table 6-5 Summary of Important Ecological Features

Important Ecological Feature	Reason for Valuation	Biodiversity Importance
Teesmouth and Cleveland Coast SPA, Ramsar & proposed Ramsar	Statutory site of conservation importance	International
Thrislington special area of conservation SAC	Statutory site of conservation importance	International
Four SSSI sites	Statutory sites of conservation importance	National
Two LNR sites	Statutory sites of conservation importance	National

Important Ecological Feature	Reason for Valuation	Biodiversity Importance
Two LWS	Non-statutory sites of conservation importance	County
Woodland	BAP priority habitat	County
Watercourses (Byers Gill and Bishopton Beck)	Lowland mixed deciduous and wet woodland BAP priority habitat	County
Non-breeding (wintering) birds	Great crested grebe, grey partridge, herring gull, linnet, pink-footed goose, stock dove, and wigeon	County
	Common gull, starling and tree sparrow	District
Breeding Birds	Skylark, tree sparrow and yellowhammer	County
	Grey partridge, lapwing, curlew, and reed bunting	District
Bats (foraging/commuting)	Nathusius' pipistrelle	County

Future Baseline

- 6.7.68. The general approach to defining the future baseline for the Proposed Development is described in ES Chapter 4 Approach to EIA (Document Reference 6.2.4).
- 6.7.69. In the short to medium term, in the absence of the Proposed Development, these habitats will continue to support a number of species, such as farmland for ground-nesting birds. In the long term, in the absence of the Proposed Development, habitats within the Order Limits will undergo agricultural management practices, such as the application of fertilizers and pesticides, hedgerow cutting, tillage, drainage, intercropping, rotation and grazing. The distribution and population of some species will change in response to these agricultural practices, with the assemblage of species broadly remaining the same. Any changes to the baseline between now and the future scenario have been taken into account in the assessment and when determining mitigation measures.
- 6.7.70. Irrespective of whether the Proposed Development were to proceed or not, the current trend is for a decline in species diversity and abundance, caused by national trends and in response to intensive agricultural practices and climate change.

6.8. Potential impacts

- 6.8.1. Based on the design of the Proposed Development during operation and associated construction and decommissioning activities, the Proposed Development has the potential to impact on biodiversity during construction, operation and decommissioning.

Construction

- 6.8.2. During construction of the Proposed Development, potential impacts are likely to include:
- Habitat loss or gain – direct impacts with changes in land use and temporary loss of habitat such as hedgerows to facilitate the installation of the Proposed Development. Permanent land-take (mainly arable land), associated with the installation of the solar PV modules.
 - Fragmentation of population or habitats – indirect impacts due to the Proposed Development impacting on the ecological network within the Order Limits with the creation of partial or complete barriers to the movement of species.
 - Disturbance to foraging bats during construction due to noise, as well as changes to habitat due to the placing of solar PV modules which could potentially lead to a temporary reduction in bat insect prey availability.
 - Potential loss of roosting habitat if any trees suitable to support roosting bats require removal to accommodate the infrastructure – considered unlikely.
 - Loss of breeding and foraging habitat for non-ground nesting birds, with construction activities creating displacement through disturbance.
 - Loss of breeding and foraging habitat for ground nesting birds such as curlew due to the placement of solar PV modules.
 - Potential disturbance and displacement of wintering wildfowl forming part of the waterfowl assemblage of the Teesmouth and Cleveland SPA and Ramsar site.

Operation

- 6.8.3. During operation of the Proposed Development, potential effects are likely to include:
- A potential positive effect from an increase in invertebrate diversity with an increase in foraging habitat for some bird species and bats and increasing in nesting habitat for birds due to biodiversity enhancement measures including along field boundaries, and the management of the land underneath the Panel Areas.
 - A significant gain in biodiversity from the above measures.
 - Potential attraction or avoidance of species such as bats and birds to the Proposed Development from potential increases in prey (i.e. flying insects), operational compound and avoidance of some bat species to Solar PV modules [6].
 - Biodiversity enhancement areas and the two fields providing open ground for ground nesting birds such as curlew, and skylark.

Decommissioning

- 6.8.4. The effects of decommissioning of the Proposed Development are likely to be similar to those for construction. Habitats and protected or notable species are likely to be subject to temporary loss of habitat or disturbance during decommissioning activities and appropriate measures will need to be put in place to minimise direct loss of habitat and disturbance.

6.9. Embedded Mitigation

- 6.9.1. The Proposed Development has been designed, to avoid and prevent adverse environmental effects on biodiversity through the process of design development and consideration of good design principles.
- 6.9.2. Mitigation measures incorporated in the design and construction of the Proposed Development, considering the potential impacts, are reported as embedded mitigation in ES Chapter 2 The Proposed Development (Document Reference 6.2.2). The effects of the Proposed Development are assessed considering embedded mitigation is in place and are reported in Section 6.10.
- 6.9.3. Where required further mitigation is deemed required as a result of a potentially significant effect, this is termed essential mitigation. Essential mitigation is set out as part of the assessment of effects in Section 6.10.
- 6.9.4. A further definition of these classifications of mitigation and how they are considered in the EIA is provided in Section 4.5 in ES Chapter 4 Approach to EIA (Document Reference 6.2.4).

6.10. Assessment of likely significant effects

- 6.10.1. This section presents the likely effects on biodiversity resulting from the construction, operation and decommissioning of the Proposed Development.
- 6.10.2. The assessment of effects takes into account the potential impacts on each receptor (as set out in Section 6.8) following the implementation of the embedded mitigation measures (as set out in Section 6.9). Where required to mitigate potentially significant effects, essential mitigation measures are outlined as part of the assessment, and the overall significance of residual effects set out.

Construction

Statutory designated sites

- 6.10.3. Teesmouth and Cleveland Coast is an SPA, and Ramsar Site is 5.4 km SPA and proposed Ramsar) and 7.2 km (Ramsar) from the Order Limits and is of international importance. Potential impacts are the displacement of wintering birds forming part of the waterfowl assemblage. However, this is unlikely given the relatively low numbers of wintering birds recorded within the Order Limits and the avoidance of fields adjacent to where geese and other wildfowl were recorded in higher numbers, suggesting no loss of functionally linked land to the designated site and the availability of alternate farmland habitat in the wider area. Any effects would therefore be short-term in duration and of negligible magnitude and not significant.
- 6.10.4. Thrislington SAC is 10 km away from the Order Limits and a total of four SSSI and two Local Nature Reserves are within 2 km of the Order Limits. Thrislington SAC is of

international importance and is designated for semi-natural dry grasslands, broadleaved deciduous woodland and scrubland. Considering the light, noise and pollution control measures that are secured via ES Appendix 2.6 Outline Construction Environmental Plan (Document Reference 6.4.2.6), it is expected that there would be negligible impacts on these designated sites. Any effects would be short-term in duration and of negligible magnitude and are therefore not significant.

6.10.5. A total of four SSSIs and two LNRs are within 2 km of the Order Limits. Considering the light, noise and pollution control measures that are secured via ES Appendix 2.6 Outline Construction Environmental Plan (Document Reference 6.4.2.6), it is expected that there would be negligible impacts on these designated sites. Any effects would be short-term in duration and of negligible magnitude and are therefore not significant.

6.10.6. No essential mitigation is required and as such residual effects remain as reported.

Non-Statutory sites

6.10.7. There are two LWS within 1 km of the Order Limits, which are Carr House Pond Darlington and Wynyard Woodland Park Stockton, which are adjacent to the Order Limits. Carr House Pond is important in regard to its pond and marshy grassland while Wynyard woodland is important in regard to the presence of GCN, harvest mouse (*Micromys minutus*) and neutral grassland. Considering that security fencing will be in place at these locations to protect these sites before construction starts and the light, noise and pollution control measures that are secured via ES Appendix 2.6 Outline Construction Environmental Plan (Document Reference 6.4.2.6), it is expected that there would be negligible impacts on these sites. The impact would be short-term in duration and of negligible magnitude, with the effect being not significant.

6.10.8. No essential mitigation is required and as such residual effects remain as reported.

Habitats

6.10.9. Semi-improved grassland, woodland, dense scrub, treelines, swamp and ponds are of local value. The majority of these habitat types are along field margins with it expected that most of these habitats will be retained. Considering buffers and fencing to be used to protect these habitats from construction activities and the light, noise and pollution control measures that are secured via ES Appendix 2.6 Outline Construction Environmental Plan (Document Reference 6.4.2.6) with the replacement of habitats (planting and sowing) that are removed, any impacts would therefore be short-term in duration and of low magnitude, with the effects considered to be not significant.

6.10.10. Construction activities are predicted to result in the potential for the loss of 0.15 km of hedgerow as a result of grid connection cables and access routes. Whilst the extent of any loss of this habitat is currently unknown, the majority of hedgerows across the Proposed Development will be avoided with the hedgerows to be affected of poor quality. Sections of hedgerow to be removed will be reinstated and replanted with

native species elsewhere within the Order Limits. This impacts have been assessed as short-term and of low magnitude, with the effects considered to be not significant.

- 6.10.11. Watercourses/waterbodies are to be protected from construction activities and all works in proximity to waterbodies/watercourses will follow measures are secured via ES Appendix 2.6 Outline Construction Environmental Plan (Document Reference 6.4.2.6) to ensure their protection against pollution, silting and erosion. It is expected that any impacts would therefore be short-term in duration and of low to magnitude, with the effects considered to be not significant.
- 6.10.12. Common valerian was recorded within the study area which is a species present on the red list for England [5] and listed as near-threatened, likely due to a loss of suitable habitat. The tributary this plant was recorded on is not expected to be impacted on by the Proposed Development. Therefore, the impacts of construction on this plant species are expected to be of negligible magnitude, with the effects considered to be not significant.
- 6.10.13. No essential mitigation is required and as such residual effects remain as reported.

Birds

- 6.10.14. The revised layout of the Proposed Development avoids open water and areas where wintering geese were recorded in higher numbers during the winter. There will be an allocation of eight biodiversity enhancement areas and two large fields in Panel Area F: North of Bishopton, that will remain free of solar PV modules to provide continued availability of habitat. The impacts on wintering birds have therefore been assessed as short-term and of low magnitude, with the effects considered to be not significant.
- 6.10.15. Eight land parcels currently used for intensive agriculture across the Order Limits to be used for biodiversity enhancement with no solar PV modules, with these areas sown with species-rich wildflower meadow grassland, with the aim of providing enhanced foraging and nesting habitat for birds. Furthermore, two large fields in Panel Area F: North of Bishopton, to remain free of no solar PV modules to be maintained with low maintenance grass sward providing enhanced availability of open ground for ground-nesting birds, such as curlew and lapwing. The clearance of vegetation of value to nesting birds will be completed outside of the bird-breeding season where possible. Should it not be possible to avoid this season, vegetation will be inspected/surveyed by the project ecologist immediately before clearance. The impacts on breeding birds have therefore been assessed as short-term and of low magnitude, with the effects considered to be not significant.
- 6.10.16. No essential mitigation is required and as such residual effects remain as reported.

Invertebrates

- 6.10.17. The revised layout of the Proposed Development enables the retention of habitats suitable for invertebrates such as field margins, woodland and the majority of

hedgerows and associated trees. Planting along field margins, under panels and planting lost hedgerows with additional planting along gappy hedgerows is likely to increase invertebrate numbers and diversity. Therefore, the impacts on invertebrates have been assessed as short-term and of low magnitude, with the effects considered to be not significant.

- 6.10.18. No essential mitigation is required and as such residual effects remain as reported.

Great-crested newts

- 6.10.19. Taking into account the retention of areas considered to be of potential for terrestrial GCN (hedgerows and field margins), and the compensation to be provided via the District Level Licence application payment, the impacts of construction on GCN is expected to be short term and of low magnitude, with the effects considered to be not significant.

- 6.10.20. No essential mitigation is required and as such residual effects remain as reported.

Reptiles

- 6.10.21. Taking into account the retention of areas considered to be of potential habitat for reptiles (field margins and scrub), and if the removal of suitable vegetation is required the adoption of management practice to reduce the impact on reptiles, the impacts of construction on reptiles are expected to be of low magnitude, which will be short term, with the effects considered to be not significant.

- 6.10.22. No essential mitigation is required and as such residual effects remain as reported.

Bats

- 6.10.23. In total seven trees with suitable potential roosting features (PRF) will be removed by the Proposed Development. One large, mature ash tree in moderate condition is being felled to leave a c.5 m monolith to prevent a fall risk onto the proposed PV panels. This ash tree will be allowed to resprout from the stump and is therefore retained. The loss of these trees with PRF will reduce roosting availability within the Order Limits. A total number of 521 trees or groups of trees which recorded PRF will be retained with 50 bat boxes to be installed across the Proposed Development. Trees that have been identified as suitable bat roost trees will be protected during development by establishing a Construction Exclusion Zone (CEZ) around their Root Protection Areas (RPA) with lighting to adhere to best practice guidance to reduce disturbance on bats [9]. Furthermore, any trees with PRF to be felled or pruned will be subject to pre-construction checks with any loss of bat roosts mitigated through licensing. Therefore, the impacts of construction on all bat species would be of short-term and of low magnitude, with the effects considered to be not significant.

- 6.10.24. Habitat suitable for foraging, commuting and roosting bats such as field margins, woodland, scrub and the majority of hedgerows and associated trees will be retained, with a buffer of 8 m from Panel Areas to boundary features. Eight land parcels

currently used for intensive agriculture across the Order Limits to be used for biodiversity enhancement with two large fields in Panel Area F: North of Bishopton, also to remain free of solar PV modules. These areas will provide enhanced foraging opportunities across the Order Limits for bat species. Furthermore, lost hedgerows will be replanted, gappy ones stocked up and management relaxed on others to provide enhanced commuting and foraging habitat for bats. Therefore, the impacts on all bat species have been assessed as short-term and of low magnitude, with the effects considered to be not significant.

- 6.10.25. No essential mitigation is required and as such residual effects remain as reported.

Otters

- 6.10.26. To prevent disturbance to commuting and foraging otter where possible buffers of 10 m between construction and riparian boundaries and watercourses will be maintained. Protection measures will be implemented and adopted during construction, formalised through a CEMP with no works within 30m of waterbodies/watercourses during hours of darkness. When taking these measures into account as well as pre-construction checks for otter along suitable watercourse/waterbodies, the impacts on otters has been assessed as short-term and of negligible magnitude, with the effects considered to be not significant.

- 6.10.27. No essential mitigation is required and as such residual effects remain as reported.

Badgers

- 6.10.28. Taking into account the retention of all known badger setts, badger access points in security fencing, pre-construction surveys, and the need for a Natural England licence should an active sett need to be disturbed, the impacts of construction on badgers is expected to be short-term and of low magnitude, with the effects the impacts on otters has been assessed as short-term and of negligible magnitude, with the effects considered to be not significant.

- 6.10.29. No essential mitigation is required and as such residual effects remain as reported.

Notable species

- 6.10.30. As habitats suitable for brown hare and hedgehog will be retained with field margin habitats enhanced and badger access points created to facilitate the movement of these small mammal species across the Proposed Development, the impact on these species has been assessed as short-term and of low magnitude, with the effects considered to be not significant.

- 6.10.31. As mentioned in Section 6.9.4 the fencing will be around blocks of panels allowing continued movement of deer through the landscape along retained margins.

- 6.10.32. No essential mitigation is required and as such residual effects remain as reported.

Operation

Statutory designated Sites

- 6.10.33. The Proposed Development is expected to have minimal operational work, and will have no change on nearby SPA, SAC, SSSI, LNR, and LWS. During the operational phase of the Proposed Development, on-site activities would be limited and restricted to routine maintenance activities, for example replacement of any components that fail, monitoring activities and vegetation management. As a result, the effects are considered to be not significant.
- 6.10.34. No essential mitigation is required and as such residual effects remain as reported.

Habitats

- 6.10.35. As solar farms are passive developments the impacts from the Proposed Development during operation on retained habitats would be minimal, with on-site activities limited and restricted to routine maintenance activities, for example replacement of any components that fail, monitoring activities and vegetation management. As such, no impacts on the retained woodlands, hedgerows and watercourses within the Order Limits are expected from the Proposed Development.
- 6.10.36. The new habitat creation and enhancement results in an anticipated 88% net gain in area habitats and 108% net gain in hedgerows. The overall impacts of the operation on habitats are therefore expected to be long-term and of low magnitude, which would result in a beneficial long-term effect, and a significant net gain in biodiversity.
- 6.10.37. No essential mitigation is required and as such residual effects remain as reported.

Birds

- 6.10.38. Low numbers of wintering birds have been recorded within the study area. However, the revised layout avoids open water and areas where wintering geese were recorded in higher numbers. Therefore, the impacts of operation on wintering birds are therefore considered to be long term and of low magnitude, with the effects considered to be not significant.
- 6.10.39. The discrete areas allocated for ground-nesting birds, curlew and lapwing will be managed in a manner sympathetic to ground-nesting birds, for example late summer hay cuts after young birds have fledged. Habitat creation including hedgerows, field margin sowing, and meadow grassland would benefit invertebrates and in turn foraging and nesting birds. The overall impacts of operation on nesting birds are therefore considered to be long-term of moderate magnitude, which would result in a beneficial long-term effect.
- 6.10.40. No essential mitigation is required and as such residual effects remain as reported.

Bats

- 6.10.41. The majority of boundary features which are of value to foraging and commuting bats as well as potential bat roost features in trees will be retained with suitable buffers to allow the continued use of these features across the Order Limits. Recent research work carried out over 19 paired sites in the Southwest of England has found that there is an avoidance of some bat species to panel areas, suggesting that loss and/or fragmentation of foraging/commuting habitat is caused by ground-mounted solar panels. In particular, the avoidance of *Pipistrellus pipistrellus* and *Nyctalus* spp. at solar PV sites regardless of the habitat type considered. Negative impacts of solar PV panels at field boundaries were observed for *Myotis* spp. and *Eptesicus serotinus* activity, and in open fields for *Pipistrellus pygmaeus* and *Plecotus* spp. It is not known if this paper has considered habitat changes to be delivered as part of solar proposals i.e. intensively farmed arable landscape to sympathetically managed grassland which would benefit bats. The study does suggest that mitigation measures to off-set this impact include, but are not be limited to, reducing the density of panels within the site footprint, ensuring boundary habitat is maintained and improved in its area and diversity, and ensuring appropriate planting to improve foraging resources for those species identified as being at risk from the development [6] .
- 6.10.42. To mitigate the potential loss or displacement of foraging habitats, there are eight biodiversity enhancement areas and two large fields to the north of Bishopton to remain free of Solar PV modules. Furthermore, the additional habitat creation including hedgerows with trees, field margin sowing, and meadow grassland would benefit invertebrates and in turn foraging bats, thereby enhancing habitat corridors / ecological networks across the Order Limits with lighting impacts negligible. The embedded mitigation outlined would likely reduce the long-term impacts to a low to minor magnitude, with the effects considered to be not significant. However, a small residual effect impact may remain due to the likely continued displacement of some bat species from Solar PV modules. But given the embedded mitigation this residual effect is not considered to be significant.
- 6.10.43. No essential mitigation is required and as such residual effects remain as reported.

Invertebrates, reptiles and amphibians

- 6.10.44. Habitat creation including hedgerows and habitat enhancement in field margins and under Panel Areas would benefit invertebrates, reptiles, GCN and other amphibians. Therefore, the impact of operation on invertebrates, reptiles and GCN are expected to be of low to medium magnitude which would result in a beneficial long-term effect.
- 6.10.45. No essential mitigation is required and as such residual effects remain as reported.

Protected and notable species

- 6.10.46. The creation of the grassland habitat and woodland habitat within the Proposed Development will benefit badger, brown hare and hedgehog in the area, creating new

foraging habitats that are of a higher quality than the existing arable landscape. Therefore, the impact of operation on badgers, brown hare and hedgehog is expected to be of low magnitude which would result in a beneficial long-term effect.

- 6.10.47. No essential mitigation is required and as such residual effects remain as reported.

Decommissioning

- 6.10.48. The effects of decommissioning are likely to be similar, and no worse, than those identified for construction, and as such a separate assessment has not been carried out. Prior to the decommissioning of the Proposed Development, a Decommissioning Environmental Management Plan (DEMP) will be produced, setting out measures to avoid or minimise impacts during the decommissioning phase.

6.11. Monitoring

- 6.11.1. Post-construction monitoring will be carried out to ensure that the new habitat creation provided as mitigation for effects (both those of an ecological nature and those associated with other technical disciplines) is established and then maintained successfully. This will focus on the botanical component, on the basis that the successful implementation of this will have associated benefits for the animal species that they support. Monitoring is set out in ES Appendix 2.14 Outline LEMP (Document Reference 6.4.2.14) and secured as a DCO Requirement.

6.12. Summary

- 6.12.1. Table 6-6 provides a summary of the important ecological features identified, impact, mitigation and likely effects of the Proposed Development on Biodiversity. The table has been subdivided into effects for construction, operation and decommissioning.

Table 6-6 Important Ecological Features assessment summary

Impact	Embedded/Essential Mitigation and how secured	Receptor Value	Magnitude of impact	Significance of effect
Construction and Decommissioning				
Potential disturbance and displacement of wintering wildfowl part of the waterfowl assemblage of the Teesmouth and Cleveland SPA and Ramsar site.	<ul style="list-style-type: none"> ▪ Revised layout avoids open water and some areas where geese were recorded in the winter. ▪ Displacement unlikely given the relatively low numbers of wintering birds recorded within the Proposed Development ▪ Noise and visual disturbance will not impact on the integrity or the functioning of SPA, Ramsar & SAC sites, owing to the distance between these sites and the Order Limits. This potential impact has been assessed through a HRA screening exercise. Full details for the HRA are presented in ES Appendix 6.5 Habitats Regulations Assessment No Significant Effects Report (Document Reference 6.4.6.5). 	International	Negligible	Not significant
Potential indirect impacts to the Thrislington SAC through noise, water quality, lighting or visual	<ul style="list-style-type: none"> ▪ Noise and visual disturbance will not impact on the integrity or the SAC site, owing to the distance between this site and the Order Limits. This potential impact has been assessed through a HRA screening exercise. Full details for the HRA are presented in ES Appendix 6.5 Habitats Regulations Assessment No Significant Effects Report (Document Reference 6.4.6.5). 	International	Negligible	Not significant
Potential indirect impacts to four SSSI sites through noise, water quality, lighting or visual	<ul style="list-style-type: none"> ▪ Construction will not directly impact on habitats within these designated sites. ▪ Noise and visual disturbance will not impact on the integrity or the functioning of SSSI sites, as standard environmental protection measures will be implemented and adopted during construction, formalised through a CEMP. ▪ Details of these measures are presented in ES Appendix 2.6 Outline Construction Environmental Plan (Document Reference 6.4.2.6) 	National	Negligible	Not significant
Potential indirect impacts to two LNR sites through noise, water quality, lighting or visual	<ul style="list-style-type: none"> ▪ Construction will not directly impact on habitats within these designated sites. ▪ Noise and visual disturbance will not impact on the integrity or the functioning of LNR sites, as standard environmental protection measures will be implemented and adopted during construction, formalised through a CEMP. 	National	Negligible	Not significant
Potential indirect impacts to two LWS sites through noise,	<ul style="list-style-type: none"> ▪ Construction will not directly impact on habitats within these designated sites. 	County	Negligible to low	Not significant

Impact	Embedded/Essential Mitigation and how secured	Receptor Value	Magnitude of impact	Significance of effect
water quality, lighting or visual	<ul style="list-style-type: none"> ▪ Noise and visual disturbance will not impact on the integrity or the functioning of LNR sites, as standard environmental protection measures will be implemented and adopted during construction, formalised through a CEMP. ▪ Details of these measures are presented in ES Appendix 2.6 Outline Construction Environmental Plan (Document Reference 6.4.2.6) 			
Potential indirect impacts to woodland	<ul style="list-style-type: none"> ▪ Woodland habitat will be retained. ▪ Woodland habitat will be protected from construction activities with fencing and other measures outlined in CEMP. ▪ Details of these measures are presented in ES Appendix 2.6 Outline Construction Environmental Plan (Document Reference 6.4.2.6). 	County	Negligible to low	Not significant
Pollution to watercourses	<ul style="list-style-type: none"> ▪ Where possible 10m buffers to watercourses. ▪ HDD where the Proposed Development crosses watercourses ▪ All works in proximity to waterbodies/watercourses will follow measures outlined in a CEMP to ensure their complete protection against pollution, silting and erosion. ▪ Details of these measures are presented in ES Appendix 2.6 Outline Construction Environmental Plan (Document Reference 6.4.2.6). 	County	Negligible to low	Not significant
Loss of foraging habitat for wintering bird due to disturbance and the placement of Solar PV modules.	<ul style="list-style-type: none"> ▪ Revised layout avoids open water and some areas where geese were recorded in the winter. ▪ Allocation of areas that will remain free of solar panels to provide continued availability of habitat. ▪ Lost hedgerows will be replanted, gappy ones stocked up and management relaxed on others to provide enhanced roosting and foraging habitat for wintering birds. ▪ Sowing with specific wild bird winter food mix along field margins. 	County: great crested grebe, grey partridge, herring gull, linnet, pink-footed goose, stock dove and wigeon District: common gull, starling & tree sparrow	Low	Not significant
Loss of breeding habitat for nesting birds through	<ul style="list-style-type: none"> ▪ Revised layout avoids open water and some areas of nesting lapwing and curlew. 	County: skylark, tree	Low	Not Significant

Impact	Embedded/Essential Mitigation and how secured	Receptor Value	Magnitude of impact	Significance of effect
<p>disturbance and the placement of Solar PV modules</p>	<ul style="list-style-type: none"> ▪ Eight biodiversity enhancement areas and two large fields to the north of Bishopton to remain free of Solar PV modules to provide enhanced nesting and foraging habitat for birds. ▪ Clearance of vegetation of value to nesting birds will be completed outside of the bird-breeding season. Should it not be possible to avoid this season, vegetation will be inspected/surveyed by the project ecologist immediately before clearance. ▪ Lost hedgerows will be replanted, gappy ones stocked up and management relaxed on others to provide enhanced foraging and nesting habitat for birds. ▪ Provision of rough grass, wildflower and game cover and winter seed source sowing within field margins improving foraging habitat for bird species. ▪ Area underneath panels to be sown with a low maintenance grassland while between panels and to margins they will be sown with legume rich herbal ley/wildflora mixes, this aims to improve foraging habitat for birds. 	<p>sparrow and yellowhammer</p> <p>District: grey partridge, lapwing, curlew, and reed bunting</p>		
<p>Nathusius' pipistrelle: Disturbance due to noise, as well as changes to habitat due to the placing of Solar PV modules which could potentially lead to a temporary reduction in bat insect prey. Potential loss and displacement from foraging and commuting habitat.</p> <p>Temporary loss of roosting habitat</p>	<ul style="list-style-type: none"> ▪ Revised layout enabling the retention of habitats suitable for foraging, commuting and roosting bats such as field margins, woodland, scrub and the majority of hedgerows and associated trees. ▪ To mitigate the potential loss or displacement of foraging habitats, there are eight biodiversity enhancement areas and two large fields to the north of Bishopton to remain free of Solar PV modules. ▪ Maintenance of appropriate buffers between solar panels and potential bat roost trees. ▪ No trees are anticipated to require felling. Any tree to be felled will be subject to a pre-construction check to determine its current bat roost potential. ▪ Lost hedgerows will be replanted, gappy ones stocked up and management relaxed on others to provide enhanced commuting and foraging habitat for bats. ▪ Planting along field margins and under panels with the aim of increasing invertebrate numbers and diversity which will enhance foraging for bats. 	<p>County</p>	<p>Low</p>	<p>Not significant</p>

Impact	Embedded/Essential Mitigation and how secured	Receptor Value	Magnitude of impact	Significance of effect
Operation				
Potential indirect impacts through noise, lighting or visual on Teesmouth and Cleveland SPA, Ramsar site & proposed Ramsar.	Solar farms are passive developments which require minimum operational work. Therefore, no operational impacts on this site are expected from the Proposed Development.	International	Negligible	No change
Potential indirect impacts to the Thrislington SAC through noise, lighting or visual	Solar farms are passive developments which require minimum operational work. Therefore, no operational impacts on this site are expected from the Proposed Development.	International	Negligible	No change
Potential indirect impacts to four SSSI sites through noise, lighting or visual	Solar farms are passive developments which require minimum operational work. Therefore, no operational impacts on this site are expected from the Proposed Development.	National	Negligible	No change
Potential indirect impacts to two LNR sites through noise, water quality, lighting or visual	Solar farms are passive developments which require minimum operational work. Therefore, no operational impacts on this site are expected from the Proposed Development.	National	Negligible	No change
Potential indirect impacts to two LWS sites through noise, water quality, lighting or visual	Solar farms are passive developments which require minimum operational work. Therefore, no operational impacts on this site are expected from the Proposed Development.	County	Negligible	No change
Potential indirect impacts to woodland through noise, water quality, lighting or visual	As solar farms are passive developments, the impacts from the Proposed Development during operation on habitats would be minimal.	County	Negligible	No change
Pollution to watercourses	As solar farms are passive developments the impacts from the Proposed Development during operation on watercourses would be minimal.	County	Negligible	No change

Impact	Embedded/Essential Mitigation and how secured	Receptor Value	Magnitude of impact	Significance of effect
<p>Wintering bird assemblage: Potential increase in foraging due to enhancement of habitats. Increased roosting habitat due to hedgerow planting, enhancement and relaxing hedgerow cutting. Solar free panel areas providing continued foraging habitat.</p>	<ul style="list-style-type: none"> ▪ Potential increase in invertebrate diversity with an increase in foraging and roosting habitat due to habitat and enhancement measures within biodiversity enhancement areas along field boundaries and hedgerows. ▪ Solar free panels areas to provide continued availability of foraging habitat for birds such as curlew (<i>Numenius arquata</i>), lapwing and skylark. 	<p>County: great crested grebe, grey partridge, herring gull, linnet, pink-footed goose, stock dove and wigeon</p> <p>District: common gull, starling & tree sparrow</p>	<p>Low</p>	<p>Not significant</p>
<p>Breeding bird assemblage: Open ground will provide breeding and foraging habitat for ground nesting birds such as curlew, lapwing and skylark. Increased nesting and foraging habitats due to habitat enhancement of field margins, hedgerows and under solar panel area</p>	<ul style="list-style-type: none"> ▪ The areas allocated for ground nesting birds will be managed in a manner sympathetic to ground nesting birds, for example late summer hay cuts after young birds have fledged. ▪ Habitat creation including wildflower meadows, rough grassland, hedgerows and field margin sowing would benefit invertebrates and in turn foraging and nesting birds. 	<p>County: skylark, tree sparrow and yellowhammer</p> <p>District: grey partridge, lapwing, curlew, and reed bunting</p>	<p>Moderate beneficial - will depend on the efficacy of mitigation</p>	<p>Not significant</p>
<p>Nathusius' pipistrelle: Potential increase in invertebrate diversity with an increase in foraging habitat for bat species due to habitat and</p>	<ul style="list-style-type: none"> ▪ All boundary features which are of value to foraging/commuting and potential bat roost features in trees will be retained with suitable buffers to allow the continued use of these features across the Proposed Development. ▪ The majority of trees that have been identified as suitable bat roost trees will be protected during development by establishing a CEZ around their RPA. 	<p>County</p>	<p>Low - Minor</p>	<p>Not significant - small residual effects may remain dependent on</p>

Impact	Embedded/Essential Mitigation and how secured	Receptor Value	Magnitude of impact	Significance of effect
enhancement measures along field boundaries and under Panel Areas. More commuting habitats available due to the planting of lost hedgerows, and planting up of gappy hedgerow. Potential avoidance to Panel Areas.	<ul style="list-style-type: none"> ▪ Habitat creation including wildflower meadows, rough grassland, hedgerow creation and enhancement with field margin sowing would benefit invertebrates and in turn foraging bats. ▪ Recent research work has found that there is avoidance of some bat species to solar farms. ▪ To mitigate the potential loss of foraging, commuting and roosting habitat to bats, there are eight biodiversity enhancement areas and two large fields to the north of Bishopton to remain free of Solar PV modules with bat boxes to be installed on trees in these areas. 			the efficacy of the mitigation
Decommissioning				
Impacts likely to be similar to those identified for Construction	See Construction	See Construction	See Construction	See Construction

7. References

- [1] Chartered Institute of Ecology and Environmental Management, Guidelines for Ecological Impact Assessment in the UK and Ireland, Terrestrial, Freshwater, Coastal and Marine, 2018.
- [2] HMSO, The Environment Act 2021. Available at:
<https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>, 2021.
- [3] England, Natural, “The Biodiversity Metric 4.0: User Guide,” Natural England, 2023.
- [4] P. L. S. A. T. W. K. P. D. R. F. H. C. F. M. M. J. P. T. P. C. & T. I. Stroh, A Vascular Plant Red List for England. Botanical Society of Britain and Ireland, 2014.
- [5] E. J. S. F. S. Z. K. L. S. a. J. G. Tinsley, “Renewable energies and biodiversity: Impact of ground-mounted solar photovoltaic sites on bat activity. *Journal of Applied Ecology*. doi:<https://doi.org/10.1111>,” 2023.
- [6] BCT and Institute of Lighting Engineers (ILE), “Bats and Lighting in the UK (Guidance Note 08/23) <https://theilp.org.uk/publication/guidance-note-8-bats-and-artificial-lighting/>,” 2023.
- [7] Collins, J. (ed.), *Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition)*. The Bat Conservation Trust, London, 2023.