

One Earth Solar Farm

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Outline Landscape and Ecology Management Plan

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1. Introduction

1.1 Structure

- 1.1.1 This Outline Landscape and Ecology Management Plan (OLEMP) has been prepared to support the Development Consent Order (DCO) application for One Earth Solar Farm (hereafter referred to as 'Proposed Development') on behalf of One Earth Solar Farm Limited (hereafter referred to as 'the Applicant'). This OLEMP includes:
 - > Purpose and objectives of this OLEMP (Section 1);
 - National Legislation, Policy, and Guidance relevant to this OLEMP (Section 2);
 - Overview of existing landscape features across the Order Limits (Section 3);
 - Landscape and Ecology Strategy (Section 4);
 - Management Prescriptions for existing and proposed vegetation (Section 5);
 - > Provision for Permissive Paths (Section 6); and
 - > Pre and post construction monitoring (**Section 7**).
- 1.1.2 This OLEMP sets out the short and long-term practices that will be implemented to establish, monitor, and manage landscape and ecology mitigation and enhancement (biodiversity net gain) measures embedded in the design. The terminology used in this document is defined in the Glossary of Terms and Abbreviations [EN010159/APP/7.17].

1.2 The Proposed Development

- 1.2.1 The Proposed Development comprises the construction, operation and maintenance, and decommissioning of a solar photo-voltaic (PV) array electricity generating facility. The project includes solar PV panels, Battery Energy Storage Systems (BESS), onsite substations and associated grid connection infrastructure which will allow for the generation and export of electricity to the proposed National Grid High Marnham Substation. The Applicant has secured a connection agreement with National Grid which will allow export and import of up to 740 megawatts (MW) of electricity to the National Grid High Marnham Substation.
- 1.2.2 The Proposed Development will be situated within the 'Order Limits'. The Site, a collective term for all land within the Order limits, is depicted on the **Site**Location Plan [EN010159/APP/2.1]. Approximately 945 ha is proposed to be



used for solar panels and associated infrastructure with the remaining 464 ha to be used for landscape and ecology mitigation and enhancement.

1.2.3 Key components include:

- Solar PV panel area: The portion of the Order Limits where Solar PV Panels, and associated infrastructure would be located;
- Battery Energy Storage Systems (BESS) and Substations: areas identified as locations for two project substations and two BESS sites;
- Habitat Management Areas: Areas of habitat management comprising landscape and biodiversity enhancement measures; habitat creation and management, including earthworks, landscaping, means of enclosure, and laying and construction of drainage infrastructure;
- Serial Connection Corridor: The area in which the 400kV Grid Connection Cables would be installed between the two On-Site Substations and the new National Grid High Marnham Substation; and
- > Site Accesses: Land required to facilitate access to the Site, including new access routes or improvements to existing ones for better visibility splays.
- 1.2.4 The Site is located within the county areas of both Lincolnshire and Nottinghamshire, and at district level falls within three separate district councils, namely West Lindsey, Bassetlaw, and Newark and Sherwood.
- 1.2.5 The maximum extent of land that could be occupied by each element of the Proposed Development is shown on the **Works Plan [EN010159/APP/2.3]**. The Landscape Mitigation Plan, provided in **Appendix A**, shows the vegetation that is likely to be planted as part of the Proposed Development as part of the wider mitigation and enhancement strategy.
- 1.2.6 Further details on the Proposed Development can be found in **ES Volume 1**, Chapter 5: The Description of the Proposed Development [EN010159/APP/6.5].

1.3 Purpose of the Outline Landscape and Ecological Management Plan

Purpose

1.3.1 The Proposed Development has been designed, as far as is practicable, to avoid or reduce effects on landscape, heritage, and biodiversity features through the implementation and provision of planting, species-specific mitigation, and habitat creation and enhancement. It also delivers new and enhanced well-connected habitats that are designed to offer opportunities for local nature conservation priorities at the landscape scale.



- 1.3.2 The overarching aim of this OLEMP is to set out the measures and prescriptions for:
 - Embedded mitigation as identified within the Environmental Statement relied upon for the mitigation of adverse environmental effects;
 - > The enhancement of biodiversity, landscape, and green infrastructure value within the Order Limits:
 - Securing compliance with relevant national and local planning policies; and
 - > Habitat creation and management with the aim of providing ecological enhancements while strengthening green infrastructure within the area.
- 1.3.3 A further purpose of this OLEMP is to secure the measures required to mitigate glint and glare impacts. This mitigation comprises the installation of opaque screens, measuring up to 4m tall, where there is potential for glint and glare to be experienced by people travelling by road or rail. These are shown within the **Glint and Glare Assessment [EN010159/APP/7.16]** as 'OB01' 'OB08'.
- 1.3.4 The Glint and Glare Assessment [EN010159/APP/7.16] has been based on the illustrative masterplan and has taken an overly precautionary approach by assuming no existing planting is in place. At detailed design, the glint and glare assessment will be re-run based on the detailed design for the Proposed Development, and appropriate mitigation confirmed in the LEMP to ensure the effects are not worse than those reported in this assessment. That assessment will take into account existing vegetation and may require some interim hoardings in some locations (as shown within the Glint and Glare Assessment [EN010159/APP/7.16]) until hedgerows proposed as part of the Proposed Development are an appropriate height to adequately mitigation any effects.

Objectives

- 1.3.5 The primary objectives of this OLEMP are to:
 - Integrate the Proposed Development into its landscape setting, aiming to avoid or minimise adverse effects on the landscape, biodiversity, heritage and visual receptors;
 - Promote the conservation, protection, and enhancement of the physical, natural and historic environment within the Proposed Development and its surroundings, ensuring the landscape measures described in this document are implemented in order to embed the Proposed Development as an integral part of the wider landscape;



- Diversify the ecological value of existing habitats through initiatives such as hedgerow restoration, riparian corridor management and the creation of an array of diverse habitats, whilst seeking opportunities to compliment the emerging Local Nature Recovery Strategies of Nottinghamshire and Lincolnshire; and
- > Guide the design and management of landscape and biodiversity elements that respond to and enhance the character of the landscape, reinforce local distinctiveness, and strengthen the sense of place.



2. National Legislation, Policy and Guidance

2.1.1 Legislation, planning policy and supporting guidance relevant to the landscape and ecological measures detailed within this OLEMP have been reviewed and embedded within the practices set out. Relevant documents reviewed are as follows:

Legislation

- Directive 2009/147/EC on the conservation of wild birds (the codified version of Council Directive 79/409/EEC as amended) (Birds Directive) (Ref. 1);
- Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) (Ref. 2);
- > Regulation (EU) 1143/2014 on the introduction and spread of invasive alien species (Ref. 3);
- Convention on Biological Diversity (Ref. 4);
- > COP15: Global biodiversity framework (2023) (Ref. 5);
- > Ramsar Convention (Ref. 6);
- > The Conservation of Habitats and Species Regulations 2017 (as amended) (Ref. 7);
- > The Wildlife and Countryside Act 1981 (as amended) (WCA) (Ref. 8);
- > The Countryside and Rights of Way Act 2000 (Ref. 9);
- > The Natural Environment and Rural Communities Act 2006 (NERC) (Ref. 10);
- > The Protection of Badgers Act 1992 (Ref. 11);
- > The Hedgerows Regulations 1997 (Ref. 12);
- The Invasive Alien Species (Enforcement and Permitting) Order 2019 (as amended) (Ref. 13);
- > Animal Welfare Act 2006 (Ref. 14);
- > Salmon and Freshwater Fisheries Act 1975 (Ref. 15);
- > Eels (England and Wales) Regulations 2009 (Ref. 16);
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref. 17); and
- > The European Landscape Convention (2000) (Ref. 18)



National Policy

- Overarching National Policy Statement (NPS) for Energy (EN-1) (2023) (Ref. 19);
- > NPS for Renewable Energy Infrastructure (EN-3) (2023) (Ref. 20);
- > NPS for Electricity Networks Infrastructure (EN-5) (2023) (Ref. 21);
- > National Planning Policy Framework (NPPF) (2024) (Ref. 22); and
- > Environmental Improvement Plan 2023 (Ref. 23)

Local Policy

- Newark and Sherwood, Amended Core Strategy Development Plan Document (2019) (Ref. 24);
- Central Lincolnshire Local Plan (2023) (Ref. 25); and
- > Bassetlaw Local Plan 2020-2038 (2024) (Ref. 26)

Other Guidance

- > National Planning Practice Guidance (PPG), Natural Environment (Landscape) (2019) (Ref. 27);
- Biodiversity 2020: A strategy for England's Wildlife and Ecosystem
 Services with regards to marine habitats, ecosystems, and fisheries (Ref. 28);
- > 25-year Environment Plan (Ref. 29);
- UK Post 2010 Biodiversity Framework (including priority habitats and species listed which succeeds the UK Biodiversity Action Plan (UK BAP) (Joint Nature Conservation Committee (JNCC) and Defra, 2018) (Ref. 30);
- Landscape Institute, Infrastructure Technical Guidance Note 04/20 (2020) (Ref. 31);
- British Standard (BS) 5837: 2012 Trees in relation to design, demolition and construction – Recommendations (Ref. 32);
- > BS 3998: 2010 Treework Recommendations (Ref. 33); and
- National Joint Utilities Group (NJUG) Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees (Ref. 34).

Biodiversity Net Gain

2.1.2 NPS EN-1, para. 5.4.46 (Ref 19) states that development proposals should provide opportunities for building-in beneficial biodiversity or geological features as part of good design and that such opportunities in and around developments should be maximised where appropriate. The NPPF 2024 (Ref. 25) states that planning decisions should continue to and enhance the natural and local environment by providing net gains from biodiversity (para 187).



- 2.1.3 The Applicant will provide at least 10% BNG as part of the Proposed Development, however it is likely that BNG significantly higher than 10% will be delivered for habitat, hedgerow and watercourse units.
- 2.1.4 Further information on BNG and potential BNG for the Proposed Development can be found within the ES Volume 2, Chapter 6: Biodiversity [EN010159/APP/6.6]



3. Existing Landscape and Biodiversity Features

3.1 Existing Landscape Features

- 3.1.1 The northeastern part of the Order Limits extends from the River Trent towards Thorney. For the majority of this area the landform is low lying at around 10m Above Ordnance Datum (AOD), before rising centrally towards the River Trent to a high point of approximately 25m AOD, north of North Clifton. The land use is agricultural, consisting of medium to large scale geometric fields divided by sparsely planted hedgerows and drainage ditches.
- 3.1.2 The southeastern part of the Order Limits follows a similar pattern to the northeast. It is also relatively low lying. The land use is mostly agricultural with medium and large scale fields varying in form. Small blocks of woodland punctuate the southeast part of the Order Limits.
- 3.1.3 The southwestern part of the Order Limits follow a slightly more varied topography with undulating landform rising away from the River Trent out towards Skegby. Land use comprises a mix of agricultural and industrial uses, with High Marnham substation occupying the land closest to the River Trent. The field pattern is made up of large arable fields either side of the National Cycle Route which bisects this portion of the Site in two.
- 3.1.4 The northwestern part of the Order Limits features a rising landform which extends from Fledborough central to the west towards the A57, which runs along the Site's northern boundary. The land use is predominantly agricultural with large scale fields surrounding the villages of Fledborough and Ragnall. National Grid pylons run the length of the Site north to south, following the River Trent towards High Marnham.

3.2 Existing Biodiversity Features

3.2.1 The following section summarises the baseline detail for biodiversity, as presented in **Volume 2**, **Chapter 6**: **Biodiversity [EN010159/APP/6.6].**

Statutory and Non-Statutory Sites

- 3.2.2 The closest statutorily designated site to the Order Limits is Spalford Warren Site of Special Scientific Interest (SSSI), which lies approximately 1.9km to the south. This SSSI is poorly connected to the habitats within the Order Limits as it is separated by a number of arable fields, roads, farm tracks and buildings; it also does not support a habitat type that is present within the Order Limits.
- 3.2.3 Although at considerable distance (in excess of 30km) the statutory site with the greatest degree of linkage to the Site is the Humber Estuary Ramsar site and Special Area of Conservation (SAC). This is because the River Trent provides



functionally linked habitat to sea and river lamprey which are a feature of the designation. River and sea lamprey will be migrating through the Site (as the transmission cables cross the River Trent) and could also use silts within the River Trent and connected watercourses / ditches as nursery grounds for juvenile lamprey (ammocetes) and areas of gravel (for example at locations within the Fledborough Beck) for spawning.

Habitats

- 3.2.4 Habitats located within the Order Limits are dominated by arable fields and areas of modified grassland that are separated by a mixture of hedgerows (both intact and defunct), wet ditches and fence lines. There are small areas of other types of habitat within the Order Limits including scrub, tree lines, ponds and running water (River Trent and watercourses).
- 3.2.5 The farmland is intensively managed and fields are typically of relatively large size. There is limited evidence of agri-environment schemes being implemented with the vast majority of land held for food production.

Species

3.2.6 The habitats within the Order Limits support an array of legally protected and notable species. These include a range of mammals including bats, water vole, otter, badger and brown hare, reptiles such as grass snake and common lizard and birds including skylark, barn owl, grey partridge and turtle dove. The River Trent and its tributaries are also known to support river and sea lamprey and European eel. Despite the array of species present, the majority are using relatively small areas of the Order Limits being focused on the network of hedgerows, wet ditches / watercourses and the River Trent.



4. Landscape and Ecology Strategy

4.1 Landscape Strategy

- 4.1.1 Good design has been a key consideration from the outset of design development. The iterative design process has been shaped by the findings of the Environmental Impact Assessment (EIA), and the project design principles specifically developed to address the unique opportunities and constraints of the Proposed Development. This iterative process is set out in the **Design Approach Document [EN010159/APP/5.8].** The landscape strategy has been developed in response to policy requirements, published landscape character assessment guidance, and fieldwork analysis.
- 4.1.2 The Landscape Mitigation Plan in **Appendix A**, sets out indicative locations for proposed planting and has been designed to minimise and mitigate environmental impacts, including effects on landscape character, visual amenity, biodiversity, and heritage assets.
- 4.1.3 In developing the landscape design strategy, special attention was given to:
 - Recommendations within relevant landscape guidelines, such as Natural England's Statements of Environmental Opportunity (SEO) outlined in the profile for NCA 48 (Ref. 42);
 - Guidance from the Landscape Institute's Infrastructure Technical Guidance Note (TGN) 04/20 (Ref. 36); and
 - Observations gained through fieldwork undertaken in winter and summer conditions.
- 4.1.4 As well as providing mitigation, the proposed planting has been developed to maximise beneficial impacts, including opportunities for delivering biodiversity net gain. Accordingly, the design aims to:
 - Integrate the Proposed Development into the existing landscape pattern by utilising and aligning with existing features, including vegetation where feasible:
 - Replace habitats lost during construction and enhance habitats within the Solar PV Areas through the creation and enhancement of hedgerows, scrub, grasslands and riparian habitats; and
 - > To filter and screen more prominent components of the Proposed Development in views from sensitive receptors.
- 4.1.5 Details of the landscape measures that are embedded into the Proposed Development's design are presented in ES Volume 1, Chapter 5: Description of the Proposed Development [EN010159/APP/6.5], ES Volume 2, Chapter



11: Landscape and Visual [EN010159/APP/6.11] and the Design Approach Document [EN010159/APP/5.8].

Overview of Landscape Design Principles

4.1.6 This section provides a description of the landscape design principles that have informed the design of the Proposed Development.

Careful Siting in the Landscape

- 4.1.7 Careful consideration of the existing visual amenity of receptors has informed the offsets from residential properties in proximity to the Order Limits, as well as PRoWs and key heritage features. The form and extent of these offsets has been refined through the design process, taking into account feedback from the community in regard to the existing character of views.
- 4.1.8 With reference to the Landscape Mitigation Plan shown in **Appendix A and Illustrative Masterplan [EN010159/APP/2.7]**, the design of the Proposed Development has been carefully developed through an iterative design process to minimise, or avoid, adverse effects on views experienced by residents.

Conserving Existing Vegetation Patterns

- 4.1.9 The layout of the Proposed Development has been designed to minimise or avoid the loss of existing landscape features where possible, and to avoid significant impacts on those existing features.
- 4.1.10 The Proposed Development is set within the existing field pattern within the Order Limits. The layout utilises existing farm tracks and field openings as the preferred method of construction and operational access in order to minimise the loss of existing landscape features, where practicable.
- 4.1.11 Proposed planting responds to the existing character of the Site and looks to perpetuate the current conditions found there, allowing key views to stay open and key habitats to remain in place, with enhancement measures proposed across the 1,409 ha areas where deemed suitable.

Creating New Green Infrastructure

- 4.1.12 New green infrastructure (GI) elements will be established, and habitat corridors enhanced through the Solar PV Site. These will improve wildlife connectivity, elevate landscape quality, and enhance visual amenity.
- 4.1.13 Large areas of species-rich grassland will be provided beneath the solar panels and across the broader Solar PV Site in order to boost biodiversity and create new habitats for a range of species including pollinators and ground nesting birds. This will also help to ameliorate soil conditions after long-term agricultural



practices. This includes a new green corridor that follows the existing PRoW east of Ragnall and continues down towards Fledborough on the western side of the Trent, extending in excess of 120m wide at its widest point.

- 4.1.14 The proposed mitigation will also increase and enhance the existing hedgerow network, with gapping up and planting of new species-rich native hedgerows with hedgerow trees, providing better connectivity and creating new valuable habitats.
- 4.1.15 Land to the west of the River Trent will be managed to create the coastal grazing marsh habitat found adjacent to the Site, helping to ensure this high-quality landscape feature and local conservation priority is delivered in areas where it would historically have been present. This would be maintained throughout the life cycle of the development.
- 4.1.16 New permissive paths will provide new connections to the existing PRoW network, helping to connect villages and provide recreational opportunities for the wider community.

4.2 **Ecology Strategy**

- 4.2.1 The layout of the Proposed Development seeks to minimise adverse ecological effects and to maximise the opportunities for biodiversity benefit by following the 'mitigation hierarchy' as generally referred to in the Overarching National Policy Statement for Energy (EN-1) (paragraph 4.6.1) and Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (regulation paragraph 14(2)(c)18 (3)(c)), including measures to avoid, prevent, reduce and if possible, offset any identified significant adverse effects.
- 4.2.2 The scale of the Proposed Development provides the opportunity to deliver improvements to biodiversity at the landscape scale by delivering large areas of biodiverse habitats that are well connected both within the Order Limits and to habitats in the surrounding area. Key to delivery of these benefits is ensuring that the Proposed Development provides:
 - A range of good quality and well managed habitats that provide opportunities for a range of legally protected and notable flora and fauna to thrive;
 - Heterogeneity within habitats to ensure that large expanses of open habitats can be used effectively by a range of species;
 - Connectivity of habitats through the careful location of infrastructure and delivery of habitat corridors providing access to wider expanses of habitat both within and outside of the Order Limits; and
 - > Focusing on providing habitats for local conservation priorities to maximise benefit to the most vulnerable species present within the locale.



- 4.2.3 The Proposed Development is anticipated to result in an uplift in biodiversity, as measured using the Statutory Biodiversity Metric of:
 - > 3440.43 habitat units, an increase of 113.17%
 - > 353.22 hedgerow units, an increase of 92.49%
 - > 77.60 watercourse units, an increase of 57.75%
- 4.2.4 The Proposed Development would contribute positively to local conservation priorities including provision of new and enhanced Habitats of Principal Importance including extensive hedgerow networks, coastal and floodplain grazing marsh, field margins and ditches and habitats that could provide increases in the size and distribution of Species of Principal Importance including brown hare, hedgehog, turtle dove, water vole, otter, green and brown hairstreaks, harvest mouse, bats and farmland birds.
- 4.2.5 The extent of the Order Limits provides the opportunity to deliver landscape scale nature conservation benefits that can positively contribute to the Local Nature Recovery Strategies (LNRS) being developed for Nottinghamshire and Lincolnshire. The Local Habitat Map for Nottinghamshire [4] (that will underpin the Nottinghamshire LNRS) shows habitats identified as 'areas of particular importance to biodiversity' both within and close to the Order Limits. These provide a skeleton on which habitats created and managed positively as part of the Proposed Development can be delivered around.



5. Management Prescriptions

5.1 Introduction

- 5.1.1 This section describes how existing and new habitats will be protected and/or implemented. These habitats are:
 - Existing retained trees and shrubs (including existing hedgerows with trees, woodland, and mature trees);
 - > Drainage ditches (including riparian zones);
 - > Hedgerow (with trees);
 - > Woodland (including woodland buffers and tree belts);
 - > Individual trees (including scattered trees); and
 - > Species-rich grassland.
- 5.1.2 As an outline management plan, further details will be added as the design progresses in order to refine species and seed mixes of local provenance, management prescriptions and timescales, and site-specific mitigation and enhancement measures.
- 5.1.3 Accesses to the Order Limits that are established during the construction phase (whether new or modified/extended existing accesses) will remain in place throughout the operational phase.
- 5.1.4 All implementation and monitoring works will be supervised by the EcoCoW.

5.2 Native Planting – General Principles

- 5.2.1 The following steps and working methods will be included as part of the establishment of all native planting:
 - Areas identified for planting will be clearly marked out and agreed with the Landscape Clerk of Works (LCoW) in advance.
 - > Planting will take place in the first available planting season and at a time of year appropriate to the species being planted.
 - Plants will be inspected by the LCoW at the nursery and on delivery to site prior to planting.
 - Plants will be planted in double staggered row at 5 plants per metre in single species groups of 3, 5 or 7's. Specimen trees to be planted at 10m intervals as hedgerow trees.



- Plants will be protected from strimming activities and damage from animals with individual biodegradable spiral guards, supported by a bamboo cane for hedgerow plants or double staked 300x60cm weld mesh guard for specimen trees. The type of guard selected appropriate to species and growth habit.
- > Trees will be staked to protect against wind-rock.

5.3 Existing Habitats

- 5.3.1 Existing habitats to be retained include:
 - > Individual trees, shrubs and woodland (including hedgerows trees);
 - > Hedgerows;
 - > Grassland; and
 - > Drainage ditches (including riparian zones).

Existing individual trees, shrubs and woodland (including hedgerow trees)

- 5.3.2 The primary function of the retained trees, shrubs and woodland will be to maintain established habitats, visual amenity and the character of the landscape and provide a structure for the addition of the new planting and other features of the solar farm development.
- 5.3.3 Existing trees, shrubs and woodland will be managed to provide longevity, increase species diversity, enhance habitat value and improve resilience to climate change. This will include the gapping up of existing hedgerows, where appropriate, to boost species and age diversity, providing better connectivity and increasing the number of climate and disease resilient species.
- 5.3.4 During construction the retained vegetation will be protected. Measures to be employed will include the use of clearly defined stand-offs, managing the structure and integrity of the retained vegetation, and undertaking any pruning outside of the bird breeding season and in accordance with hedgerow regulations.
- 5.3.5 Retained trees will be periodically inspected by an arboriculturist during construction. Where construction works are adjacent to retained trees, works will be undertaken under a watching brief to record root loss and to recommend further arboricultural works where required. A grassland buffer will be maintained around retained individual trees. Management of the grassland buffer is detailed under species-rich grassland below.
- 5.3.6 Removal of existing trees will only occur where access is required. These crossings will, wherever possible, be located at current field access locations or in areas where there are existing gaps in the hedgerow and no trees. For an



indication of the expected maximum extent of vegetation removal see Vegetation Removal Plan in **Appendix C**.

Existing hedgerows

- 5.3.7 Existing hedgerows will be managed to enhance biodiversity and improve ecosystem services, whilst also increasing screening for visual receptors. This will involve filling gaps and thickening hedgerows with a broader range of native species, where needed, and planting additional native hedgerow trees with locally appropriate species.
- 5.3.8 All retained hedgerows will be managed to achieve a minimum width and height of 3m x 3m. Where overshading of solar panels is not of concern the target height of hedgerows will be 4m. The planting of hedgerow gaps and positive management to increase hedgerow size will commence in the planting season (i.e. winter) prior to the commencement of construction.
- 5.3.9 When gapping up additional species diversity will be introduced; this will include the provision of hedgerow trees where appropriate (i.e. where over-shading issues can be avoided). The hedgerows will be managed in a rolling programme to ensure that no hedgerow is cut more than once in each three-year period, to maximise flower and fruit production. More detail on the implementation, management and maintenance of hedgerow enhancements is described below in 'native hedgerows with trees and hedgerow enhancement'.
- 5.3.10 No tracks (other than field entrances), solar panels or other electrical infrastructure (other than cable crossings) will be located within 5m of the centre line of a hedgerow. Within this buffer zone a variety of habitats may be established including species-rich grassland, flower-rich margins (including those tailored for turtle doves), winter bird food margins, cultivated areas for arable plants and autumn sown bumble bird mix.
- 5.3.11 Removal of existing hedgerow will only occur where access is required. These crossings will, wherever practical, be located at current field access locations or in areas where there are existing gaps in the hedgerow. The anticipated maximum extent of hedgerow removal required is shown on the Vegetation Removal Plan provided in **Appendix C**, and identified in Schedule 11 of the DCO.
- 5.3.12 Where hedgerows are present within visibility splays at access and egress points from the local highway network, vegetation management will be used to maintain safety during the period of construction. These hedgerows will be reduced in height to 0.9m to allow suitable visibility, whilst avoiding hedgerow removal. During the operational period these hedgerows will be allowed to re-grow.



Existing species-rich grassland

- 5.3.13 Existing areas of species-rich grassland will be managed to enhance biodiversity and improve ecosystem services, retaining valuable habitats. This will be supplemented with large areas of species-rich grassland beneath Solar PV panels and in habitat management areas, providing additional habitat and better connectivity across the Site.
- 5.3.14 Further details on the management of these areas of species-rich grassland can be found below in the section titled 'Species-rich Grassland'.

Existing ditches (holding permanent water)

- 5.3.15 Ditches across the Order Limits will be retained and maintained with new crossings minimised to maintain habitat connectivity. No development (other than at crossing points) will take place within 5m of the bank top.
- 5.3.16 Ditches will be managed to provide habitat for fish and other aquatic and semiaquatic fauna, with new or upgraded crossings designed to maintain connectivity (provided as clear span bridges). Riparian zones (5m strips from bank top) will be managed for biodiversity and will be supplemented with a species rich seed mix, such as that shown in Table 5.4 through to
- 5.3.17 Table 5.6. The exact location and proportion of seed types will be tailored to conditions on Site.

5.4 Proposed habitats

Overview of proposed habitats

- 5.4.1 Habitats proposed across the Order Limits comprise:
 - Over 9km of species-rich native hedgerow with trees (including existing hedgerow enhancement);
 - Approximately 6km of species-rich native hedgerow;
 - Approximately 1,240ha of species-rich grassland accounted for across the Order Limits in hedgerow and field margins, riparian zones, wildflower meadows and tussock mixes beneath solar panels;
 - 4.2ha of woodland and native tree belts:
 - > Individual trees; and
 - > Agricultural field margins.
- 5.4.2 Planting will take place in the first available planting season and at a time of year appropriate to the species being planted. Within the majority of habitat



management areas (other than where transmission cable installation is required) habitat creation will begin in the first available planting season prior to construction commencing (considered to be installation of above ground infrastructure).

Native hedgerow with trees (including existing hedgerow enhancement)

Function

- 5.4.3 New species-rich hedgerows with trees will be established to supplement the existing, retained hedgerows with trees.
- 5.4.4 New species-rich hedgerows with trees will be planted across the Site to help supplement the existing hedgerow network and to filter views of the Proposed Development. New hedgerows with trees will provide valuable habitats for a range of species, allowing for better connectivity across the Proposed Development. The height at which these hedgerows will be maintained will be between 3- 4 m in order (hedgerow trees to grow taller) to adequately screen the Solar PV Infrastructure, where screening is not required, proposed hedgerows will be maintained at 3m or lower with a balance struck between biodiversity and desire to maintain open views of the countryside.
- 5.4.5 Species will be chosen to build in resilience and will consider the requirements of the local area, taking into account climate change and potential pest and pathogen threats.
- 5.4.6 Existing hedgerows across the Site will be 'gapped up', in order to enhance existing landscape features, reinforce field patterns, increase species diversity and to provide continuous habitat corridors.

Implementation

- 5.4.7 The indicative locations of the new hedgerows with trees and gapping up of existing hedgerows are shown on the Landscape Mitigation Plan in **Appendix A**.
- 5.4.8 Hedge trenches will be dug to dimensions of 450 mm wide by 450 mm deep, with the base loosened before returning the backfill mixture. All stock will be supplied as bare root if in season (unless otherwise stated) and container-grown if planted out of season. A detailed specification for hedgerows will be developed based on the indicative species, sizes, and percentages outlined in Table 5.1.
- Individual trees will be planted in pits measuring 900 mm in diameter and 900 mm in depth. The base of the tree pit will be broken up to a depth of 200 mm, and the pit will be backfilled with topsoil, consolidated in layers to ensure the tree is positioned at the correct depth. Each tree will be planted to the nursery line and secured with stakes, ties, and an irrigation pipe. A specification for hedgerow trees will be developed, detailing the indicative species, sizes, and percentages, as presented in **Table 5.1**.



5.4.10 Planting should take place from November to March, in soil that is not frozen or waterlogged. New planting shall be protected using adequate strimmer and pest guards and will vary depending on the size of the plant.

Table 5.1 Indicative mix for hedgerows

Botanical Name	Common Name	Height	Root	Form	% Mix
Acer campestre	Field Maple	40-60cm	BR	Transplant	15
Cornus sanguinea	Dogwood	40-60cm	BR	Transplant	10
Corylus avellana	Hazel	40-60cm	BR	Transplant	10
Crataegus monogyna	Hawthorn	40-60cm	BR	Transplant	15
Ilex aquifolium	Holly	40-60cm	Container	Transplant	10
Ligustrum vulgare	Wild privet	40-60cm	BR	Transplant	10
Malus sylvestris	Crab Apple	40-60cm	BR	Transplant	5
Prunus spinosa	Blackthorn	40-60cm	BR	Transplant	10
Rosa canina	Dog Rose	40-60cm	BR	Transplant	10
Viburnum opulus	Guelder Rose	40-60cm	BR	Transplant	5

5.4.11 The Local Planning Authorities, Nottinghamshire Wildlife Trust and Lincolnshire Wildlife Trust will be consulted in preparation of the detailed Landscape and Ecology Management Plan to input to the species list proposed to respond to current priorities at the time of implementation.

Establishment Maintenance

- 5.4.12 A detailed plan for the establishment and maintenance of the new hedgerows with trees will be submitted as part of the detailed LEMP. This will cover a period of five years from the start of the operation stage of the Proposed Development.
- 5.4.13 The aim of establishment maintenance will be to support the early stages of growth to encourage thick, bushy growth and good form. This is based on the following principles and outline prescriptions:
 - Maintain a 0.5 metre weed free strip either side of hedgerow through chemical and mechanical control



- First cut in spring to 45–60 cm above ground level taking care to exclude hedgerow trees;
- Irrigation may be required during periods of drought or extended dry weather;
- > Remove litter, rubbish, and debris from planted areas throughout the year;
- Re-firm soil around roots to ensure plants are supported and upright in spring each year;
- Inspect and adjust stakes, guards, and ties in spring and autumn and after periods of particularly inclement weather;
- Check and record failed or defective plants in September annually;
- Replace failed or defective plants with matching species of the same size during the next planting season after failure; and
- > ECoW to undertake a quarterly check of plants to record their growth and condition.

Long-Term Management

- 5.4.14 The long-term management of new hedgerows with trees will focus on the following interventions:
 - Hedgerows required for screening purposes will be managed and maintained at a height of 3 m – 4 m, whilst individual tree species planted within hedgerows will be allowed to establish and left to reach maturity;
 - Cutting of hedgerows will take place outside of the bird nesting season and at the end of the winter in February. This will allow berries to stay in place for the maximum period of time throughout the winter;
 - Any branches/growth that overhangs or obstructs PRoWs or access tracks will be cut back to keep routes clear to use;
 - Dead, dying or over-mature hedgerow trees will be removed if considered a hazard on health and safety grounds and in accordance with any protected species constraints; and
 - Monitoring of new hedgerows will be undertaken periodically in order to check any significant changes in health and viability of the hedgerow. Maintenance and condition checks will take place every three years.
 - > Hedgerow with trees will be managed for the duration of the operation phase (up to 60 years).

Hedgerows

Function

5.4.15 New species-rich hedgerows will be established to supplement the existing, retained hedgerows and to expand the existing network of hedgerow across the



Site. The proposed species-rich hedgerows will restore previously lost connectivity and create a new habitat network for local wildlife through the planting of native and species-rich hedgerow.

- 5.4.16 Hedgerows provide a valuable habitat, forming important wildlife corridors, a visual screening function and establish formal boundaries. Hedgerow height is important to screen views and the hedgerows will be maintained at a height of between 3 4 m and 'infilled' where there are gaps in existing hedgerows. Where hedgerows are not required for their screening function, they may be maintained at a lower height in order to maintain open views.
- 5.4.17 New species rich hedgerows will be planted across the Site to help supplement the existing hedgerow network and to filter views of the Proposed Development. New and retained hedgerows will provide and continue to provide valuable habitats for a range of species, allowing for better connectivity across the Proposed Development. The height at which these hedgerows will be maintained will be between 3-4m in order to adequately screen the Solar PV Infrastructure. Where screening is not required, proposed hedgerows may be maintained at a lower height in order to maintain open views of the countryside, balancing this with the biodiversity value provided by larger and more complex hedgerow structure.
- 5.4.18 Existing hedgerows across the Site will be 'gapped up', in order to enhance existing landscape features, reinforce field patterns, increase species-diversity and to provide continuous habitat corridors.
- 5.4.19 Species will be chosen to build in resilience and will consider the requirements of the local area, taking into account climate change and potential pest and pathogen threats.

Implementation

- 5.4.20 The indicative locations of the new hedgerows and gapping up of existing hedgerows are shown on the Landscape Mitigation Plan in **Appendix A**.
- 5.4.21 Hedge trenches will be dug to dimensions of 450 mm wide by 450 mm deep, with the base loosened before returning the backfill mixture. All stock will be supplied as bare root if in season (unless otherwise stated) and container-grown if planted out of season. A detailed specification for hedgerows will be developed based on the indicative species, sizes, and percentages outlined in **Table 5.1**.
- 5.4.22 Planting should take place from November to March, in soil that is not frozen or waterlogged. New planting shall be protected using adequate strimmer and pest guards and will vary depending on the size of the plant.



Establishment Maintenance

- 5.4.23 A detailed plan for the establishment and maintenance of new and retained hedgerows will be submitted as part of the detailed LEMP. This will cover a period of five years from the start of operation stage of the Proposed Development.
- 5.4.24 The aim of establishment maintenance will be to support the early stages of growth to encourage thick, bushy growth and good form. This is based on the following principles and outline prescriptions:
 - Maintain a 0.5 metre weed free strip either side of hedgerow through chemical and mechanical control:
 - > First cut in spring to 45–60 cm above ground level taking care to exclude hedgerow trees;
 - Irrigation may be required during periods of drought or extended dry weather;
 - Re-firm soil around roots to ensure plants are supported and upright in spring each year;
 - Inspect and adjust stakes, guards, and ties in spring and autumn and after periods of particularly inclement weather;
 - > Check and record failed or defective plants in September annually;
 - Replace failed or defective plants with matching species of the same size during the next planting season after failure; and
 - > ECoW to undertake a quarterly check of plants to record their growth and condition.

Long-Term Management

- 5.4.25 The long-term management of new hedgerows will focus on the following interventions:
 - Hedgerows will be managed and maintained at a height of up to 3 to 4 m, whilst individual tree species planted within hedgerows will be allowed to establish and left to reach maturity;
 - Cutting of hedgerows will take place outside of the bird nesting season and at the end of the winter in February. This will allow berries to stay in place for the maximum period of time throughout the winter;
 - Any branches/growth that overhangs or obstructs PRoWs or access tracks will be cut back to keep routes clear to use;



- Dead, dying or over-mature hedgerow trees will be removed if considered a hazard on health and safety grounds and in accordance with any protected species constraints; and
- Monitoring of new hedgerows will be undertaken periodically in order to check any significant changes in health and viability of the hedgerow. Maintenance and condition checks will take place every three years.
- 5.4.26 Hedgerows will be managed for the duration of the operation phase (up to 60 years).

Woodland and native tree belts

Function

- 5.4.27 Proposed woodland and native tree belts will be established to introduce new areas of woodland and provide screening in sensitive areas. Proposed areas of woodland and native tree belts will be planted to provide visual and physical screening to more sensitive receptors on the edge of the Proposed Development. These will also provide better connectivity and habitat for local wildlife.
- 5.4.28 Trees will be managed to achieve their maximum mature height, to better provide biodiversity enhancements and screening, where necessary. Species will be chosen to build in resilience and will consider the requirements of the local area, taking into account climate change and potential pest and pathogen threats.
- 5.4.29 Native species will form the majority of the tree stock, while specially selected non-natives may be used to build in resilience in the face of climate change.

Implementation

- 5.4.30 The locations of the new woodland and tree belts are shown on the Landscape Mitigation Plan in **Appendix A**.
- 5.4.31 Larger specimens within the mix indicated below should be planted approximately 2.5m apart to allow the canopy to close sooner. Specific species will be determined through future detailed design work to ensure mixes are reflective of local character, whilst also building in climate resilience.
- 5.4.32 New areas of woodland and tree belts will be planted in well-prepared ground, with protection such as biodegradable spiral rabbit guards or shrub shelters to avoid harm by local wildlife. Where larger specimens have been specified, suitable anchoring will be necessary with tree stakes and ties to avoid root rock and/or displacement of trees. Once shelters and ties are deemed too small, they are to be removed and disposed of off-site.
- 5.4.33 Larger specimens within the mix indicated in Table 5.2 will be planted in pits measuring 900 mm in diameter and 900 mm in depth. The base of the tree pit will



be broken up to a depth of 200 mm, and the pit will be backfilled with topsoil, consolidated in layers to ensure the tree is positioned at the correct depth. Each tree will be secured with stakes and ties. A specification for proposed woodland and tree belts will be developed, detailing the indicative species, sizes, and percentages outlined in **Table 5.2**.

Table 5.2 Indicative mix for proposed woodland and tree belts

Botanical Name	Common Name	Height	Root	Form	% Mix
Acer campestre	Field Maple	175-200cm	Root ball	Feather	10
Cornus sanguinea	Dogwood	40-60cm	BR	Transplant	10
Corylus avellana	Hazel	40-60cm	BR	Transplant	10
Crataegus monogyna	Hawthorn	40-60cm	BR	Transplant	15
llex aquifolium	Holly	40-60cm	Cell grown	1L	5
Prunus padus	Bird Cherry	175-200cm	Root ball	Feather	10
Quercus robur	English Oak	175-200cm	Root ball	Feather	15
Tilia cordata	Small Leaved Lime	175-200cm	Root ball	Feather	5
Torminalis glaberrima	Wild Service tree	175-200cm	Root ball	Feather	10

Establishment Maintenance

- 5.4.34 The aim of establishment maintenance will be to support the early stages of growth to encourage thick, bushy growth and good form. This is based on the following principles and outline prescriptions:
 - Maintain a 0.5 metre weed free strip around the base of the tree through mechanical control;
 - Irrigation may be required during periods of drought or extended dry weather;
 - > Remove litter, rubbish, and debris from planted areas throughout the year;
 - Re-firm soil around roots to ensure plants are supported and upright in spring each year;
 - Inspect and adjust stakes, guards, and ties in spring and autumn and after periods of particularly inclement weather;
 - Check and record failed or defective plants in September annually;



- Replace failed or defective plants with matching species of the same size during the next planting season after failure; and
- > ECoW to undertake a quarterly check of plants to record their growth and condition.

Long-Term Management

- 5.4.35 The long-term management of proposed woodland and native tree belts will focus on the following interventions:
 - Woodland and native tree belts will be left to reach maturity, with careful thinning to avoid any one species becoming dominant;
 - Any necessary pruning/thinning will take place outside of the bird nesting season and at the end of the winter in February. This will allow any fruit to stay in place for the maximum period of time throughout the winter;
 - Any branches/growth that overhangs or obstructs PRoWs or access tracks will be cut back to keep routes clear to use;
 - Dead, dying or over-mature trees will be removed if considered a hazard on health and safety grounds and in accordance with any protected species constraints; and
 - Monitoring of new woodland and tree belts will be undertaken periodically in order to check any significant changes in health and viability of the hedgerow. Maintenance and condition checks will take place every three years.

Individual trees

Function

- 5.4.36 Individual trees will be planted along field boundary edges, within existing and proposed new hedgerow and in larger areas of grassland to supplement existing retained trees and provide further screening and ecological benefits. Planted both singularly and in groups, they will provide structure in larger, wide spanning landscapes, whilst breaking up long distance views.
- 5.4.37 Proposed planting of individual trees will restore individual trees to the landscape and provide visual amenity and enhance biodiversity, creating important opportunities for nesting birds and creating habitats for invertebrates and small mammals. Whilst providing valuable shelter for various nesting birds and other wildlife, individual trees also link larger areas of woodland, hedgerows and belts of trees, further adding to connectivity across the Site.
- 5.4.38 As well as providing additional habitat and wildlife connections, scattered individual trees will screen and filter views from the PRoWs and residences.



Implementation

- 5.4.39 The locations of the individual trees are shown on the Landscape Mitigation Plan in **Appendix A**.
- 5.4.40 Individual trees will be planted in pits measuring 900 mm in diameter and 900 mm in depth. The base of the tree pit will be broken up to a depth of 200 mm, and the pit will be backfilled with topsoil, consolidated in layers to ensure the tree is positioned at the correct depth. Each tree will be secured with stakes and ties. A specification for hedgerow trees will be developed, detailing the indicative species, sizes, and percentages outlined in Table 5.3.
- 5.4.41 Planting will take place from November to March, in soil that is not frozen or waterlogged. Consideration will be given to periods of excess flooding. New planting will be protected using adequate strimmer and pest guards and will vary depending on the size of the plant.
- 5.4.42 A specification for individual trees will be developed based on the indicative species, sizes and percentages presented in **Table 5.3**.

Table 5.3 Indicative mix for individual trees

Botanical Name	Common Name	Height	Root	Form	% Mix
Acer campestre	Field Maple	175-200cm	Root ball	Feather	5
Alnus glutinosa	Alder	175-200cm	Root ball	Feather	10
Betula pubescens	Downy Birch	175-200cm	Root ball	Feather	10
Crataegus laevigata	Midland Hawthorn	175-200cm	Root ball	Feather	15
Crataegus monogyna	Hawthorn	175-200cm	Root ball	Feather	5
Populus nigra	Black Poplar	175-200cm	Root ball	Feather	15
Prunus padus	Bird Cherry	175-200cm	Root ball	Feather	10
Quercus robur	English Oak	175-200cm	Root ball	Feather	15
Salix caprea	Goat Willow	175-200cm	Root ball	Feather	10
Torminalis glaberrima	Wild Service tree	175-200cm	Root ball	Feather	5

Establishment Maintenance

5.4.43 The aim of establishment maintenance will be to support the early stages of growth to encourage thick, bushy growth and good form. This is based on the following principles and outline prescriptions:



- Maintain a 0.5 metre weed free strip around the base of the tree through mechanical control;
- Irrigation may be required during periods of drought or extended dry weather;
- > Remove litter, rubbish, and debris from planted areas throughout the year;
- Re-firm soil around roots to ensure plants are supported and upright in spring each year;
- Inspect and adjust stakes, guards, and ties in spring and autumn and after periods of particularly inclement weather;
- Check and record failed or defective plants in September annually;
- Replace failed or defective plants with matching species of the same size during the next planting season after failure; and
- > ECoW to undertake a quarterly check of plants to record their growth and condition.

Long-Term Management

- 5.4.44 The long-term management of proposed individual trees will focus on the following interventions:
 - Individual trees will be left to reach maturity, where trees are spaced close together, pruning/thinning may be required in order to promote growth and longevity;
 - Any necessary pruning/thinning will take place outside of the bird nesting season and at the end of the winter in February. This will allow any fruit to stay in place for the maximum period of time throughout the winter;
 - Any branches/growth that overhangs or obstructs PRoWs or access tracks will be cut back to keep routes clear to use;
 - Dead, dying or over-mature trees will be removed if considered a hazard on health and safety grounds and in accordance with any protected species constraints; and
 - Monitoring of new individual trees will be undertaken periodically in order to check any significant changes in health and viability of the hedgerow. Maintenance and condition checks will take place every three years.

Species-rich grassland

Function

5.4.45 Species-rich grassland will be established across the Order Limits, under the PV panels, field margins and buffer zones/habitat management areas. The type of mix will vary across the Site and will consider ground conditions and soil types to establish a diverse and successful sward of grasses and wildflowers.



- 5.4.46 Grassland diversity will be achieved both through different species mixes and through management (e.g. traditional meadow style management and maintenance of flower rich tussocky swards).
- 5.4.47 By establishing a diverse sward of grasses and wildflowers biodiversity will increase, enhancing value for wildlife. The mixes used for the open areas, verges and field margins will provide a variety of wildflowers to both enhance biodiversity and to provide a valuable food source and habitat to local invertebrates and wildlife.
- 5.4.48 Areas of grassland within the habitat management areas (more than 15m from boundary features) will contain plots measuring at least 16m² to provide additional opportunities for breeding skylarks.

Implementation

- 5.4.49 The exact location and proportion of seed types will be tailored to conditions on Site and to the needs of the Site's biodiversity. The buffer zones vary in their scale dependent on the location of panels/roads/residential properties.
- 5.4.50 A specification for species-rich grassland will be developed based on the indicative species, sizes and percentages presented in Table 5.4 through to
- 5.4.51 Table 5.6. This may be subject to change based on the prevailing soil types.

Table 5.4 Indicative mix for proposed species-rich grass beneath solar panels

Botanical Name	Common Name	%Mix				
	Wildflowers					
Achillea millefolium	Yarrow	0.8				
Agrimonia eupatoria	Agrimony	0.4				
Arctium minus	Lesser Burdock	0.1				
Centaurea nigra	Common Knapweed	1.4				
Centaurea scabiosa	Greater Knapweed	1.0				
Chaerophyllum temulum	Rough Chervil	0.8				
Cruciata laevipes	Crosswort	0.5				
Daucus carota	Wild Carrot	1.0				
Dipsacus fullonum	Wild Teasel	1.6				
Filipendula ulmaria	Meadowsweet	0.8				
Galium album	Hedge Bedstraw	1.8				



Botanical Name	Common Name	%Mix
Knautia arvensis	Field Scabious	0.8
Lathyrus pratensis	Meadow Vetchling	0.4
Leucanthemum vulgare	Oxeye Daisy – (Moon Daisy)	1.6
Lotus corniculatus	Birdsfoot Trefoil	0.4
Malva moschata	Musk Mallow	1.6
Plantago lanceolota	Ribwort Plantain	1.8
Poterium sanguisorba	Salad Burnet	1.6
Silene dioica	Red Campion	1.2
Vicia cracca	Tufted Vetch	0.4
	Grasses	
Alopecurus pratensis	Meadow Foxtail (w)	4.0
Cynosurus cristatus	Crested Dogstail	20
Dactylis glomerata	Cocksfoot (w)	16
Festuca rubra ssp rubra	Strong-creeping red fescue	12
Holcus lanatus	Yorkshire Fog	8
Lolium perenne	Perennial Ryegrass (w)	4
Cruciata laevipes	Smooth-stalked Meadow-grass	6.4
Schedonorus arundinaceus (Festuca arundinacea)	Tall Fescue (w)	9.6

Table 5.5 Indicative mix for proposed species-rich grass in field margins and hedgerows

Botanical Name Wildflowers	Common Name	%Mix
	Wildflowers	
Agrimonia eupatoria	Agrimony	0.5
Alliaria petiolara	Garlic Mustard	1.0
Anthriscus sylvestris	Cow Parsley	0.5
Arctium minus	Lesser Burdock	1.0
Centaurea nigra	Common Knapweed	2.0
Chaerophyllum temulum	Rough Chervil	0.4



Botanical Name Wildflowers	Common Name	%Mix
Cruciata laevipes	Crosswort	0.8
Daucus carota	Wild Carrot	0.8
Dipsacus fullonum	Wild Teasel	1.5
Filipendula ulmaria	Meadowsweet	0.4
Galium album	Hedge Bedstraw	1.5
Geum urbanum	Wood Avens	0.4
Geranium pratense	Meadow Crane's-bill	0.3
Lathyrus sylvestris	Narrow-leaved Everlasting-pea	1.0
Leucanthemum vulgare	Oxeye Daisy – (Moon Daisy)	1.2
Malva moschata	Musk Mallow	1.0
Origanum vulgare	Wild Marjoram	0.3
Plantago lanceolota	Ribwort Plantain	0.8
Primula veris	Cowslip	0.6
Rumex acetosa	Common Sorrel	0.4
Silene dioica	Red Campion	2.0
Silene vulgaris	Bladder Campion	0.8
Vicia cracca	Tufted Vetch	0.8
	Grasses	
Agrostis capillaris	Common Bent (w)	2.4
Anthoxanthum odoratum	Sweet Vernal-grass (w)	1.6
Brachypodium sylvaticum	False Brome (w)	0.8
Cynosurus cristatus	Crested Dogstail	48
Deschampsia cespitosa	Tufted Hair-grass (w)	1.6
Festuca rubra	Red fescue	19.2
Poa nemoralis	Wood Meadow-grass	6.4



Table 5.6 Indicative mix for proposed species-rich grass in buffer zones/mitigation areas

Botanical Name Wildflowers	Common Name	%Mix			
Wildflowers					
Achillea millefolium	Yarrow	0.75			
Agrimonia eupatoria	Agrimony	0.3			
Centaurea nigra	Common Knapweed	1.5			
Daucus carota	Wild Carrot	0.9			
Galium verum	Lady's Bedstraw	1.5			
Knautia arvensis	Field Scabious	0.45			
Leucanthemum vulgare	Oxeye Daisy – (Moon Daisy)	1.27			
Malva moschata	Musk Mallow	1.8			
Plantago lanceolota	Ribwort Plantain	1.8			
Poterium sanguisorba	Salad Burnet	0.9			
Primula veris	Cowslip	0.3			
Ranunculus acris	Meadow Buttercup	0.75			
Silene dioica	Red Campion	1.5			
Rhinanthus minor	Yellow Rattle	0.98			
Rumex acetosa	Common Sorrel	0.3			
Grasses					
Agrostis capillaris	Common Bent (w)	8.5			
Cynosurus cristatus	Crested Dogstail	29.75			
Festuca rubra	Red fescue	25.5			
Phleum bertolonii	Smaller Cat's-tail (w)	4.25			
Poa nemoralis	Wood Meadow-grass	17			

5.4.52 Tailored mixes will also be created for areas of newly created Coastal and Floodplain Grazing Marsh (e.g. species rich mix capable of thriving in waterlogged soils) and riparian strips alongside existing wet ditches and watercourses.



Establishment Maintenance

- 5.4.53 The aim of establishment maintenance will be to support the early stages of growth to encourage a healthy sward and allow a diverse mix of species to establish. This is based on the following principles and outline prescriptions:
 - Where practicable, seed will be obtained from a local source for the purpose of maintaining continuity with local species-rich grasslands;
 - Receiving soils should be prepared in order to reduce the nutrient levels. Techniques for reducing nutrient levels should follow best practice and take into consideration soil survey results. These measures may include sowing of crops such as forage maize or mustard without fertiliser application;
 - Once the nutrient level is reduced, all clods will be broken up and alien material (such as plastics and metals) above 50 mm in size will be removed.
 - > The top 50mm should be raked to allow for a fine tilth before seeding. This should be done directly before seeding which should take place in preferably in the autumn to avoid sowing during dry periods. If unable to sow during autumn then the spring sowing window should be used; and
 - Seeding and rolling will be carried out in dry weather and access will be prohibited to seeding areas until seed has germinated and a sward has established (see establishment maintenance section for grasslands generally).

Long-Term Management

- 5.4.54 Within the first 12 months after sowing, the species-rich grassland field margins, PRoW buffers and open space areas will be cut to help the sown species to establish. The cuttings will be left for a period of seven days before being removed to appropriate storage areas on site.
- 5.4.55 Once the areas are fully established, typically the second Spring after sowing, the area will need to be cut in the Spring (before April) to reduce the vigour of the grass.
- 5.4.56 Following this, areas will be cut towards the end of September, after the breeding season (typically March to August inclusive), to avoid disturbing ground nesting birds. Tussocky grassland areas will be cut less frequently once established (on or 2 to 3 year cycle).
- 5.4.57 Cutting will be done strategically to allow for areas with both taller and shorter swards to provide opportunities for a range of fauna.



Agricultural field margins

5.4.58 Agricultural field margins are to be established following prescriptions from Defra along one boundary in each of the fields supporting solar PV are to be established, maintained and resown as required.

Function

5.4.59 By establishing and maintaining a range of agricultural field margins food sources and cover for a range of fauna will be provided (e.g. for farmland birds, invertebrates and small mammals) and heterogeneity delivered.

Implementation

- 5.4.60 The exact location and proportion of seed types will be tailored to conditions on site and to the needs of the site's biodiversity. Countryside Stewardship prescriptions AB8 Flower-rich margins (targeting pollinators in the summer), AB16 Autumn sown bumblebird mix and AB9 Winter bird food (provisioning for farmland bird species in long and/or cold winters) will be grown. In locations where hedgerows will be allowed to grow to 4m tall, mixes will be tailored with fumitory and chickweed that will benefit turtle dove.
- 5.4.61 The margins will be established as per guidance and maintained for the appropriate time-scale (usually 1 or 2 years dependent on mix), before being removed and replaced. There is no long term management as these margins will be created, lost and replaced on a regular cycle.

Ditches (holding permanent water)

- 5.4.62 Ditches across the Order Limits will be retained and maintained with new crossings minimised to keep habitat connectivity. No development (other than at crossing points) will take place within 5m of the bank top.
- 5.4.63 The condition of the watercourses varies significantly across the Site, although most show steep side slope profiles and are relatively straight. This is likely to be a result of historic agricultural practices.

Function

- 5.4.64 Ditches will be managed to provide habitat for fish and other aquatic and semiaquatic fauna, with new or upgraded crossings designed to maintain connectivity.
- 5.4.65 Riparian zones will be managed for biodiversity and will be supplemented with a species rich seed mix, such as that shown in Table 5.4 through to
- 5.4.66 **Table** 5.6.



Implementation

5.4.67 The exact location and proportion of seed types will be tailored to conditions on Site and to the needs of the Site's biodiversity. Grassland strips approximately 5m wide (measured from bank top) would be established as described above for other species-rich grasslands.

Long-term management

5.4.68 Ongoing management of drainage ditches will involve the clearance of any silt build-up as required (outside of the main bird breeding season), with the aim of clearing no more than one third of each ditch in each year, and from one bank/side only. Bankside vegetation will be cut every other year (in autumn), alternating from one bank, to the opposite bank, maintaining vegetation cover all year round.

Localised features

- 5.4.69 A range of localised measures will be delivered to increase the opportunity for a range of flora and fauna, many of which are local conservation priorities. These measures are:
 - > Beetle banks;
 - > Habitat piles/hibernacula;
 - > Gabion baskets;
 - Bat and bird boxes; and
 - Otter holts.

Beetle Banks

5.4.70 Beetle banks are to be created within solar PV fields and species-rich grassland mitigation areas to improve the availability and diversity of invertebrates for skylark and other species which feed on invertebrates. They will be constructed to be 0.4m high and 1.5–2m wide (as per Countryside Stewardship prescription). Each field between 20ha and 28.9ha will have one beetle bank (unless in the flood plain), and those larger than 29ha will have three. They will be positioned to run along solar panel arrays or alongside access tracks. The banks will be between 140 to 450m in length and will be constructed in spring or autumn and sown with a species-rich grassland sward to create a diverse structure.

Habitat piles/hibernacula

5.4.71 A minimum of 50 habitat piles will be created within solar PV panel fields and mitigation areas. They will be strategically located close to scrub, woodland, hedgerows and other habitats providing habitat for invertebrates and shelter and/or hibernating opportunities for amphibians and reptiles. They will be created



from logs (ideally locally sourced from associated vegetation clearance) piled into a shallow hole up to 30cm deep and covering an area of 2 x 3-4m and up to a height of 1-1.5m above ground level. The pile will be topped with a layer of mulch and/or brash and leaves to help initiate decomposition of the logs below. A final layer of grass sods or turf will be applied to prevent the materials from dispersing in high winds. These will be created outside of the design flood extent.

Gabion baskets

5.4.72 Gabion baskets/cages will be used to create habitat for invertebrates, amphibians and reptiles (minimum of 25). They will be filled using a range of materials, including large and small rocks/pebbles, stacked logs, bamboo, bricks and ceramic pipes. This will create a range of features for fauna of various sizes and life stages. They will be provided in a variety of sizes; a minimum of 1m wide and high, and up to 20m long, located in both solar PV panel fields and mitigation fields. Some will be located in the centre of fields, and others along drainages ditches and woodland edge boundaries. Where they are positioned running east to west, they can be used to support earth works to create a shallow, south facing slope, providing basking opportunities for reptiles.

Bat and bird boxes

5.4.73 Bat and bird boxes will be installed (50 of each - including at least 3 barn owl boxes) within mature trees throughout the Order limits to increase roosting and nesting opportunities for bats and birds. A range of sizes, designs and materials will be used to provide a range of conditions for various species. They will be installed on the south-west or south-eastern aspect of a tree trunk, at a minimum of 3m from ground level, ensuring there is a clear entry to the box with no branches or foliage which might block the entrance.

Otter holts

5.4.74 Two otter holts will be constructed; one within the bank of a substantial ditch either side of the River Trent, east and west. The holts will be constructed of locally sourced logs and branches, partially buried and covered in brash to create camouflage and reduce potential for disturbance. Locations will be selected for their connectivity to the River Trent and proximity to scrub and mature trees, providing cover and support to the bank structure through root systems.



6. Permissive paths

- 6.1.1 New permissive paths have been designed to supplement the existing Public Right of Way (PRoW) network, linking existing routes and creating new connections. The location of the proposed permissive path network is shown in **Appendix B**.
- 6.1.2 The permissive paths will be made available to the public, 364 days a year, by permission of the Landowner. They will be managed by the Applicant and will include signs to make clear that its use is for the public by permisson of the Landowner. At the end of the Proposed Development's operation, the area will be returned to the Landowner (with further detail to be included in the DEMP) when the land will be in private ownership and the permitted public use will cease.
- 6.1.3 Baseline research and consultation feedback demonstrated that Newton on Trent is not served by any public footpaths that connect to the wider network. A permissive path network, totalling 2.5km, will therefore be implemented to provide a route from the south of the A57 to the Sustrans route, including an additional spur heading west to join the Trent Valley Way, enhancing the recreational value of the Order Limits.
- 6.1.4 A further 3.6km of permissive paths are proposed on the west of the River Trent, providing a circular route between Fledborough and Ragnall, connecting to an existing footpath that follows the western bank of the River Trent.
- 6.1.5 Permissive paths will be open for use by pedestrians, cyclists, and equestrians. The surface will be permeable, typically comprising mown grass, with crushed aggregate used where required.
- 6.1.6 These new permissive paths will feature many of the proposed habitats mentioned within this report, with their management prescriptions following those given in the relevant sections. Proposed habitat types along the permissive paths will feature (but are not limited to), grassland, individual trees, hedgerow, hedgerows with individual trees and woodland and native tree belts.
- 6.1.7 As well as proposed habitats, the permissive path network will feature and interact with existing habitats such as ditches, hedgerows and grassland. The management of these existing habitats will follow the management prescriptions listed in this document with the aim of preserving and enhancing the existing landscape features and habitats.

Implementation

6.1.8 New signage will be installed to help wayfinding and provide information on how to link to existing parts of the PRoW network as well as course distances to promote active travel. Access points will be clearly defined. Signage will be



designed to be durable, weather-resistant and sympathetic to the natural surroundings.

Long-Term Management

- 6.1.9 Management of the habitats found along the permissive paths will follow the management prescriptions noted in this report, with particular attention paid to the heights and canopies of the individual trees and hedgerows in order to maintain accessibility for all users, including equestrian recreation activities.
- 6.1.10 Regular inspection of the path signage and wayfinding equipment will be undertaken in order to identify any damage or vandalism. Replacement or repairs will be carried out promptly to maintain visibility and accessibility. Regular inspection of the surface of the paths will also be undertaken.



7. Pre and post construction monitoring

- 7.1.1 Monitoring is required to determine that the functions documented within this OLEMP are being achieved and whether any remedial management action may be required. The baseline against which the monitoring can be compared against comprises the pre-construction baseline data. This baseline data collected in 2023/2024 will require updating prior to construction, as by operation (from 2030 at the earliest) this data will be over six years old and out of date. Updates would include a similar set of surveys undertaken at the baseline where relevant ecological receptors have been identified, including surveys of breeding and non-breeding birds, bats, riparian mammals and badgers.
- 7.1.2 The Applicant will define the appropriate roles and responsibilities for site staff, as outlined in the **Outline Construction Environmental Management Plan** [EN010159/APP/7.4]. An Environmental Clerk of Works (ECoW) will be tasked with ensuring that construction-related environmental mitigation measures are properly implemented, monitored, and maintained. These measures will include, but are not limited to, vegetation clearance, species identification, and exclusion of protected or non-protected species.
- 7.1.3 The ECoW's responsibilities will encompass activities that could impact biodiversity, such as providing advice on methods to prevent or minimise light spill, as well as delivering Toolbox Talks before starting any work that might affect habitats and species.
- 7.1.4 The Contractor, appointed by the Applicant to construct the Proposed Development, will be responsible for establishing, managing, and monitoring the implementation of landscape and ecological mitigation during the five-year establishment aftercare period. The Applicant will inspect and record the success of this establishment during that time. Further details are provided in **Section 4**.
- 7.1.5 Any long-term biodiversity monitoring and management requirements specified in this document will be carried out by the Applicant and/or a Contractor appointed by the Applicant.
- 7.1.6 A post-construction monitoring programme will be formalised, agreed and included within the detailed LEMP. Walkover surveys of the Site will be undertaken between April and June in years 2, 4, 6, 10 and then every 5 years post-construction until year 40. The surveys will involve inspection of the hedgerows, woodland/tree belts grassland and riparian habitats to ensure they are being managed accordingly.
- 7.1.7 Post-construction monitoring for flora, birds (breeding and non-breeding), riparian mammals, badgers and bats (bat box roosting and activity survey), will be undertaken in the respective seasons, in years 1, 3, 5,10 and 15 postconstruction and thereafter every ten years from years 20 to 40. For the purposes of BNG Condition Assessments, post-construction surveys will also be undertaken in



- years 2, 5, 10, 15, 20, 25 and 30. These surveys are likely to involve similar methods to those used to determine the ecological baseline of the Proposed Development.
- 7.1.8 Maintenance checks of wildlife feature (e.g. otter holts, bat and bird boxes etc.) will be made annually to ensure that these features are still in position and secure. Some refitting of boxes, repairs and replacements are likely to be required over the life-time of the Proposed Development.
- 7.1.9 Results from the post-construction monitoring will feed into the management plan and, if required, management may be amended accordingly based on this monitoring.



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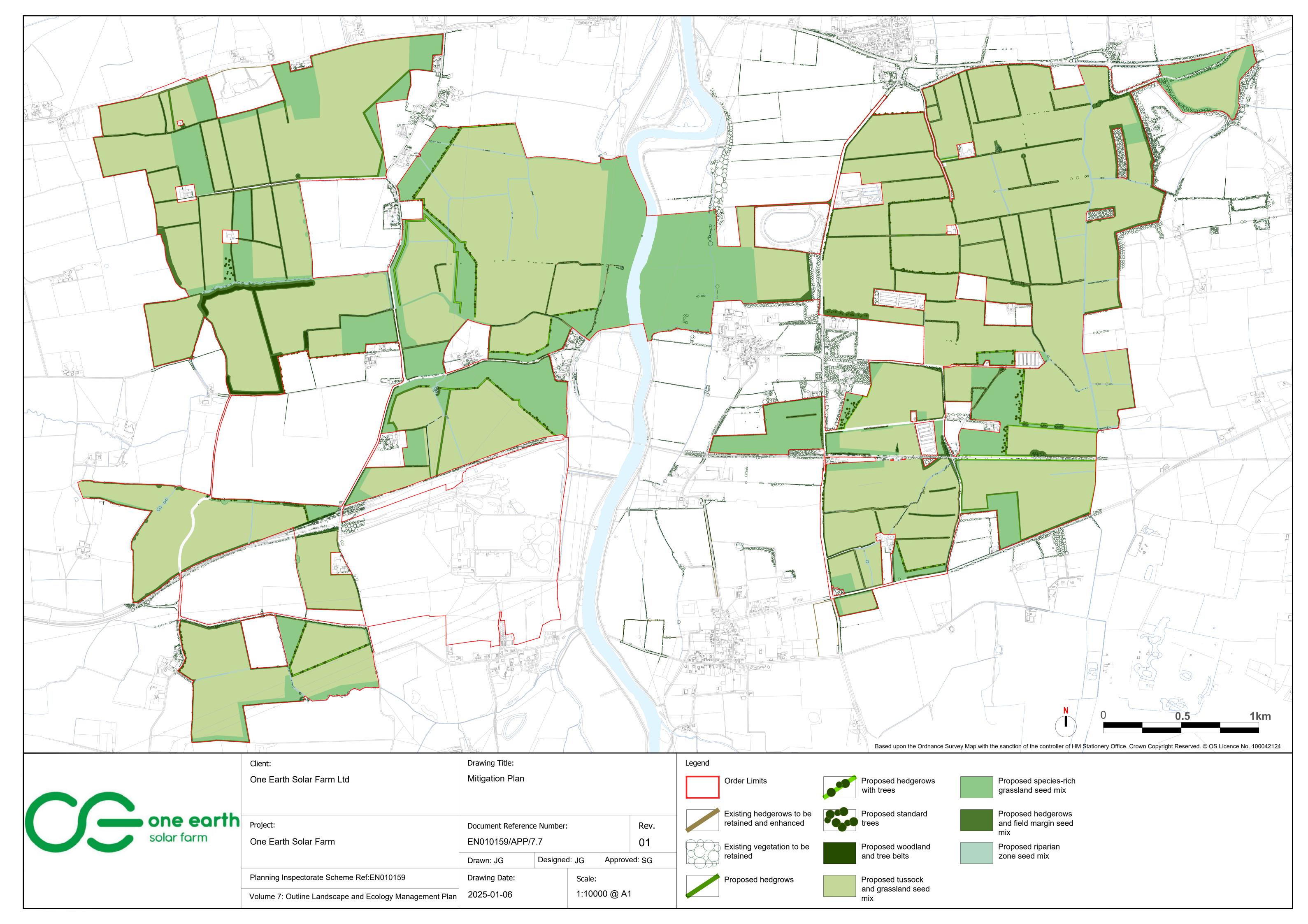
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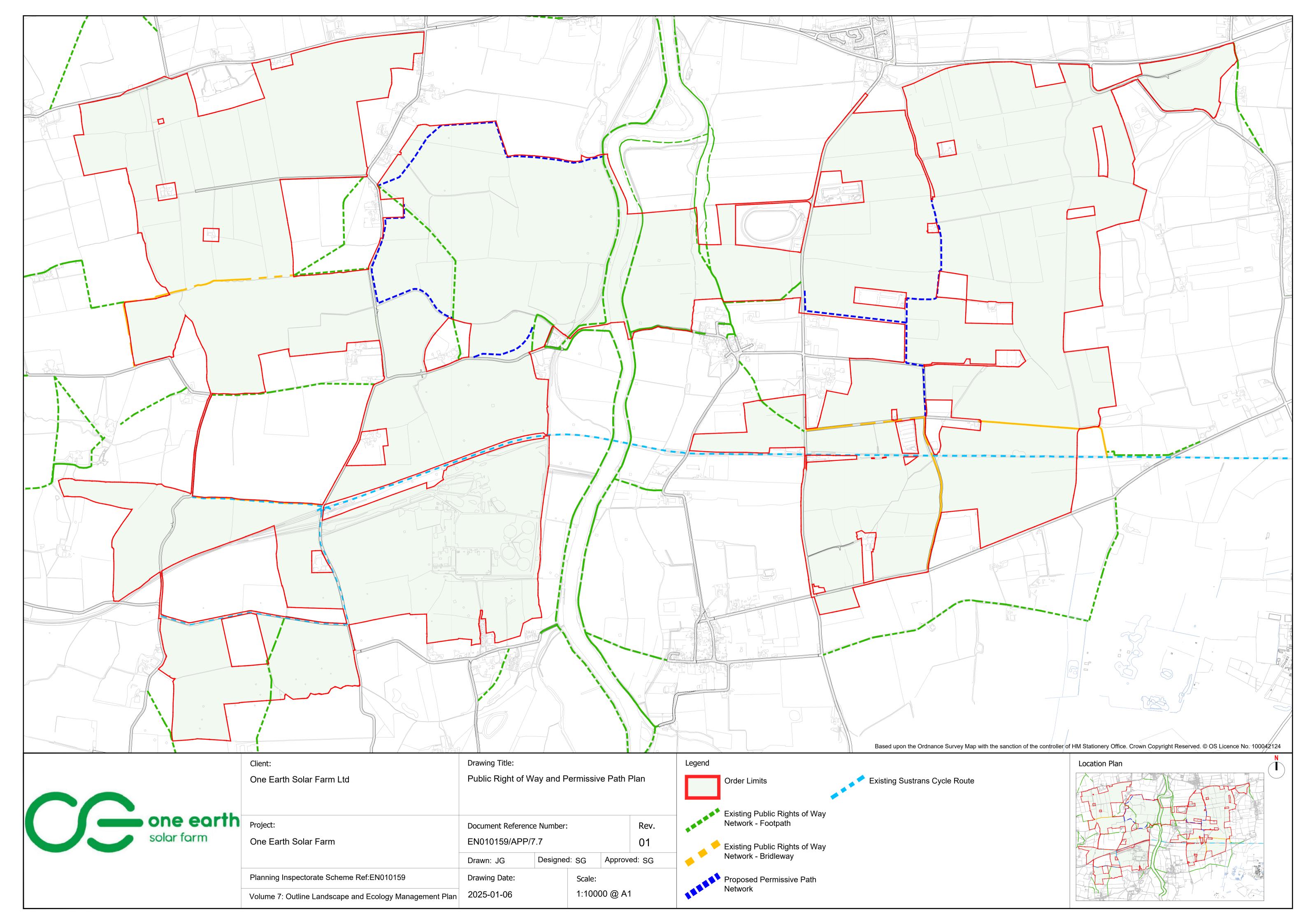


Appendix A Landscape Mitigation Plan





Appendix B Permissive Path Plan





Appendix C Vegetation Removal Plan

