APPENDIX 7.9
OUTLINE LANDSCAPE AND ECOLOGICAL MANAGEMENT PLAN

Alleston Solar Farm, Pembrokeshire

Outline Landscape and Ecological Management Plan

On behalf of Alleston Clean Energy Limited Ltd.

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For and on behalf of Stantec UK Limited			

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1 Introduction

1.1.1 This Outline Landscape and Ecological Management Plan (LEMP) has been prepared by Stantec to provide a long-term planting, management and maintenance approach for the implementation and after-care of landscape and ecological mitigation and enhancement aspects of Alleston Solar Farm, Pembrokeshire. It has been prepared to accompany a Development of National Significance (DNS) application for the installation of a ground-mounted solar farm and associated works ('the Proposed Development') at Alleston Farm, Pembrokeshire ('the Site'). The Site sits within the administrative boundary of the Pembrokeshire County Council (PCC), adjacent to the southeast of Pembroke and approximately 300m to the west of the village of Lamphey. This Outline LEMP concerns works which will be required during both the construction and operation phases of the Proposed Development.

1.1.2 The purpose of the Outline LEMP is to set out a framework for the creation and maintenance of landscape and ecological features described within the application proposals. While as much detail as possible has been included at this stage to accompany the DNS application, it is anticipated that it will be revised through further consultation during the DNS examination process, and a finalised LEMP be secured via the relevant Local Planning Authority by discharge of a Planning Condition post-consent. In some cases, this Outline LEMP contains more than one management options to leave some flexibility for specification, however the finalised LEMP shall be substantially in accordance with the principles set out in this Outline LEMP. The finalised LEMP will contain all the necessary detail required to identify all parties responsible for its delivery, as well as how, where and when all habitat creation, management and monitoring prescriptions shall be undertaken.

1.1.3 This Outline LEMP needs to be read in conjunction with the Landscape Strategy Plans (333100437 LN-LP-13 – 17) prepared by Stantec, Chapter 9 - Biodiversity of the Environmental Statement (ES) by Clarkson & Woods Ltd., the Arboricultural Impact Assessment and Tree Survey (AIA) prepared by Stantec, and the Outline Construction Environmental Management Plan (CEMP)

1.2 Planning and Legislative Background

1.2.1 The Outline LEMP is intended to satisfy the intent of Regulation 9 of The Conservation of Habitats and Species Regulations 2017[1] which seeks the compliance with the Directives through the functions of an authority competent in habitats conservation management.

1.2.2 Section 6 of the Environment (Wales) Act 2016[2] sets out the biodiversity duty of public authorities in Wales to "*seek to maintain and enhance biodiversity in the exercise of its functions in relation to Wales, and in so doing promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions*". The duty required authorities to take account of the resilience of ecosystems and in particular the DECCA Framework, where DECCA stands for Diversity, Extent, Condition, Connectivity, and Adaptability:

- Diversity between and within ecosystems;
- Extent: increasing the area of semi-natural habitat/features;
- the Condition of ecosystems (including their structure and functioning);
- the Connections between and within habitats; and
- the Adaptability of ecosystems.

1.2.3 In response to Section 6, Planning Policy for Wales[3] (PPW) requires that "*Planning authorities must seek to maintain and enhance biodiversity in the exercise of their functions. This means development should not cause any significant loss of habitats or populations of species, locally or nationally and must*

[1] UK Government. The Conservation of Habitats and Species Regulations 2017.

[2] National Assembly for Wales (enacted 2016, most recently updated April 2024). Environment (Wales) Act 2016,

[3] Welsh Government, February 2024. Planning Policy Wales - Edition 12

provide a net benefit for biodiversity. In doing so planning authorities must also take account of and promote the resilience of ecosystems…." (6.4.5)

1.2.4 "Welsh Government's Approach to Net Benefits for Biodiversity [NBB] and the DECCA Framework in the Terrestrial Planning System" outlines the Welsh Government's approach to delivering net benefits for biodiversity and key considerations for ecologists and developers in submitting planning proposals. The briefing notes the following which is of relevance to long term management of landscape and ecology:

> *"Once the measures have been designed to achieve NBB and improved ecosystem resilience, the final essential steps are developing long term management (maintaining the habitat for as long as is necessary depending on what is being secured) and monitoring plans that are proportional to the scale and impact of the development. Monitoring plans should identify key measures of success, and what rectification actions will be taken by who if these success measures are not met. Management plans should clearly set out timescales and responsibilities for all stakeholders involved. NBB measures should aim to be designed in such a way that minimal maintenance is required, they are climate change resilient, and that opportunities for destruction, damage or removal of features should be reduced as far as possible." (Page 10)*
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> *"The onus on the developer will be to demonstrate how the development will deliver this, including evidence of site management and the resources to do this for as long as is necessary." (Page 5)*

1.2.5 The Outline LEMP is intended to guide how requirements can be satisfied through identification of management components, success criteria and required monitoring activities. In the production of this strategy, input has been received from ecological consultancy, Clarkson & Woods Ltd., to ensure appropriate reference to existing species and habitats and mitigation measures has been included.

2 Scope

2.1 Overview

2.1.1 The aim of this Outline LEMP is to promote a sensitive management approach that protects, manages, and enhances the Site for the benefit of habitats in the long-term.

2.1.2 This document provides a strategy for overall management and maintenance of the landscape features of the Proposed Development, including existing features, hard and soft landscape proposals incorporating newly created habitats of woodland, grasslands and hedgerows.

2.1.3 The Outline LEMP has been prepared to provide an integrated approach to the management of the landscape, ecology and amenities associated with the Proposed Development. It is a dynamic document that will be renewed on a regular basis to ensure it remains fit for purpose. This Outline LEMP does not specify the exact interval or the parties responsible and the standards for their qualifications and experience. This will be set out in the finalised LEMP at a later stage.

2.1.4 This Outline LEMP has been prepared to cover the operation life of the Proposed Development (40 years).

2.2 Document Structure

- Section 3 describes the existing landscape context and describes the existing fauna and flora present in and around the Site, including key species;
- Section 4 sets out the vision, aims and objectives for the Outline LEMP;
- Section 5 describes the Landscape Management Components and their associated maintenance tasks;
- Section 6 describes the general maintenance and management tasks; and
- Section 7 outlines the arrangements for management responsibilities and the recommendations for the monitoring and review of the Outline LEMP.

2.3 Key Personnel

2.3.1 The final LEMP will set out the roles and responsibilities of those involved in creating, managing and monitoring the prescriptions within this document. A suitably qualified person will be appointed to oversee the coordination of implementing the LEMP, including sourcing appropriate seed and plants at an early stage.

3 Existing Landscape

3.1 Location and Site Context

3.1.1 The Site is located at Alleston Farm, Pembrokeshire. The Site sits within the administrative boundary of the Pembrokeshire County Council (PCC), adjacent to the southeast of Pembroke and approximately 300m to the west of the village of Lamphey.

3.1.2 The area surrounding the Site is predominantly agricultural, featuring scattered farmhouses and residential developments near Pembroke town and Lamphey village. The Site itself comprises 14 fields used for arable and pasture farming, located around the Alleston Farm complex. The Site is accessible by vehicle from the north via Lower Lamphey Road and from the west via Watery Road.

3.1.3 The northern boundary of the Site is bordered by Lower Lamphey Road, a narrow lane lined with vegetation and several detached, two-storey homes, with further fields and a railway line beyond. To the east, agricultural fields with mature hedgerows extend towards the settlement of Lamphey and the Pembrokeshire Coast National Park (PCNP), while to the south and west, the Site is surrounded by pastoral landscapes, woodland blocks, and the nearby town of Pembroke.

3.1.4 The vegetation pattern within the Site and its surrounding context is varied and comprises hedgerow boundaries of varied condition often with hedgerow trees. Trees, tree groups and mixed and broadleaf woodland are also present, including broadleaf ancient woodland that tends to be associated with watercourses.

3.2 Site Appraisal

3.2.1 The Site encompasses approximately 96ha and comprises 14 agricultural fields with a mix of improved grassland and arable land. The fields are separated by rows of mature hedgerows. Within the eastern region of the Site a collection of fields are currently used for equestrian activities. This is with the exception of Alleston Farmhouse, a Grade II Listed building, and the associated buildings which are located within the centre of the Site.

Vegetation and Water Bodies

3.2.2 The fields within the Site are bordered by hedgerows of varying structure. All of the hedgerows within the Site have been subject to some level of management and are generally intact and stockproof. The hedgerows are connected to an extensive network of hedgerows and woodland blocks in the wider area. Species composition within hedgerows varies slightly across the Site. They are generally dominated by blackthorn *Prunus spinosa*, with occasional hazel *Corylus avellana*, bramble *Rubus fruticosa,* ivy *Hedera helix,* common gorse *Ulex europaeus* and hawthorn *Crataegus monogyna*.

3.2.3 Semi-mature and mature trees are present within some of the hedgerows, particularly those along the northern boundary of the Site and along the stream corridor through the northern part of the Site. These trees are predominantly ash *Fraxinus excelsior*.

3.2.4 An area of mature trees and vegetation is located within the southwestern region of the Site and runs into the central region of the Site. This collection of trees is known as Alleston Wood, part of which is defined as “ancient semi-natural” on the Natural Resources Wales Ancient Woodland Inventory.

3.2.5 The Arboricultural Impact Assessment and Tree Survey (AIA) prepared by Stantec identified a total of 255 tree features including 162 individual trees, 45 groups of trees, 43 hedges and 5 woodlands a proportion of which will be removed to accommodate development.

3.2.6 Thirteen tree features were categorised as high A grade, 97 tree features were categorised as moderate B grade, and 128 were categorised as low C grade. 17 tree features were categorised as very low-quality U grade and are not considered a constraint to development.

3.2.7 Environment Statement (ES) Chapter 9 Biodiversity describes the habitats and vegetation present within the Site and the Arboricultural Survey submitted in support of the DNS application describes the hedgerows, trees, tree groups and woodland in greater detail.

3.2.8 The landscape of the Site incorporates well vegetated, unnamed streams that align with Alleson Wood and field boundary hedgerows. Within Alleston Wood there is also a pond and some marshy grassland areas.

3.3 Biodiversity Impact Assessment

3.3.1 Strategies for protection and enhancement of habitats, as detailed in Chapter 9 - Biodiversity of the Environmental Statement (ES) - carried out by Clarkson & Woods Ltd - inform both the Landscape Strategy and this Outline LEMP. These in turn have been evaluated in the Biodiversity Net Gain (BNG) Assessment, Green Infrastructure Statement and the Landscape and Visual Impact Assessment.

3.3.2 The main habitat types identified in Chapter 9 Biodiversity are:

- *"Woodland and Scrub;*
- *Arable Fields;*
- *Grassland and Arable Field Margins;*
- *Hedgerows and Trees; and*
- *Bare ground"*

3.3.3 Protected species potentially supported by the habitats on the Site include:

- *"Amphibians;*
- *Badgers;*
- *Bats;*
- *Birds;*
- *Dormouse;*
- *Hedgehog;*
- *Otter;*
- *Water Vole; and*
- *Reptiles "*

3.4 Statutory and Non-Statutory Ecological Designations

3.4.1 There are no statutory or non-statutory designated sites within the Site.

3.4.2 The nearest designated sites are Pembroke Mill Ponds LNR and Wildlife Trust Reserve (WTR), 1.0km northwest of the Site and Freshwater East LNR 1.2km south of the Site. Further designated sites and their relevance is mentioned in Table 1 within the ES Chapter 9.

3.5 Landscape Strategy

3.5.1 The Landscape Strategy draws together the ecological mitigation and enhancement measures set out in the ES Chapter 9. These are set out below:

- Areas of new woodland (approximately 1.95ha) are proposed within the Development, which would contribute to the proliferation of Green Infrastructure, connectivity of habitats across the Site and provide some visual screening of the Proposed Development;

- A range of grassland types are proposed, with the fencing associated with the Development enabling changes in management regimes for different parts of the Site that would benefit from less intense grazing to encourage greater species diversity. The Landscape Strategy incorporates the preparation and seeding of existing grassland and changes in management regimes to minimise the amount of agriculturally improved areas and promote species rich grassland including hay meadow, rough tussocky grassland and marshy grassland;

- The arable fields, which dominate the Site, will be reverted to grassland under the panels following ground preparation and sowing, which can be expected to lead to a significant NBB and generate a simple mosaic of grassland habitats, with the most diverse (species-rich) grassland habitats focussed within the buffer zones, easements and other areas free of array hardware and hard standing;

- Areas of existing semi-improved grassland, which are not cultivated or receive much management will be retained wherever possible, particularly the large semi-improved grassland bank field within the south of the Site. These habitats will be managed sympathetically through implementation of a rotational cutting regime whereby not all areas are cut each year;

- Significant enhancement through the planting of new hedgerows at boundaries is proposed, along with a focus on the gapping-up of existing hedgerows, creation of new hedgerows (approximately 1.4km) at boundaries where none exist, along Public Rights of Way and where landscape and visual impact mitigation is required. This planting will also more than compensate for the minor loss of hedgerow habitat resulting from the small number of new construction access gaps. Hedgerows to be pruned following a regime to prevent disruptions to foraging opportunities for wildlife; and

- Additionally, approximately 0.07ha of orchard planting is proposed, which will be sensitively managed without the use of fertilisers to provide habitat and foraging resources for a range of wildlife.

4 Vision, Aims, Objectives & climate change

4.1 Vision

4.1.1 The landscape strategy and the Outline LEMP seek to provide a holistic landscape and ecological mitigation strategy for the Proposed Development and offers the opportunity to retain, enhance and create a variety of landscape features alongside the proposed built elements. These measures will assist in integrating the Proposed Development within the landscape, as well as complementing local landscape character and providing biodiversity opportunities.

4.2 Aims

4.2.1 To achieve this vision, the key overarching aims and objectives of the Outline LEMP are set out below:

- Aim 1: Secure the current value of existing landscape features that are to be retained;
- Aim 2: To establish new, high-quality landscape features to soften and integrate the Proposed Development within the surrounding landscape, enhancing its amenity and visual value;
- Aim 3: To enhance biodiversity and contribute towards a larger framework of Green Infrastructure; and
- Aim 4: To provide a framework for monitoring the management outcomes on the Site in line with the Outline LEMP.

4.3 Objectives

- To protect features to be retained during site preparation and construction;
- To ensure new planting is healthy and of good form;
- To maintain the healthy growth of trees, shrubs and grassland for landscape and visual amenity value, and to minimise adverse visual impacts;
- To increase ecosystem resilience within the Site through strengthening and creating new species-rich hedgerows, providing additional connected areas of scrub, woodland, and species-rich grassland;
- To create a tussocky grassland buffer alongside the hedgerow network to form valuable marginal habitats at the field boundaries;
- To provide additional nesting and foraging habitat for birds and other wildlife (through creation of new hedgerows and buffering of existing hedgerows with meadow grassland, together will new woodland and scrub planting);
- To incorporate specific enhancement measures for local priority species such as inclusion of specific species in planting mixes or targeted management regimes; and
- To implement periodic monitoring to ensure that the Site is being managed in line with the Outline LEMP and to inform remedial action, where necessary.

4.4 DECCA Framework

4.4.1 The Aims and Objectives outlined above align with the DECCA framework as required by Section 6 of the Environment (Wales) Act and the Planning Policy for Wales. Increasing the area of semi-natural habitats and creating connections between them is an objective met through the Landscape Strategy. The LEMP will provide the framework to ensure the establishment and sustainable management of these

diverse ecosystems, ensuring the healthy functioning of ecosystems and adaptability of those ecosystems to climate change or other evolving environmental conditions.

5 Landscape Maintenance Components

5.1 Landscape Maintenance Component Definition

5.1.1 Critical to the management process is the identification of Landscape Maintenance Components. These are habitat and vegetative features with defined characteristics and qualities for which there are related user expectations, and which require distinct maintenance guidance.

5.1.2 To achieve the objectives for the Outline LEMP, maintenance recommendations and tasks have been grouped into Landscape Management Components, in line with the Landscape Strategy Plan.

5.1.3 The Landscape Management Components are outlined as follows.

- Component 1: Existing Trees and Proposed Native Woodland and Orchard Planting;
- Component 2: Existing and Proposed Grasslands;
- Component 3: Existing and Proposed Hedgerows; and
- Component 4: Proposed Fencing & Hard Surfacing;

5.2 Component 1: Existing Trees & Proposed Native Woodland and Orchard Planting

5.2.1 Woodland is a national (Section 41, NERC Act 2006) Habitat of Principal Importance.

5.2.2 As set out in the Arboriculture Impact Assessment (AIA) which accompanies the Application, the Proposed Development does not require the removal of any significant trees, tree groups woodland or hedgerows. All existing trees and woodlands will be protected from damage during construction and decommissioning in accordance with the AIA recommendations and BS 5837: 2012. The ongoing management of existing woodland and trees will be amalgamated with that of proposed new woodland.

5.2.3 A total of 1.8ha of native woodland planting is proposed, including English oak *Quercus robur*, downy birch *Betula pubescens* and rowan *Sorbus aucuparia*, with mix details mentioned in the Landscape Strategy Plan – Planting Schedule (333100437 LN-LP-17). The woodland areas form seven blocks of varied sizes in the Landscape Strategy. One of these is in the central part of the Site, south-east of the proposed substation and enclosed by an existing area of trees and hedgerow trees. The other six are located along the edges and corners of the Site. This planting is intended to assist in screening views from public footpaths and nearby properties, and to extend and link together existing woodland habitats within and around the Site.

5.2.4 Any new tree planting for the woodland or the orchard is to be in accordance with BS 4428:1989. New planting should favour locally sourced indigenous tree species, wherever possible. Planting of bare root stock shall take place in October to March in favourable planting conditions – soil shall be free from frost and waterlogging.

5.2.5 Woodland tree planting and the Orchard planting includes a species mix of seed raised bare root, transplants to promote a diverse initial plant matrix. Cultivate all areas shown for planting to a depth of 300mm and level. Transplants to be notch planted and supported and protected by a biodegradable tube guard 0.6m high x 50mm diameter or greater to suit girth of shrub/tree, supported by 900mm bamboo cane inserted 300mm below ground level.

5.2.6 The proposed orchard planting focuses on creating and maintaining a healthy, productive, and ecologically sustainable orchard and create a new habitat on the Site. As listed in the Landscape Strategy, fruit tree species and varieties suited to the local climate and soil conditions, with consideration for disease resistance and pollination compatibility are selected.

5.2.7 The woodland planting and the orchard planting should be laid out with adequate spacing to ensure healthy growth, air circulation, and ease of access for maintenance. Companion planting like

understorey plants or ground covers can also be integrated to provide additional ecological benefits like pest control, soil enrichment, or erosion prevention, details of which are provided in Landscape Strategy Plan – Planting Schedule (333100437 LN-LP-17).

5.2.8 A Woodland Management Plan would cover removal of invasives, ensure dead wood is retained, and also ensure that the woodland isn't mismanaged. This will be set out in the full LEMP, with the broad aim being to remove invasives and manage minimally.

Maintenance Strategy

5.2.9 All existing and proposed trees relevant to the Proposed Development, if and where impact on the Development is expected, are to be inspected by a qualified arboriculturist at least every three years or as required for shading of the panels. Any recommended tree works will be carried out in accordance with BS 3998: 2010 'Tree Works – Recommendations', Health & Safety legislation, and relevant best practice.

5.2.10 The retention of mature trees will be secured by the continued application of "minimal safety management" rules, which will be set out in the finalised LEMP. If possible, works should be undertaken outside the birds nesting season (nesting season – March to August inclusive). If this is not possible appropriate checks by a qualified ecologist should be undertaken and, if occupied nests are identified or suspected, works will need to be delayed until nestlings have fledged. If necessary, further surveys should be carried out and appropriate licenses obtained to ensure legal compliance and/or secure appropriate or necessary mitigation.

5.2.11 'Future veteran' trees and 'old growth' features will be encouraged by retaining specific trees to mature and decline naturally. Small scale selective felling shall be undertaken where desirable to improve stand composition and structure and to create opportunities for natural regeneration, enrichment planting, and occasional permanent glades.

5.2.12 Any timber arising from safety and regenerative works shall be piled in appropriate locations within woodland areas to break down naturally and provide food and habitat for invertebrates.

5.2.13 Any trees that fail to establish within the first 5 years shall be replaced in the next available planting season in accordance with the original planting specification. Where a single species is failing in large numbers, species mix may be revised in agreement with the Local Planning Authority.

5.2.14 Any dead, diseased or damaged branches shall be pruned back to the main stem or suitable side shoot or removed.

5.2.15 Mulched areas around proposed trees shall be maintained for the first 5 years to a minimum depth of 10cm.

5.2.16 All existing and proposed trees relevant to the Proposed Development, where impact on the Development is expected, shall be subject to annual monitoring by an appropriately experienced ecologist for the first five years, and then every three years up to year 20, and every five years thereafter. All other trees subject to monitoring as per agreed timescales with the ecologist.

5.2.17 At the beginning and end of each growing season all stakes, ties and plant protection shall be inspected by parties to be confirmed in the finalised LEMP. Any looseness, constriction or abrasion shall be corrected by adjustment or replacement as required. Where the support of a stake is no longer required the stake shall be removed from site. All stakes, ties and plant protection shall be removed from Site after 3 years, unless still required to ensure the successful establishment of planting (e.g., newly planted trees to replace failures).

5.2.18 Watering is to be undertaken as necessary to allow healthy establishment of plants, particularly during prolonged periods of hot, dry weather.

Table 5.1: Potential Maintenance Tasks – Existing Trees

Task:	Proposed Frequency/ Timing
Safety inspections and report on condition of trees by arboriculture advisor if and where tree-panel risks are present.	Once a year
Works recommended following inspection typically include the removal of fallen, diseased, dead, dying or dangerous trees and damaged or crossing branches.	As recommended by annual inspection
Remove timber and arisings from safety and regenerative work and use to create deadwood habitat and refugia in local areas.	Immediately following works

Table 5.2: Potential Maintenance Tasks – Proposed Native Woodland and Orchard Planting

Task:	Proposed Frequency/ Timing
Maintenance of a 1m 80% weed-free area to the base of each planted tree for five years – this can be achieved through the application of a 5-7.5 cm mulch in this area.	Once or twice a year and as required
Maintenance of rabbit guards and other forms of protection.	As required, following monthly inspection
Maintenance of stakes and ties, including loosening, as necessary.	As required, following monthly inspection
Maintenance of good levels of soil fertility and moisture. Irrigation may be required during dry periods. A 5-7.5 cm mulch for 1m around the base of each tree will increase retention of soil moisture.	Watering (to field capacity) min. 8 times during dry months
Treatment of pests and diseases and repair of any damage from vandalism.	As required, following monthly inspection
Check for root firmness and upright alignment of tree after high winds, frost heave and in spring and autumn until trees are considered to be wind firm.	Twice annually and as required
Formative pruning to avoid future structural problems and to remedy disease and vandalism problems.	As required following maintenance visits
Removal of guards, stakes and ties.	After 2 years, subject to inspection
Following the maintenance period, trees are to be inspected by a qualified arboriculturist who will provide a time-bound schedule of tree works to be undertaken. Recommendations will be based upon satisfying the objectives of this management plan and ensuring no hazards are present on site.	Annually
Lift tree canopies to minimum height of 2m, maintaining balanced canopy as tree matures.	Annually
Reduce crown to maintain canopies clear of buildings, maintaining a balanced form.	As required

5.3 Component 2: Existing and Proposed Grasslands

Component 2a: Proposed Grassland outside of perimeter fence

5.3.1 10.5ha of proposed grassland outside perimeter fence to be allowed to develop a taller sward, with some tussocks allowed to develop in the margins; cut no more than once annually to maintain a suitable height and to ensure self-seeded scrub coverage does not exceed 5%. The potential for the adoption of a two-year rotation for cutting for habitat diversity will be considered ahead of production of the finalised LEMP.

Component 2b: Proposed Grassland within perimeter fence

5.3.2 38.8ha of proposed grassland within the perimeter fence to be seeded and managed by grazing or mowing, or a combination of both to maintain a low/ suitable height to avoid shading of the panels.

Component 2c: Proposed Species–Rich Grassland

5.3.3 7.8ha of land is proposed species-rich grassland. In these areas, the grassland will be seeded with a locally-appropriate seed mix as agreed and allowed to grow to a tall sward and maintained to a suitable height. It will be managed using low impact grazing/ mowing (removal of arisings in late July/August / aftermath grazing in autumn).

5.3.4 Preparation and seeding to be carried out in accordance with a detailed specification as advised by a specialist ecological consultant and supplier's recommendations. An ecologist will sign off the seed mix and each stage of ground prep and seeding (this could be done by photograph).

5.3.5 The initial vegetation establishment would be achieved by tight / hard grazing of the sward over winter, followed by harrowing the grass heavily and broadcasting a seed mixture using a heavy seed rate (c. 6g/m2) to ensure a seed bank is established in the soil. This process will need to be repeated in years 3 and 5 to ensure the establishment of diverse vegetation as it is likely the sward mix will fluctuate over the first few years of establishment. Optionally, a green hay cut from a suitable local donor meadow site may be utilised to provide an additional seed source, depending on availability.

5.3.6 The timings for establishment would be for grazing from October to March and seed spreading in April/May or September/October immediately following cultivation.

Component 2d: Existing Tussock Grassland

5.3.7 3.7ha of existing tussock grassland will be retained grassland – this is not new habitat. It will be allowed to develop a taller sward of suitable height; cut rotationally no more than once every three years where there is little or no vigorous scrub encroachment (i.e., no more than 10% encroachment).

Grassland Maintenance Strategy

5.3.8 In the first and second year after seeding, resist cutting species-rich grassland areas (component 2c) until mid to late summer (Early August) in order to allow plants to set seed naturally. Maintain to a short sward (50mm) where required (component 2b) to avoid shading of the panels by grazing or mowing until March. Dig out residual perennial weeds such as docks. Thereafter management of grasslands will require a single cut (observing any rotations) of the sward for hay/ forage in July onwards or as and when required to avoid shading of panels. To be followed by a second cut in August / September if growth is heavy. Aftermath grazing (following cut) to keep sward in check with ongoing winter grazing (excluding component 2d) before resting from February onwards annually. Grazing level should be suitable for a conservation grazing approach. A broad margin of at least 2 m wide around outer margins (i.e. boundary lines) of the grassland areas will remain unmown. Application of inorganic fertilisers will be avoided where practicable, although selective spraying beneath the modules and inaccessible areas will be carried out.

5.3.9 Arisings will be removed from Site to an authorised tip as to reduce nutrient input.

5.3.10 Undesirable herbaceous (ruderal) species will need to be controlled. These species include those which legally need to be controlled and those which suppress or otherwise inhibit the development of a species-rich sward. Should they become established, remove any invasive or exotic species annually in autumn or winter, ideally by hand, to ensure growth of other species is not suppressed. Ideally, weeds will be removed by hand pulling and weed wiping/spot spraying should not be necessary. Use of pesticides and fertilisers will be avoided; however, spot treatment may be applied where pernicious or invasive weeds occur. Herbicides shall not be used within proximity of any watercourses unless prior agreement has been obtained from the Environment Agency.

5.3.11 Annual monitoring and reporting by an appropriately experienced ecologist shall include an assessment of the establishment of the areas of grassland.

5.3.12 Where the meadow sward fails to establish or dies out, or where the level and range of grassland species is poor, measures will be undertaken to resolve any underlying problems. Areas will be re-sown following implementation of other remedial works. It is expected that following establishment, species diversity will naturally increase with time.

Table 5.3: Potential Maintenance Tasks - Grasslands

Task:	Proposed Frequency/ Timing
Water during prolonged periods of dry weather.	As required during Year 1
Mow regularly to control weed growth.	Year 1-2 at a suitable time of the year (March until October)
Spot treat weeds.	Yearly, as required on inspection
Cut areas proposed for Species-rich grassland and Tussock grassland (components 2c and 2d) (rotational cut of one third of all areas every year).	A broad margin of at least 2 m wide around outer margins (i.e. boundary lines) of the grassland areas will remain unmown. After flowering carry out hay cut mid-late summer, mow or graze new growth (at a level suitable for a conservation grazing approach) to later Autumn/ Winter- resting from February onwards.
Cut areas proposed for Grassland outside perimeter Fence (Component 2a).	Annually at a suitable time of the year (preferably July or August)
Cut areas proposed for Grassland within Perimeter Fence (Component 2b).	Grazed/mown on a regular rotation, to maintain short sward to prevent shading and coverage of solar panels and security features, and as required
Remove any litter or debris.	Bi-annually, as required
Preparation of Annual Monitoring Report in line with Ecologist's and Supplier's recommendations.	Annually

5.4 Component 3: Existing and Proposed Hedgerow

5.4.1 Hedgerows are national (Section 41, NERC Act 2006) Habitats of Principal Importance and it is recommended that these are retained and enhanced where possible for their intrinsic landscape and biodiversity value and as part of an extended Green Infrastructure and habitat corridor network.

5.4.2 There is 1,444m of proposed hedgerow on the Site as identified in the Landscape Strategy Plan. They include a range of locally appropriate native species - blackthorn, hawthorn, field maple, holly and hazel. Existing hedgerow for retention will be protected in accordance with the Landscape Strategy Plan, the AIA, BS 5837: 2012 and the Outline CEMP.

5.4.3 Proposed hedgerow will comprise native, biodiverse hedgerows and will contribute to the mosaic of habitats within the Site and provide enhanced habitat connectivity. Both existing and proposed hedgerow will also contribute to the wider landscape setting of the Proposed Development, and to landscape character assessment objectives.

5.4.4 Hedgerows to be pit planted in a deep 0.5m wide x 0.3m deep weed-free trench (or larger, if necessary, in order to take the full spread of the roots). The sides and bottom of the trench will be forked over and 'ripped' to facilitate proper drainage, prior to back-filling. The trench shall be excavated on the same day as planting and to be backfilled with an appropriate excavated topsoil/compost mix. New hedgerow to be planted in double staggered rows at 0.5m centres.

5.4.5 Where existing hedgerow is to be gapped up or reinforced, hand dig only with care to avoid damaging existing planting - not severing any roots larger than 2.5cm in diameter. No herbicide to be used in proximity to existing vegetation. Hedgerow reinforcement to comprise planting 0.5m to the back of existing vegetation wherever possible. Fill any gaps in existing hedgerows larger than 0.5m.

5.4.6 Transplants, cuttings, and seedlings to be protected with biodegradable tube guards 0.6m high x 50mm diameter or greater to suit girth of shrub/tree, supported by 900mm bamboo cane inserted 300mm below ground level.

Maintenance Strategy

5.4.7 Best practice horticultural techniques should be used in the planting of native hedgerow vegetation to ensure rapid early growth. The ground below planting will be maintained as weed free through mulching for the first 3 years after planting.

5.4.8 Existing native hedgerows should be positively managed to maximise landscape and wildlife value, favouring hedge-laying for restoration of hedgerow structure and an alternating management cycle of cutting two thirds of the hedgerow every three years, with a third left uncut for up to 9 years, and so on in a cycle. The minimum dimensions for cutting are 3m in height and 2m in width. Hedgerows shall be pruned in February, aiming to promote bushy growth while providing continued habitat and foraging opportunities for wildlife. Hedgerow trees shall be selected, retained, and encouraged to develop to full maturity.

5.4.9 Hedgerows shall be subject to annual monitoring by an appropriately experienced ecologist.

Table 5.4: Maintenance Tasks – Hedgerow

Task:	Proposed Frequency/ Timing
Undertake routine maintenance visits identifying the existence and location of any hedgerow plants which are suffering from visible defects likely to cause danger, potential danger, obstruction, or nuisance to users of adjoining properties, pathways and roadways.	Yearly
Non-desirable species should be removed during management operations and at other times as necessary, where this does not prejudice screening requirements.	Yearly
Trim hedge sensitively but regularly to encourage dense, species rich hedgerow growth (to a height of approximately 3-4m and a width of no less than 1.5m).	Every 2 years
Cut back undergrowth, overgrowing or overhanging hedgerow shrubs and minor tree branches from any pathways to maintain an unobstructed width of at least 2m or the existing width of the pathway, whichever is the greater.	Yearly
In the interests of wildlife, hand weeding, where feasible, should take precedence over the use of herbicides in hedgerows. However, in certain instances, herbicide may be the most effective measure to take against unwanted species. Where herbicide application is needed this should be in small, controlled areas around the tree base. Herbicides must be listed on the HSE Pesticides Register of UK Authorised Products, and herbicide application must conform to the 'Pesticides: Code of Practice for Using Plant Protection Products' (DEFRA, January 2006).	Hand weeding: As required by maintenance visits. Herbicide application: July - August
Marker tags to be removed after 3 years once infill planting established and planting can be maintained with existing hedgerow.	Year 3
Coppicing or hard pruning of adjacent existing hedgerow plants to prevent over-shadowing of new infill plants until well established. Where large hedgerow trees cause overshadowing remove lower branches to encourage light exposure.	Yearly
Examine rabbit guards and where necessary remove guards on newly established hedgerow species to prevent spindly hedgerow growth.	Yearly
Inspect plant marker tags to ensure infill sections still adequately demarked and replace where necessary.	Yearly

5.5 Component 4: Proposed Fencing & Hard Surfacing

5.5.1 The Proposed Development includes security fencing around the perimeter of the proposed solar panels. Access Roads through the Site will be formed of crushed aggregate.

Maintenance Strategy

5.5.2 In order to maintain security and a high standard of appearance, these proposed features will be maintained to a high standard throughout the lifetime of the Proposed Development.

5.5.3 To achieve these objectives, the following measures will be undertaken:

Table 5.5: Maintenance Tasks – Fencing and Hard Surfacing

Task:	Proposed Frequency
Check and report and defects with fencing, with remedial works to be carried out at the earliest opportunity.	As required
Strim back any weed growth on hard surfacing.	Annually at a suitable time of the year (preferably September), and as required
Remove any litter or debris.	Bi-annually, and as required
Top up and recompact any granular fill to ensure no puddles or ruts form on areas of hard standing. Clean away any accumulated mud to prevent tracking onto adjacent roads.	Every 3 years, and as required

5.6 Component 5: Habitat Enhancement Features for Species of Conservation Concern

5.6.1 Habitat boxes can be a useful tool for monitoring and can provide nesting/roosting opportunities where there is a lack of natural features within the landscape. For this Outline LEMP, exact locations and plans for bat and bird boxes have not been produced owing to the likely refinement of these specifications during, or following, the examination process. It is anticipated that a finalised location and specification plan will be produced as part of the final detailed LEMP approved pursuant to a planning condition.

Bird Boxes

5.6.2 Bird boxes that mimic cavities can be installed according to the species and their distribution identified during the breeding bird surveys and so are known to be present within the local area.

5.6.3 Barn owl boxes are known to be particularly successful on solar sites[i], especially when placed close to areas of rough grassland where there will be an abundance of small mammals. Where no mature trees are present, barn owl boxes can be post mounted (although trees are preferable).

5.6.4 Kestrels are a priority species under the Pembrokeshire BAP and readily use open grassland and farmland for foraging. Kestrel boxes will be provided to provide suitable nesting opportunities for this species.

5.6.5 Table 5.6 gives outline details of which boxes will be installed together with numbers, distribution and siting recommendations. Where the exact boxes cannot be sourced, a similar model will be secured and all boxes will be constructed from long-lasting materials such as woodcrete, where possible. All bird boxes will be installed out of direct sunlight, facing away from prevailing wind (northernly, easterly or south-easterly preferably). Boxes should also be placed clear of vegetation and away from ivy growth. All boxes will be placed 3m from the ground, unless otherwise specified.

5.6.6 The numbers of boxes proposed for the Development have been calculated as approximately 1 box for every 2ha This gives a total of 50 boxes, which have been split between various target species.

Table 5.6: Bird Box Specifications

Box Type	No.	Description	Placement	Location
Barn Owl Trust Box	2	Nest box with platform for young.	At least 1km from Lamphey Road. Placed on a mature, ideally solitary, tree with a high canopy and few/no lower branches, with entrance clearly visible	Across site where open hunting ground (tussocky grassland) available
Schwegler No.28 or 2TF Kestrel Box	3	Nest box to encourage kestrels in variety of habitats	On a solitary tree on the edge of woodland at 5m high	Around Alleston Wood and southern woodland strip or on building associate with Alleston Farm
Schwegler No.30 Tawny Owl Nest Box	2	Provides a safe and sheltered space for tawny owls	Sited within areas of woodland on a mature tree at 4-6m high	Within Alleston Wood
Schwegler 2HW Box with balcony-type entrance	5	Designed for species that nest in cavities or recesses	On trees or potentially under bridges	Along riparian corridor
General boxes, i.e. Schwegler Seville or Bilbao	38	Varying access hole shapes (round/oval) and sizes (28/32mm) will be provided for a variety of tit, sparrow and other smaller bird species	Installed in clusters of 5 over a group of trees, with some placed at lower height (1.5m) within hedgerow network	Across Site

Bat Boxes

5.6.7 The installation of boxes suitable for bat species, all of which are a Pembrokeshire BAP species, may act as an enhancement, but could also provide an important monitoring tool given that some notable bat species have been recorded in the area, including Nathusius' pipistrelle and barbastelle.

5.6.8 Boxes could be installed in a variety of places including hedgerow trees, woodland or post mounted within marshy or riparian areas. Double panel bat boxes may be more desirable in some cases, as these prevent birds from nesting within the boxes.

5.6.9 Table 5.7 gives outline details of which boxes will be installed together with numbers, distribution and siting recommendations. Where the exact boxes cannot be sourced, a similar model will be secured and all boxes will be constructed from long-lasting materials such as woodcrete, where possible. Bat boxes will be placed in sunny locations without obscuring vegetation and away from ivy growth. Boxes will be placed approximately 3m from the ground and preferably on south-facing, mature tree trunks.

5.6.10 The numbers of bat boxes installed are based on approximately one box every 2ha of the Development area, totally 50 boxes. An additional feature has also been recommended, which will provide night-roosting opportunity for horseshoe bat species, which were regularly recorded within the Site and are associated with the nearby Pembrokeshire Bats Sites and Bosherton Lake SAC.

Table 5.7: Bat Box Specifications

Box Type	No.	Description	Placement	Location
Vincent Pro Bat Box	20	Suitable for use by Barbastelle and other bat species	On suitable trees	Across Site
Schwegler 2F (with front panel)	20	Especially suitable for pipistrelle species	On suitable trees	Across Site
Schwegler 1FS Colony Bat Box	5	Suitable for groups of breeding bats, including noctule, Nathusius' Pipistrelle and long-eared bats	On suitable trees	Across Site

Box Type	No.	Description	Placement	Location
Schwegler 1FW Hibernation Box	5	Suitable internal insulation for long-eared bats	On suitable trees	Across Site
Horseshoe bat night-roost feature	1	Structure constructed to extend feeding ranges and provide additional bat colony resilience by providing additional occasional shelter/feeding perches	Standalone structure	Within wide undeveloped buffer adjacent to existing mature vegetation

Other Habitats

5.6.11 Hibernacula and log piles will be created (approximately ten in total) within boundary habitat around the Site, particularly within areas of tussocky grassland and scrub. These provide shelter and hibernation opportunities for reptiles, amphibians and invertebrate species. The final design and location of these features will be set out within the final LEMP.

5.7 Ecological Monitoring

5.7.1 An outline ecological monitoring strategy is set out below, however, the final details for essential regular monitoring of the developing habitats will be set out within the final LEMP, based on a standardised approach[ii]. This monitoring will be carried out more regularly during the first five years of operation, when habitats are in the early stages of developing. This regular monitoring will identify issues early on so that remediation measures or changes in management can be applied.

5.7.2 Habitat-specific monitoring will be required as part of NBB delivery / progress reporting, and is included as a combination of a UKHab survey along with Condition Assessments of the habitats recorded to be consistent with the baseline surveys.

UKHab Surveys and Botanical Quadrats

5.7.3 It is suggested that a habitat survey combining Condition Assessments and botanical quadrats within the establishing and retained/enhanced habitats is undertaken in Years 1 and 2, then every 2 years until Year 8, then every 5 years.

5.7.4 It is expected that the monitoring schedule will be finalised within the final LEMP once the requirements for these are established.

5.7.5 Fixed point quadrats will be recorded at selected locations, with quadrats focussing on each habitat type to be established, as well as locations between and underneath panels (as per the standardised solar monitoring protocols). As rough guidance, it is estimated that a total of 30 botanical quadrats would be carried out across the Site, with ten being directly beneath the panels, ten being between the rows of panels and ten being in the most botanically diverse part of the Site that is unaffected by the panels.

5.7.6 This will help to track habitat establishment according to LEMP proposals and targets, monitor the biodiversity benefit of the scheme and identify any problems should the habitat not be forming as required.

Nectar Production Potential

5.7.7 From the above data, nectar production potential can be extrapolated for each habitat. This is a calculation that can be made from the species present and their cover using an established data set of nectar sugar values[iii]. This is a relatively easy way to ascertain the Site's value for pollinating species without undertaking extensive pollinator surveys.

5.7.8 This calculation can be made subsequent to the botanical surveys as set out above.

Soil Survey

5.7.9 A soil survey would provide a helpful measurement, particularly within an area that had previously been subject to intensive agricultural production for many years. It is therefore proposed that such a survey is carried out prior to seeding and habitat establishment across the Development, although this could be targeted or sampled according to needs identified during the finalisation of this document. Basic measurements may include pH, soil type, soil organic matter, bulk density, soil moisture, infiltration capacity, and texture. Additional measurements may include soil carbon, nitrogen, phosphorous, potassium and magnesium.

Bird Survey

5.7.10 Given that robust baseline data on the use of the Development by birds has been obtained, this can be compared to similar surveys undertaken post construction. Surveys should focus on areas where high numbers of notable birds have been identified.

5.7.11 The surveys should be undertaken using the same methodology as employed for the baseline surveys and a suitable schedule may be year 2, 4, 10, 20, 30, 40. This would be fed into a monitoring report as required by the scheme and will inform any remedial measures, as well as decommissioning.

Bat Survey

5.7.12 Again, given that baseline information of bat activity has been obtained, monitoring should seek to replicate this (i.e. with the same static bat detector locations used) in order to assess how bat activity changes post-construction.

5.7.13 As with the birds, a suitable schedule may be year 2, 4, 10, 20, 30, 40.

6 General Maintenance and Management Tasks

6.1 Overview

6.1.1 For woodland planting during years 1-5 or until canopy closure, new planting shall be maintained by annual visits.

6.1.2 All plants shall be checked and if necessary, firmed up in the ground.

6.1.3 Any damaged shoots or branches shall be pruned off using secateurs.

6.1.4 The Contractor shall ensure that all new planting is maintained free of weed growth. This shall normally be achieved by the application of mulching and hand pulling of weeds, although appropriate contact herbicides are permitted where necessary. It remains the responsibility of the Contractor to adopt suitable methods for weed control based on training and accreditation.

6.1.5 The Contractor shall remove any dead, dying, or diseased plants, which are evident during any maintenance visit. The Operations Manager shall be informed of the location, number and species of all material that has been removed. Any plants that have shall be replaced during the next planting season.

6.1.6 All replacement planting shall be with like species unless otherwise agreed with the Operations Manager. Plant failures shall be monitored, and alternative species may be agreed with the Local Planning Authority should any single species be subject to repeated or significant failures.

6.1.7 The landscape contractor shall clean and make good all hard standings, fencing, planting areas, highways, and footways after each visit. No stockpiles to be left on Site.

6.1.8 Plant material to conform to the National Plant Specification. Plant handling and planting operations to be in accordance with HTA 'Handling and Establishing Landscape Plants', Parts I-III.

6.1.9 Soil conditioner: For proposed woodland and tree planting areas use sanitized and stabilised peat-free compost to BSI PAS 100. Apply 75mm depth even coverage and incorporate into topsoil during cultivation operations, to a minimum depth of 150mm. Compost to be Compost Association certified or conforming to the specification from an approved supplier.

6.1.10 Mulch planting beds with matured coniferous bark, with an even particle size between 5-35mm, to 100mm minimum depth over weed-free soil after completion of planting and watering operations.

6.2 The Use of Pesticides & Other Hazardous Substances

6.2.1 No pesticides to be used. The use of herbicides in the first few years, while grassland is establishing, should only be permitted if absolutely necessary in the context of selective weed spraying in the solar farm under modules and inaccessible areas.

6.2.2 The Contractor’s attention is drawn to the following statutes and regulations:

- The Food and Environment Protection Act 1985;
- Plant Protection Products Regulations 2011;
- Plant Protection Products (Sustainable Use) Regulations 2012
- The Control of Substances Hazardous to Health Regulations 2002; and
- The Environment Protection Act 1990.

6.2.3 It is the Contractor's responsibility to ensure that he is fully conversant with the requirements of the foregoing legislation and other relevant Codes of Practice, British Standards, rules, guidelines, or directives that relate to the use of hazardous materials.

6.2.4 All manufacturers' recommendations relating to application, storage, mixing and other safety precautions must be strictly adhered to, in the interests of health and safety.

6.3 Litter Removal

6.3.1 The Contractor is responsible for regular monitoring, collection, and disposal of litter and hazardous debris, ensuring the site remains free from litter and dangerous objects like broken glass and sharp items, with extra care taken for discarded needles or syringes.

6.3.2 All collected litter and debris must be disposed of at an authorised tip in compliance with the Code of Practice on Litter and Refuse, in accordance with the Environmental Protection Act (1990).

7 Implementation and Management Structure

7.1.1 This Outline LEMP incorporates the objectives and prescriptions for the suggested approach to be adopted in the maintenance and management of the landscape features which are to be incorporated into the proposed development.

7.1.2 The aim is to promote a sensitive management approach, which protects and improves the landscape and visual amenity value interests of the Site, is compatible with the proposed uses of the Site and maximises the habitat and biodiversity potential of the landscape scheme.

7.1.3 The finalised LEMP will be implemented fully and wholly by the Applicant or the agreed third- party (individual or professional).

7.1.4 The LEMP will be reviewed at suitable regular intervals, for example every five years following monitoring milestones, by the agreed Professional with input from a suitably qualified landscape architect and ecologist with a view to ensuring all maintenance objectives are being met, and that the management requirements set out in the LEMP continue to provide effective and appropriate measures to meet those aims.

7.1.5 These periodic reviews shall include analysis of monitoring of the condition of the landscape and biodiversity components at the start of the period, the work carried out, and how well the habitats and landscape respond have responded to maintenance measures.

8 References

[i] https://www.clarksonwoods.co.uk/wp-content/uploads/PDF/Solarview2019.pdf

[ii] https://solarenergyuk.org/resource/solar-energy-uk-guidance-a-standarised-approach-to-monitoring-biodiversity/

[iii] https://catalogue.ceh.ac.uk/documents/69402002-1676-4de9-a04e-d17e827db93c