

Preliminary Environmental Information Report

Appendix 8J: Outline Landscape and Ecological Management Plan (oLEMP)

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Future Energy Llanwern Limited

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8.0 Outline LEMP

8.1 Introduction

8.1.1 This Outline Landscape and Ecological Management Plan (oLEMP) has been produced on behalf of Future Energy Llanwern Ltd in relation to the proposed Future Energy Llanwern solar project, located on land between Goldcliff and Magor.

8.1.2 This document accompanies a Development Consent Order (DCO) application for a Nationally Significant Infrastructure Project (NSIP) comprising the construction, operation, maintenance and decommissioning of Future Energy Llanwern (the Proposed Development), a ground mounted solar farm with a generating capacity of more than 350 MW for a temporary period of 40 years.

8.1.3 The LEMP will be finalised during the DCO process and is to be used to guide management of the development, covering the lifetime of the project (40 years).

8.1.4 Once approved and implemented, the LEMP will be reviewed and updated every five years.

8.1.5 The area covered by the LEMP is referred to as the 'Site'.

8.2 Outline Aims of LEMP

8.2.1 The aims of the LEMP will be to:

- Provide details on habitat creation and enhancement measures, which will ensure a net biodiversity benefit and contribute to Resilient Ecological Networks within the Gwent Levels SSSIs;
- Provide sufficient detail on management operations to ensure that retained and new habitats are managed and maintained to meet appropriate and realistic objectives;
- Provide a timetable for the implementation of the LEMP; and,
- Provide a monitoring framework to ensure that appropriate refinements and/ or revision of the plan can be made, in order to promote any objectives/ targets of the LEMP.

8.3 Format of the LEMP

8.3.1 The LEMP will be set out as follows:

- Details on implementation and funding of the plan;
- A description of the existing ecological and landscape features;
- Details of habitat creation and enhancements, including landscape and visual mitigation and planting schemes;
- Objectives for the management of each ecological feature;
- Management and maintenance specification and annual schedule of operations; and,
- Review and monitoring of the plan.

8.4 Management Mechanism and Funding

8.4.1 This section will describe how the LEMP will be implemented, who will fund it and who will be responsible for its delivery.

8.4.2 It is likely that a Managing Agent will be the organisation responsible for the delivery of the LEMP. The Applicant will take on responsibility for this role.

8.4.3 The Managing Agent will be responsible for commissioning a contractor/s to undertake the works in accordance with the LEMP. This Approved Contractor will be a suitably qualified and experienced contractor, capable of delivering the ongoing management works in line with the LEMP.

8.4.4 The Applicant is committed to fund the costs of compliance with the LEMP in full. This will occur for the lifetime of the project (40 years).

8.5 Management Constraints

Timing

8.5.1 The LEMP will set out timing constraints for activities that could impact ecological features. For example, the Site supports dormouse and nesting birds, therefore hedgerow, tree and shrub management should be undertaken between November and February inclusive.

8.5.2 Any tree work should be preceded by a check for roosting bats and barn owl by a suitably licensed ecologist.

8.5.3 Ground-nesting birds and sensitive populations of wintering birds will be safeguarded through careful management of livestock grazing and the avoidance of

grass cutting during key periods.

- 8.5.4 Rotational management techniques will be employed to reduce impacts to habitats and species over a large area.

Herbicide Use

- 8.5.5 Herbicide use will be limited to problem areas within essential infrastructure, only after other methods have failed. Where possible targeted mowing or strimming will be used first to reduce the prevalence of unwanted plant species, followed by grazing.
- 8.5.6 No herbicide will be used within reens/ ditch buffers or ecological mitigation fields.
- 8.5.7 Any herbicide use will be agreed with a suitably qualified ecologist prior to use, and a herbicide permit and SSSI consent obtained from NRW.

8.6 Existing Ecological Features and Landscape Character

Site Context and Landscape Character

- 8.6.1 The Site is located on the northern side of the Severn Estuary between Whitson in the west and south of Undy in the east within the administrative jurisdiction boundaries of Newport City Council and Monmouthshire County Council. The nearest settlement is Redwick village located 70 metres (m) to the north of the PEIR Assessment Boundary.
- 8.6.2 The Site occupies a low-lying landscape comprising a low-lying landscape comprising a mixture of regular, rectilinear and irregular agricultural fields of small-medium scale used for predominantly pasture and some arable use. These are bordered by a combination of hedgerows, hedgerow trees, linear tree belts, drainage reens and ditches, which are used to drain and manage water on the Gwent Levels. Hedgerows often line reens which, in places have become overgrown, although many are clipped and managed as part of the agricultural management regimes.
- 8.6.3 The host National Landscape Character Area (NLCA) containing the Site is NLCA34 – Gwent Levels covering the majority of the PEIR Assessment boundary. The NLCA34 profile provides the following description:

“This is a distinctive, flat, lowland landscape with a geometric patchwork of watercourses that run between fertile fields. It is remarkable for having been created by reclaiming marshland and inter-tidal areas during successive periods going back to Roman times. In parts, the older patterns have changed almost beyond recognition over the past 150 years, sections having been built over by a major railway line, two motorways, a large steelworks, and a power station. In addition, there has been a rapid growth of once small settlements into dormitory villages, and urban expansion from both Cardiff and Newport.

Yet despite these changes, substantial areas of rural landscape and traditional historic features remain, including in many places the pattern reens, being ditches that manage the water between the fields, and whose size and appearance varies according to the fashion of the period when reclamation work took place. Medieval churches and farmsteads stand on low horizons; the characteristic pollarded willows stand in lines beside the reens, though they are ever-decreasing; and the fertile soils are used for a variety of land uses, including cereal production, dairying, sheep and store cattle rearing and equestrian pursuits”.

8.6.4 The Key Characteristics of NLCA34 are identified as:

Alluvium – former marsh and inter-tidal areas from the Severn Estuary. Triassic mudstones are beneath.

Reclaimed landscape – drained, improved, enclosed, historical, agricultural landscape.

Divided by the Usk estuary – into two distinct parts: the Wentlooge levels to the west and the Caldicot Level to the east. Collectively they occupy all the coastal levels between Cardiff and the England border by the Severn crossings. The Wye also flows out across the eastern end of this area.

Reens and willows or hedgerows - a network of straight drainage ditches known as reens, acting also as field boundaries; still very extensive patterns but there are only remnant lines of willows on their banks. Hedgerows with less regular field shapes are on the slightly higher ground, reflecting different phases of reclamation and enclosure.

Flood embankment to the sea - The land has been successively reclaimed from the sea and coastal marshes, and is protected from the tides by a sea wall.

Fertile soils and agriculture - supporting a variety of crops including cereal, sheep grazing, dairying, lowland beef production and equestrian husbandry.

Wet pasture - one of the largest areas of reclaimed wet pasture in Britain. The reens support rare aquatic plants and are home to a diverse range of invertebrates.

Archeologically important - one of the finest examples of a 'hand crafted' landscape, it is on the Register of Landscape of Outstanding Historic Interest. Some of the drainage and reclamation works still present in today's landscape date from the Roman period, while buried under the alluvium are archaeological deposits of immense potential and spanning the prehistoric to Medieval periods.

Comparatively little settlement - away from the urban fringes, the Levels have comparatively little settlement, with small nucleated and ribbon settlements linked by narrow roads.

Open views between hills in Wales and England – an exposed landscape in places with long views to surrounding areas and (from only areas with slight elevation) to the Severn Estuary and Bristol Channel.

Major developments on fringes – Llanwern Steelworks, a power station and pylons stand out in the flat landscape, while disproportionately large modern factory units outside Newport are also visible for long distances, and main motorways and rail lines are heard. Suburban development has enlarged settlements and urban development has spread from the adjacent Cardiff and Newport areas.

Designated Sites

- 8.6.5 The Site lies contains four Sites of Special Scientific Interest (SSSI), which make up a series of six SSSIs as part of the Gwent Levels, lying alongside the Severn Estuary: the Site lies within Magor and Undy SSSI, Redwick and Llandeenny SSSI and Whitson SSSI, with part of the Site also overlapping Nash and Goldcliff SSSI at the north-west corner. The land is below high mean water level and the sea is kept out by extensive sea defences. Traditionally, fields are drained by a system of ridge

and furrow or 'grips' (shallow trenches) into the extensive system of interconnected ditches that surrounded each field.

8.6.6 The SSSI's all support three notified features:

- Reen and ditch habitat
- Insects and other invertebrates
- Shrill carder bee

8.6.7 The special interests of the SSSI are dependent on the water quality, water quantity, the existence of the drainage system and its continued management.

8.6.8 20m to the south of the Site, beyond the sea wall, lies the Severn Estuary Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar site. The estuary is of importance for various estuarine habitat types, migratory fish, as a feeding and nursery ground for fish and supports wintering birds populations of international importance.

8.6.9 The Site is linked to the River Usk SAC via a network of reens and field ditches, a site that is primarily important for fish species and otter.

Habitats

8.6.10 The development site can be mainly classified as coastal and floodplain grazing marsh (listed on Section 7¹ of the Environment (Wales) Act 2016) of low botanical interest comprising sheep and/or cattle-grazed poor semi-improved and improved grassland. Some fields comprised semi-improved or marshy grassland fields.

8.6.11 There are also several arable fields, managed on rotation either purely for crops or rotated between improved grassland and an arable crop.

8.6.12 The fields are bound by hedgerows (listed on Section 7 of the Environment (Wales) Act 2016), and/or water courses. Hedgerows comprised mainly of hawthorn, hazel, blackthorn and elm. Standard trees predominantly associated with hedgerows and field boundaries included mature willow, alder and oak.

¹ *Species or habitat of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales.*

- 8.6.13 The network of reens, ditches and field drains, which link to a much larger network across the wider landscape, are known to support a wide variety of aquatic plants and invertebrates and are the primary reason for the designation of the SSSI. Larger reens, designated as main rivers, the responsibility of NRW, convey water to the Severn Estuary, where discharge occurs via tidal flaps.
- 8.6.14 Hedgerows alongside some ditches or reens are considered likely to have an adverse effect on adjacent watercourses and the SSSI qualifying features within them due to shading and siltation. This is particularly the case where a hedgerow is present on both sides of a reen/ ditch bank (referred to as a 'double hedgerow' within this document).

Fauna

- 8.6.15 A summary of the baseline fauna is provided in **Table 8J-1** below. Further details can be found in the technical appendices that accompany the PEIR.

Table 8J-1 Baseline Fauna at Future Energy Llanwern

Species/ Group	Summary of Findings	Location (Field number)
Great crested newt	<p>One offsite pond supported a small population (peak count of four adults) during traditional surveys in 2025.</p> <p>The fields within proximity to this pond are considered to be suboptimal for this species, however the network of hedgerows and ditches provide potential commuting, shelter and foraging habitat.</p>	<p>Fields partially within 250m of pond = 106, 105, 108, 119, 121,120, 124, 113</p> <p>Fields 105 and 124 are fully retained.</p>
Badger	A single active sett was recorded offsite but close to the boundary of Field 197. A disused sett was located with Field 141.	Field 197, Field 141. Potential for foraging/ commuting across entire site.
Bats	<p>During activity surveys, at least nine species were recorded commuting and/or foraging within the site, with transects indicating that bats favour the boundary hedgerows and reens, with little activity over the open fields.</p> <p>The majority of activity was from common pipistrelle (EPS, SPI) and this species was widespread and abundant across the Site, with calls recorded during typical</p>	All hedgerows and reens/ ditches.

	<p>emergence times indicating that there are multiple roosts in close proximity to the Site.</p> <p>Annex II species (lesser horseshoe, barbastelle and greater horseshoe (all also EPS, SPI)) were recorded in very low numbers and after typical emergence times in both years, indicating that these species are travelling to the Site to forage on an occasional basis.</p>	
Dormouse	Evidence of dormice was found at three locations during nest tube surveys in both the 2020 and 2023 surveys. Locations were widely distributed (one at the far eastern boundary and two to the west of Redwick c. 4.6km away).	All hedgerows, and linked scrub.
European eel	Historic monitoring data suggests presence on Elver pill, Windmill, Cold harbour and Yoke reen (NRW fisheries team, pers.comm., 29/07/24).	Eel presence across the Site's waterways (all that contain water) has been assumed.
Invertebrates	<p>During the invertebrates surveys, 384 species were recorded, of which 18 are notable species (IUCN International or UK threatened or near threatened; Section 7 Species of Principal Importance in Wales; or Red Data Book (RDB), Nationally Rare (NR) or Nationally Scarce (Na, Nb, N, NS, pNS)).</p> <p>The overall assessment indicated that the aquatic and grassland pollinator community of invertebrates is of high ecological importance, however both are currently in sub-optimal condition.</p>	Open ditch margins, ruderal vegetation, hedgerows and deadwood.
Shrill Carder Bee	The population of the shrill carder bee was very small and severely threatened (only nine worker bees recorded). Intensive agriculture and grazing close to the field edges has reduced nesting and foraging habitat.	F187, F503, F160, F130, F248.
Otter	Evidence of otter (EPS, SPI, Annex II) was found on several reens/ ditches, with activity focused on five key watercourses – Yoke Reen, Cock Street reens, Mead Lane, Monk's Ditch and the sea wall south of Mead Lane. Signs indicated otter were moving from the north to the south and the sea wall area.	Activity focused on five key watercourses – Yoke Reen, Cock Street reens, Mead Lane, Monk's Ditch and the sea wall south of Mead Lane.
Water vole	Evidence of water vole (SPI, WCA Schedule 5) was found on a single reen at	Evidence was found on a single reen at the northern

	the northern edge of the Site. Holes and chewed vegetation were recorded but no latrines found.	edge of the Site on Monkscroft Reen.
Other mammals	Other notable species potentially present on site include hedgehog (S7), harvest mouse (S7) and brown hare (S7). Thirty-three records of brown hare were returned as part of the data search and they were relatively ubiquitous across the site, present within fields and field edges.	Brown hare and hedgehog – all fields and hedgerow bases. Harvest mice are associated with hedgerows, long uncultivated grass, ditch banks and field boundaries, rather than open fields and their presence is therefore likely confined to field edges.
Reptiles	Suitable habitat for basking, foraging, commuting and sheltering reptiles is present throughout the Site. Intensively grazed improved grassland and arable fields are considered sub-optimal for reptiles and therefore any population is considered to be small, relative to the extent of habitat available. Two incidental records of individual grass snake were recorded suggesting a small population of grass snake is present on Site.	Reens and ditches (for grass snake) and margins and dense hedgerow bases.
Breeding Birds	The majority of breeding species recorded utilise the extensive network of hedgerows, reens and ditches for nesting and foraging, although with some reliance on grassland and arable fields. Ground-nesting species include skylark, curlew, oystercatcher, lapwing, meadow pipit and gadwall. Schedule 1 breeding species include barn owl, Cetti's warbler and kingfisher.	Skylark – throughout the site. Curlew – Field 137, 20 Oystercatcher – Field 126, 119, 95, 102, 105 and 177. Lapwing – Field available 96, 99, 105, 124, 126, 134, 173, 95, 102 and 211. Meadow pipit – no confirmed nesting, but 'probable' breeding within 13 different fields the site. Gadwall - Windmill Reen and Yoke Reen north and south of Mead Lane and within the reen bordering field 108.

		<p>Barn owl - Nesting was recorded within a tree nest box within Field 35 and from within the barn in Field 133. A barn owl was also recorded within a barn in the northwestern corner of Field 92 although nesting was not confirmed.</p> <p>Cetti's warbler – Throughout the site associated with scrubby areas and reeds adjacent to ditches.</p> <p>Kingfisher - within reens associated with Fields 124 and 504 – 'possibly' breeding.</p>
Wintering Birds	<p>Across the winter surveys, a total of 76 notable species were recorded. Of these, four species are specifically named in the SPA/ Ramsar designation (European white-fronted goose, dunlin, shelduck and gadwall).</p> <p>Thirty-four species are waterbirds and therefore can be considered to be a part of the SPA 'Waterbird Assemblage'.</p> <p>Numbers of shelduck, curlew and snipe were considered to exceed 1% of the national population on more than one occasion.</p>	<p>Gadwall – Field 124</p> <p>Shelduck – Field 124. Occasionally on Fields 119, 134 and 170.</p> <p>Curlew – Field 160, 170, 124 and 134.</p> <p>Snipe – Broadly spread across the survey area, with most frequently used fields being 16, 25, 33 and 48.</p>

8.7 Summary of Proposed Habitats to be Managed

8.7.1 **Table 8J-2** below provides a summary of the features that the Site supports and will be retained, or are to be created. These features will be managed in perpetuity. The mosaic of these habitats will support the existing fauna recorded on Site, and increase connectivity and resilience via the extensive ree and ditch buffers, scrub, hedgerows and 'bee highway'. See also **Figure 1**.

8.7.2 Additional features for protected and notable species will be installed, including bat boxes, bird boxes, habitat piles/ hibernacula, barn owl boxes and invertebrate

'hotels'. Details of numbers and locations will be provided in the detailed LEMP.

Table 8J-2 Proposed Features to be Managed

Feature	Details
Temporary access or cable routes	<ul style="list-style-type: none"> Following completion of cable burial/ removal of temporary access routes, (outside the panelled fields) these areas will be returned to their former habitat through seed sowing (for arable) or reinstatement of turves (for grassland). Previous agricultural operations and management of these areas (e.g. arable/ grazing) will continue during operation.
Panelled Areas	<ul style="list-style-type: none"> Panelled areas are currently calculated to make up 149ha of the Site. Existing habitat comprises arable, improved grassland, poor semi-improved grassland, rush pasture, semi-improved grassland and marshy grassland. The panelled areas will be fenced with a security fence, with buffers remaining outside (see below). Arable fields (55ha) will be seeded with a suitable grassland mix. Management of all fields will comprise a similar low intensity grazing/ mowing regime to create/ maintain a moderate level of plant species diversity and structural variation. Creating a mosaic of structural variances will maximise the value of the grassland as an ecological resource.
Buffers to Reens and Ditches	<ul style="list-style-type: none"> 7m buffers will be maintained adjacent to field ditches and 12.5m adjacent to main reens. This area will be outside the security fence and subject to a sensitive, low intensity management regime to enhance species diversity. The buffers will create a connected network of flower-rich and tussocky grassland throughout the Site to create habitat for a range of species including corridors for great crested newt, habitat for shrill carder bee and foraging habitat for barn owl.
Reens and diches (SSSI feature)	<ul style="list-style-type: none"> Hedgerow reduction will be undertaken to enhance the reens and ditches, by removing the southern side of double hedgerows. Hedgerows are often present on both sides of the watercourses, leading to shading, siltation and reducing water levels, as

	<p>well as preventing management of the watercourse.</p> <ul style="list-style-type: none"> Existing reens and ditches will be retained and subject to rotational management in accordance with NRW guidance. The management of water levels through the Internal Drainage District (IDD) in NRW is an important part of the ongoing management of the SSSI. The rotational ditch management to remove silt will maintain water levels and enhance habitat requirements of the SSSI feature: shrill carder bee.
Scrub	<ul style="list-style-type: none"> Mixed scrub will be created close to the southern boundary to provide screening from the Wales Coast Path and provide compensation for loss of dormouse habitat. This will be north of the Bee Highway and away from watercourses to prevent shading. Other pockets of scrub will be created close to existing dormouse records, connected to hedgerows to provide additional foraging and shelter habitat. Scrub will not be created within bird mitigation fields.
Hedgerows	<ul style="list-style-type: none"> Where possible, defunct hedgerows will be 'gapped up' (unless where they would create reen/ditch shading) to compensate for hedgerow losses. Hedgerows will be managed for the lifetime of the project to maintain continuous, dense and connected habitat, providing commuting habitat for bats and dormice and a foraging resource (e.g. berries and nuts) for a range of species.
Bee Highway	<ul style="list-style-type: none"> The Bee Highway comprises a minimum 10m wide, 5.5km long strip of bee-friendly habitat, broadly linking previous sightings of shrill carder bee within the Site. It is located, for the majority, north of the sea wall reen. The Bee Highway will be sown with a specific flower-rich wildflower mix and be managed sensitively for nesting and foraging.
Bird Mitigation Fields	<ul style="list-style-type: none"> Fields 95, 102, 105, 124, 126, 134, 160, 170 and 215 totally 51.5ha are retained to either avoid impacts to important winter and breeding bird species, or provide compensation for loss of ground nesting habitat by increasing the carrying

capacity. Where possible, these are within close proximity to the estuary to reduce visual impacts of the panels to birds in flight.

- Management will aim to create open habitat with good visibility, shallow wet pools (e.g. scrapes), some bare patches for winter feeding and a few taller tussocks or clumps or rushes or longer grass.
- No scrub, trees or fencing will be present (excluding existing boundaries) to avoid creation of predator perches.

8.8 Proposed Habitat Measures and Outline Management Objectives

8.8.1 The following sections outline proposed habitat measures to be undertaken at the commencement of development and includes outline objectives for ongoing management.

Temporary access or cable routes

Habitat Measures

8.8.2 Where temporary works occur outside the panelled areas, for example buried cable routes and temporary access tracks, all habitats will be returned to the previous use and management (for example arable, grazed or other agricultural use) via seeding or turf replacement.

Outline Management Objectives

- Where possible, continue existing standard agricultural practices.

Panelled Areas

Habitat Measures

Arable Fields

8.8.3 Nineteen arable fields totalling c. 55ha will become panelled and these will be converted to permanent grassland with low inputs. This will protect the soil from erosion and surface water runoff and improve the water quality of adjacent

watercourses. The fields will be seeded with a standard meadow mix suitable for the area and local conditions in autumn or spring.

8.8.4 Grassland creation on the arable fields will take place prior to solar panel construction if a sufficient lag time of >1yr is possible to allow the sward to develop. Further sowing will also take place after construction in any areas that have been damaged through vehicle movements during construction. If this is not possible, sowing will take place post-construction.

8.8.5 This applies to Fields 59, 60, 64, 65, 73, 90, 96, 136, 152, 154, 174, 380, 381, 184, 186, 187, 192, 195, 448.

Existing Grassland

8.8.6 No habitat creation will take place within existing grassland fields, with the exception of sowing after construction in any areas that have been damaged. A standard meadow mix suitable for the area and local conditions will be used.

Temporary Damage

8.8.7 Once the solar arrays are installed the extent of disturbance to existing vegetation and soil conditions will be assessed and an appropriate restoration method agreed in consultation with a suitably qualified ecologist. In areas with minimal disturbance, the grassland may be allowed to re-colonise naturally. Where more significant disturbance has occurred, bare ground will be restored to permanent grassland using an appropriate meadow seed mix.

Outline Management Objectives

- Convert arable to permanent grassland, using a seed mix suitable to local conditions.
- Maintain a varied sward height (beneath and around the panels) through staggered low-density grazing or cutting practices, avoiding spring period to allow wildflowers to establish.
- Reduce stocking densities in wetter weather or where structural variation cannot be maintained.
- Prevent shading of panels with occasional additional cut in the growing season beneath the leading edge of the panel, where necessary.

- Monitor and manage, as appropriate the spread of scrub and invasive non-native species.

Reens and Ditches

Habitat Measures

Hedgerow Removal

- 8.8.8 In agreement with NRW, one side of a hedgerow will be cut to ground level in selected places, where double hedgerows exist either side of reens/ditches and it is assessed that the ecological benefits for removal exceed those of retention of the hedgerow. This will broadly comprise the south side of internal site hedges that run roughly east to west. Double hedgerows on the outer edges of the PEIR Assessment Boundary will be retained to provide visual screening.
- 8.8.9 No hedgerow will be reduced until a dormouse EPS licence or agreed method statement has been obtained from NRW.

Cattle Watering Features

- 8.8.10 The creation of artificial cattle watering areas/ shallow water areas (or maintenance of existing ones) in some reens will benefit some of the notable invertebrate features such as the nationally scarce weevils *Gymnetron beccabungae*, *G. villosulum* and the larvae of the black colonel soldierfly *Odontomyia tigrina* as well as some food plants associated with these species. As cattle will no longer be grazed in the solar fields, these proposed shallow areas cut into the reen bank creating a shallow muddy environment to recreate this habitat. Where they currently exist, they will be maintained.

Outline Management Objectives

- Decrease shading of selected watercourses through hedgerow removal as agreed with NRW;
- Replicate cattle poached drinking areas at the edge of some watercourses to provide bare mud habitat and shallower margins, to benefit some key invertebrate species e.g. weevils, and soldierfly larvae.

- Manage ditches on rotation over 10 years following a Ditch Management Strategy to include de-weeding, desilting/ casting between September and February. This will be undertaken in small clusters, on rotation. Castings will be left on the bankside. Main ditches and IDD reens will continue to be managed by NRW.
- Monitor and manage encroaching scrub on southern bank to prevent shading of watercourses.
- Maintain high water levels in summer, via desilting on rotation.
- Monitor and manage, as appropriate the spread of scrub and invasive non-native species.
- Demonstrate enhancement of watercourses via increased plant, riparian mammal and/or invertebrate diversity.

Buffers to Reens and Ditches

Habitat Measures

- 8.8.11 No specific measures will be undertaken to the buffers (e.g. seeding) other than ongoing sensitive management to increase plant diversity and structural variation.
- 8.8.12 As well as reen/ ditch buffers, this also applies to field corners which are not panelled.

Outline Management Objectives

- Cut on rotation every 2 – 3 years, with a maximum of one third cut per year to create tussocky grassland.
- Where buffers form part of the solar array fields (i.e. are not fenced) they will be subject to low intensity sheep grazing as per ‘Panelled Areas’ above.
- Monitor and manage, as appropriate the spread of scrub and invasive non-native species.

Hedgerows

Habitat Measures

- 8.8.13 Where defunct or “gappy” hedgerows exist on the northside of boundaries reens/ ditches, these will be planted up with native species of local provenance, selected from NRW’s Gwent Levels native tree list, with the intention of maintaining good connectivity and habitat for dormice.

Outline Management Objectives

- Enhance connectivity with infill planting, whilst avoiding ditch shading.
- Manage hedgerows on a regular, rotational basis to promote structural and botanical diversity, without increasing height;
- Maintain the connectivity of the Site to facilitate the movement of wildlife through and across the Site.

Bee Highway

Habitat Measures

- 8.8.14 Twenty five fields (or parts of) make up the bee highway.
- 8.8.15 A number of fields within the bee highway currently comprise arable crops (F184, F187, F65, F73). The parts of these fields that overlap with the bee highway will be ploughed and seeded with a locally sourced seed mix e.g. from Great Traston (Solutia) Gwent Wildlife Trust reserve where possible. Alternatively, if this is not available, appropriate seed mixes can be obtained from Celtic Flowers, Wyndrush, John Chambers Wildflower Seed or Emorsgate, with additional long-necked flowers added to the mix.
- 8.8.16 Fields comprising poor semi-improved grassland (F143, F97, F182 and F172) and improved grassland (F503, F177, F185, F188, F148, F142, F141, F137, F133, F123, F119, F108, F82, F55 and F35) will be disc-harrowed to create frequent gaps in the sward, and oversown with the above mix as well as yellow rattle to reduce the grass component. After seeding, fields should be rolled to ensure seeds make good contact with the soil.
- 8.8.17 To inform the final seed mix choice, soil sampling will be undertaken in the above fields. Where conditions indicate high nutrient levels, a mixture will be designed to include larger percentages of clovers, a food source of the shrill carder bee, which can withstand higher nutrients.
- 8.8.18 Remaining fields, which already comprise semi-improved grassland will be retained (F139 and F42).

Outline Management Objectives

- Establish new late-flowering wildflower grassland.
- Maintain late-flowering grassland via traditional hay meadow management regime. Depending on the previous land use, two cuts per year may be needed to reduce competitive weeds. Cuts will be made on rotation to ensure nesting sites are maintained each winter and provide rough grassland for foraging species such as barn owl.

- Monitor and manage, as appropriate the spread of scrub and invasive non-native species.
- Increase the population of shrill carder bee, to be quantified via ongoing monitoring.

Scrub

Habitat Measures

- 8.8.19 Scrub will be created north of the ‘bee highway’ to provide foraging habitat for dormice and provide ecotones for invertebrates. It must be planted to the north of the bee highway to prevent shading.
- 8.8.20 In addition the following fields will have scrub planting, close to existing records of dormouse nests to provide additional nesting and foraging habitat: Field 189 (part), Field 72 (part), Field 71, Field79 (part) and Field 343 (part).
- 8.8.21 Scrub species will be native and of local provenance, selected from NRW’s Gwent Levels native tree list, to provide foraging sources for as long as possible through the active dormouse season.

Outline Management Objectives

- Provide visual screening where required and deliver good integration of the development into the landscape;
- Manage on rotation once established to provide dense pockets of scrub with at least five to six different woody species, ensuring the height remains below 3m.
- Allow some more open areas to create ecotones, ensuring there is always aerial connectivity to nearby hedgerows.
- Monitor and manage, as appropriate the spread of invasive non-native species.

Bird Mitigation Fields

Habitat Measures

- 8.8.22 The existing habitats of the bird mitigation fields currently comprise improved grassland (211, 95, 105, 124, 126, 134, 160, 170 and 173) and semi-improved grassland (F102). No additional seeding is proposed.

- 8.8.23 Scrapes will be created to provide shallow, wet pools for wintering birds.
- 8.8.24 The creation of a small pond will be explored within Field 105 and Field 124 to provide breeding habitat for great crested newt within 250m of the existing offsite population. Creation will follow guidance in the Great Crested Newt Conservation Handbook.
- 8.8.25 Ideally cattle grazing will be implemented.

Outline Management Objectives

- Management will provide short, extensively grazed damp pasture with low stocking rates: from March 15th to June 30th stocking density must not exceed one beast (cow/heifer/steer/bull) per hectare (ha) or five sheep /ha. Mixed grazing is acceptable;
- Any pesticide and herbicide use will be ceased;
- By mid-March, grazing will aim for a short sward less than 5cm over c. 70% of area, with scattered areas of bare ground and light hoof-printing and scattered areas of taller rushes/ longer grass (e.g. up to 20% of sward);
- There may need to remove stock for part if not all the period from 15th March to the end of April when birds are on eggs to avoid trampling;
- Tall trees and bushes within the adjacent hedgerows will be pollarded as they can be used as look-out posts for avian predators such as corvids.

8.9 Management Schedule

- 8.9.1 A management schedule will be prepared detailing a five-year management programme of maintenance activities and actions to meet the proposed objectives. The management schedule will be reviewed and updated every five years.

8.10 Monitoring and Remedial Actions

Monitoring

- 8.10.1 Monitoring is fundamental to the success of this management plan and is required to assess biodiversity changes compared to the baseline and identify potential issues. This will not only enable the effectiveness of mitigation or compensation to be identified, but will also inform future revisions of the management plan to be produced.

8.10.2 The LEMP will include details of proposed monitoring including a schedule of monitoring visits and how this will be reported.

8.10.3 The proposed ecological features to be monitored are:

- Habitats (e.g. new habitats, retained grasslands, hedgerows and ditches)
- Breeding lapwing, curlew and gadwall
- Winter birds, focussing on waders/ waterbirds
- Bat activity
- Dormouse
- Terrestrial invertebrates, including shrill carder bee
- Aquatic invertebrates
- Great crested newt

8.10.4 Monitoring of breeding lapwing will include an assessment of predation issues (for example breeding attempts but unsuccessful fledging) with remedial actions designed if required.

Plan Review

8.10.5 An adaptive management approach will be adopted whereby the results of monitoring feed back into the appropriate management of the Site and the management plan updated accordingly. The Managing Agent will be responsible for implementing any remedial actions recommended by a suitably qualified ecologist.

8.10.6 Management will be undertaken for the lifetime of the project following each revised management plan.

8.11 Decommissioning

8.11.1 After 40 years of operation the site will be restored with the exception of new areas of wildlife habitat and wildlife features which will be retained such wildflower grassland.

8.11.2 Habitats created/maintained in the 40-year period have the potential to be ecologically valuable and support protected species and as such the restoration impacts will be assessed in advance of works commencing. This process will be informed by on-going monitoring of ecological features and pre-decommissioning

surveys to establish the value of the Site and any suitable mitigation. Prior to restoration the ecological and landscape value will be appraised by a suitably qualified ecologist and landscape architect and a method statement devised.

- 8.11.3 A separate Decommissioning Management Plan will be prepared detailing any required mitigation.

Figure 1: Draft Outline of Habitat Mitigation and Enhancement Locations



