



ETIVE ECOLOGY Ltd

Proposed Solar Park

Marchwiel, Wrexham

Great Crested Newt Habitat Management Plan

Produced for:



March 2022

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FIGURES

Figure 1 Proposed Site Layout

Quality Assessment Record

Report Version	Written by	Date	Reviewed by	Date
1.0	Wendy O'Neil	24 th February 2022	Russell Grey	9 th March 2022

1 INTRODUCTION

1.1 Site Background

- 1.1.1 This document has been produced in relation to the proposed solar development on land to the north of Maelor Gas Works, Marchwiell, Wrexham.
- 1.1.2 The preparation of a Habitat Management Plan (HMP) has been requested from Natural Resources Wales (NRW) as part of their initial response to the planning application submitted for the proposed development. The HMP supports the Great Crested Newt (GCN) Mitigation Strategy (MS) that has been prepared to address other aspects of the NRW response. The HMP is designed to ensure the delivery of the immediate and long-term biodiversity enhancements proposed within the GCN MS.

1.2 The Scheme

- 1.2.1 The proposed scheme is to construct a solar park across four fields on land to the north of Maelor Gas Works but south of the Afon Clywedog (Fields 1A, 1B, 1C and Field 2). The proposed site layout is shown in Figure 1 and includes:
- Develop Fields 1A, 1B, 1C and Field 2 into solar panel compartments.
 - Create maintenance access roads to Fields 1A, 1B, 1C and Field 2.
 - Shrub planting and creation of a hibernacula in Field 1A.
 - Create a shallow ditch, an attenuation swale area and a hibernacula within Field 1B. Translocate a small section of hedgerow into the field and create a new access gate.
 - Create a soil bund, two hibernacula, a pond and ancillary infrastructure within Field 1C.
 - Retain all scrub, improved grassland within the site and all of the existing trees and hedgerows around the edge of the site.
 - Manage the retained habitats for their biodiversity value for the operational life of the scheme (anticipated to be 40 years) with monitoring and site wardening.
- 1.2.2 Full details of the scheme and the ecological baseline of the site are provided within the planning application.

1.3 Site Ecology

- 1.3.1 The ecological sensitivities and features of the site comprise:
- GCN known to be present within land immediately adjacent to the site.
 - Potential for reptiles to be present within suitable terrestrial habitats.
 - Bat roost known to be present within two of the abandoned buildings in Field 1B and 1C.
 - Potential for bat foraging and flight lines along hedgerows and field boundaries.
 - Potential for badger to be present on site within the woodland / scrub areas.
 - Nesting birds known to be present within suitable habitats during breeding season.
 - Otter known to use the Afon Clywedog and potential to use suitable terrestrial habitat on site.
 - Semi-natural Broadleaved Woodland and Species-rich Native Hedgerow and considered likely to qualify as Habitats of Principal Importance in Wales.
- 1.3.2 Various measures and actions are required to ensure that these ecological receptors are protected and mitigated appropriately as part of the construction of the proposed scheme, as

detailed within the PEA Report¹. This HMP has been prepared to ensure the delivery of long-term conservation site management.

2 RESULTS

2.1 Overview

2.1.1 The proposed scheme layout is provided in Appendix A and shows the following habitats and features:

- Rough Grassland
- Native Hedgerows
- Hibernacula
- Pond
- Soil mound

2.1.2 Each of these habitats / features is described below in terms of location, functionality and potential biodiversity value.

2.2 Rough Grassland

2.2.1 Rough grassland will be the dominant cover across the site. This habitat will sit beneath the new solar panels across the whole site, will surround the built features and will extend up to the retained trees, scrub and hedgerows that form the site boundaries.

2.2.2 This grassland habitat is incorporated into the landscape plan for its value to biodiversity. With appropriate management, the grassland will deliver a tussocky sward and a dense thatch layer, which will provide suitable habitat for mammals, reptiles and amphibians, including GCN. Rough grassland also provides over-wintering opportunities for a range of invertebrates. The abundance of insect life attracted to this habitat will also provide a good food supply for foraging bats, small mammals and birds. This habitat is expected to add significant overall biodiversity capacity to the site.

2.3 Native Hedgerows

2.3.1 A small section of existing native hedgerow will be translocated at the northwest corner of Field 1B. Existing hedgerows elsewhere on site will all be retained, protected and enhanced through conservation management post-development.

2.3.2 Hedgerows will perform both a landscape/visual function and a biodiversity function, by separating and screening the solar panels and associated infrastructure from the adjacent land-use and offering habitat connectivity and their own intrinsic biodiversity value. The wildlife benefits include increased connectivity around the site, buffering from adjacent disturbance and provision of foraging and shelter for invertebrates, amphibians, terrestrial mammals and nesting birds.

2.4 Hibernaculum

2.4.1 A total of four hibernaculum will be created, one unit within Field 1A and 1B and two within Field 1C. Each hibernaculum will cover a footprint 2m x 1m and built to a height of 0.5m. The

¹ Novus Renewable Services Limited (2021). *Solar Park and Battery Storage Facility at Land to the North of Meallor Gas Works, Marchwiell, Wrexham, LL13 0UN. REPORT REF:258/PEA. Preliminary Ecological Appraisal*

structures will comprise inert material (brick, rubble, timber) and brash recovered from any vegetation clearance works on site.

- 2.4.2 The hibernacula will provide refuge and over-wintering opportunities for amphibians, small mammals and invertebrates.

2.5 Pond

- 2.5.1 A single new pond will be created on site, at the southern edge of Field 1C. This will provide a potential breeding site for GCN and other amphibian species. It will also provide habitat for aquatic invertebrates and offer biodiversity value in the form of species-richness and prey items for foraging birds and bats.
- 2.5.2 There are three existing ponds within the adjacent existing solar park, as well as numerous other ponds <500m of the site. Creation of this new pond will therefore allow greater connectivity between ponds and encourage geneflow to bolster and enhance the local meta-population of GCN and other amphibian species.

2.6 Soil Mound

- 2.6.1 A soil mound will be created within Field 1C from the excavated material arising from the pond creation. This habitat will initially provide a basking habitat for reptiles, foraging for insectivorous birds and mammals and will eventually succeed to scrub invasion and provide shelter for insects, amphibians and reptiles.

3 AIMS & OBJECTIVES

3.1 Overall Aims

3.1.1 The broad overall aims of this HMP are as follows:

- To create an on-site pond for GCN breeding.
- To increase the suitability and value of the grassland beneath the solar panels for GCN and other biodiversity interests.
- To enhance the biodiversity and carrying capacity of the site through habitat management.
- To provide a framework for ongoing monitoring and reporting of retained/created habitats.
- To prevent INNS from becoming established on site.

3.2 Objectives

3.2.1 The following objectives are given for each habitat/feature retained or created as part of the scheme. The objectives are carried forward throughout this Management Plan as a means of determining appropriate management prescriptions, monitoring methods, performance indicators and remedial measures.

Rough Grassland

3.2.2 The objective is to change the structure of the improved grassland to that of a rough grassland for the duration of this Management Plan. The rough grassland should be in good condition with a long and diverse sward. Rough grassland is of high value to wildlife and will provide an increase in biodiversity. It will be managed to provide suitable habitat to support small mammals, a range of invertebrates and to provide connectivity for species such as amphibians and reptiles. The rough grassland will be assessed on the basis of its extent/area and its structural diversity.

Native Hedgerows

3.2.3 The objective is to successfully translocate a small section of existing native hedgerow within Field 1B to facilitate one of the new site access roads, and to retain/protect all other existing hedgerows within the site boundary. All of the native hedgerows shown in Figure 1 will be maintained in good condition for the duration of this Management Plan. The hedgerows are to be of suitable quality to provide good connectivity and to offer foraging opportunities to a wide range of species including GCN, bats and terrestrial mammals. This habitat is to be assessed on the basis of its length, continuity, composition and its structure.

Hibernacula

3.2.4 The objective is to maintain four hibernacula in good condition for the duration of this Management Plan. The hibernacula are to be maintained to offer a place of shelter to various species of amphibian, invertebrate and small mammal throughout the year. These features are to be assessed primarily on the integrity of the structure and overall condition.

Pond

3.2.5 The objective is to manage and maintain the newly created pond in good condition for the duration of this Management Plan. The pond will provide suitable breeding habitat for amphibians including GCN. These ponds are to be assessed on the basis of the Habitat Suitability Index (HSI) and the presence of GCN.

INNS

- 3.2.6 The objective is to ensure that the site, including the ponds, remain free from all INNS for the duration of this Management Plan.

4 GCN MITIGATION STRATEGY

4.1 Rough Grassland

Baseline Condition

- 4.1.1 The extent of the existing grassland to be managed is as per the Proposed Site Layout (**Figure 1**). This shows areas of improved grassland across the whole of the site which will be managed with the aim of creating rough grassland.
- 4.1.2 All of the current grassland areas have been heavily grazed by sheep over the years and comprise a species-poor sward, lush and green in places and short in others.

First Year Management

- 4.1.3 The first year of management of the existing improved grassland will comprise sheep grazing at a livestock unit (LSU) rate 0.5/ha, which equates to three sheep per hectare. Grazing will be undertaken during the last two weeks in June and the first two weeks in July. This grazing regime is designed for the conservation of GCN and balances the emergence of meta-morphs and juvenile GCN later in the summer with the desire for a diverse grassland sward.
- 4.1.4 The sward will be selectively grazed by sheep and a short grazing period will remove height, create structural diversity and allow formation of a thatch layer that improves connectivity and provides sheltered niches.

Ongoing Management

- 4.1.5 The ongoing maintenance of the grassland will remain the same as the first year. However, a review of the grassland condition will discern if grazing levels or timings require modifying. No artificial fertiliser or other feed supplements are to be applied to any areas of the grassland.
- 4.1.6 The rough grassland banks on the drainage ditches to Field 1B should be cut alternately to a height of ~100mm in April and July.

4.2 Native Hedgerows

Baseline Condition

- 4.2.1 There are five existing hedgerows located along the eastern boundary of the Site. These features will be managed for both their wildlife and aesthetic/landscape value.
- 4.2.2 One hedgerow is species rich, whilst the remaining four are all species-poor. Two of the species-poor hedgerows are defunct. A small section of hedgerow will be translocated; where an access route runs through an existing hedgerow. The translocated section will be replanted to extend another nearby hedgerow.

- 4.2.3 The translocated hedgerow will require careful Year 1 management actions to ensure its long-term success. Similarly, Year 1 management will be used to kick-start a new conservation management regime for the retained hedgerows.

First Year Management

- 4.2.4 All translocated stock will be checked twice a year during the first year to ensure successful establishment. Management and maintenance in Year 1 will involve frequent watering and feeding. Any damaged or failed stock will be replaced on a like-for-like basis.
- 4.2.5 All retained hedgerows will be subject to significant trimming works to reduce the height of hedge species to 1.5m and to create a hedge-structure that is widest at the base and narrower at the top. All cuttings will be retained and used to replenish the hedge-bottom. All hedgerow trees will be retained and will not be cut.

Ongoing Management

- 4.2.6 Ongoing management of all hedgerows will include the following good practise measures:
- All plants shall be watered adequately to ensure healthy growth.
 - Plants which have become loosened, lifted up or out of the ground will be set upright and re-firmed by treading.
 - All litter shall be removed from the site.
 - Straggling stems, over-vigorous shoots, suckers and dead, misshapen or broken branches will be removed from trees and shrubs by pruning back with a clean smooth cut to the main stem, or a sound and living outward growing lateral.
 - If any temporary fencing (e.g. rabbit/deer fencing) is used it will be checked and if necessary, repaired.
 - Any temporary fencing will be removed at the end of the maintenance period. The ground surface shall be made good and left tidy.
 - Where plants are missing, have died or have failed to make satisfactory growth these shall be replaced in the first two months of the next scheduled planting season.
- 4.2.7 The aim of hedgerow management is to create a dense continuous hedgerow approximately 1.5m high, 1-2m wide at the base and approximately 0.5-1m wide at the crown. Hedges will be trimmed once a year in January-February; before breeding birds start nesting and after the wintering birds have fed on the berry crop. During cutting operations it will be important to avoid trimming any hedgerow standards.
- 4.2.8 It is likely that for the long-term management of hedges (after about 10 years of trimming) there will need to be some restoration, e.g. to fill gaps or prevent them from developing into a line of trees. This may be achieved by coppicing (cutting the stems to just above ground level) or hedge laying. As with trimming, the hedge coppicing and laying should be done on a rotational basis and take place towards the end of winter.

4.3 Hibernaculum

Baseline Condition

- 4.3.1 The four hibernacula will have been constructed shortly before the commencement of this HMP. They will have been constructed using cuttings from any site work or from locally

sourced brash/woody material and are designed to provide robust places of shelter for reptiles, amphibians and small mammals.

First Year Management

- 4.3.2 Hibernacula will be inspected during Year 1 and remedial action taken to restore them if they are found to be in a sub-optimal condition, i.e. if they do not provide a robust place of shelter.

Ongoing Management

- 4.3.3 Hibernacula will be checked annually and remedial action taken to restore them if they are found to be in a sub-optimal condition, i.e. if they do not provide a robust place of shelter. Additional woody material will be added to each hibernacula following management works elsewhere on site.

4.4 Pond

Baseline Condition

- 4.4.1 There are no ponds present within the site. A pond will be created as part of mitigation works.

First Year Management

- 4.4.2 Year 1 management will be minimal, requiring only an annual visit to remove litter and any other detritus within the immediate vicinity of the pond, and to review the establishment of the pond.

Ongoing Management

- 4.4.3 Annual management, undertaken outside of the GCN breeding period (March to June inclusive) will comprise;
- Litter/detritus picking.
 - Control and removal of marginal vegetation, aiming for ~75% marginal coverage.
 - Control and removal of emergent vegetation, aiming for ~50% of pond coverage.
 - Control and removal of over-shading vegetation, aiming for <50% of the margins to be shaded.
 - Control and removal of any INNS.

4.5 INNS

Baseline Condition

- 4.5.1 There are no INNS present within the site boundary pre-construction, but both Indian balsam and Japanese knotweed are known to be present in neighbouring land.

Ongoing Management

- 4.5.2 INNS will be subject to management as/when identified on site. It is anticipated that species such as Indian balsam may occur on site post-development. The species will be subject to immediate hand-pulling whenever found on site during any of the management or monitoring site visits.

5 MONITORING

5.1 Methods

- 5.1.1 Monitoring will take place in Years 1, 2, 3, 5 and 10, by way of a single annual visit undertaken in June. The timing of the monitoring visit is to ensure all habitats are in a suitable condition (i.e. prior to cutting and in full flower) to assist in the assessment of habitat quality.
- 5.1.2 The monitoring visit will comprise a walkover survey and assessment of all habitats and features described herein. Each habitat/feature will be assessed against the Key Performance Indicators (KPIs) described below and given in Table 5.2.1.
- 5.1.3 Monitoring of habitats/features will be undertaken by a suitably experienced ecologist with the relevant skills in botanical identification and protected species licenses where appropriate.

Rough Grassland

- 5.1.4 The rough grassland will be monitored for its extent/area, its species-richness and its structural diversity, based on a single annual survey in June.

Native Hedgerows

- 5.1.5 The hedgerows will be monitored for their length, continuity and structure. Length will be assessed against the site plan provided herein, continuity will consider the % of gaps along the length and structure will cover height/width and % hedge-bottom coverage.

Hibernacula

- 5.1.6 The hibernacula will be monitored for their height, width, and integrity of structure.

Ponds

- 5.1.7 The pond will be monitored using the Habitat Suitability Index (HSI) and the presence/absence of GCN (based on two torch surveys carried out mid-March to mid-June).

INNS

- 5.1.8 INNS will be monitored for their presence/absence.

5.2 Key Performance Indicators

- 5.2.1 The following KPIs have been identified primarily as a means of assessing the success of the management regime in achieving the aims and objectives of this Habitat Management Plan. KPIs are given on a species/feature basis in Table 5.2.1 below.

Table 5.2.1 KPIs by Habitat / Feature

	Lower Limit	Upper Limit	Target
Rough Grassland			
Species - richness	5 species	No upper limit	A species-rich grassland
Structural Diversity	Moderate	No upper limit	Excellent structure for GCN
Coverage	5% loss	No upper limit	No loss in coverage
Native Hedgerows			
Length	1% loss	See Figure 1	No loss in length
Continuity	5% gaps	No upper limit	No gaps
Structure	1m ground-width 25% hedge-base cover	No upper limit	1.5m height 2m ground-width 50% ground cover
Hibernacula			
Height	0.5m height	No upper limit	1m height
Width	1m width	No upper limit	2m width
Integrity	Moderate	Good	Fully integral
Pond			
Presence / Absence	GCN presence	No upper limit	GCN present and breeding in pond
HSI Score	Good	No upper limit	Excellent
INNS			
Presence	-	-	Absence of NNIS

5.2.2 Monitoring will be undertaken in the following years post-completion:

- Year 1
- Year 2
- Year 3
- Year 5
- Year 10

5.2.3 The pond within Field 1C will be subject to an annual Habitat Suitability Index (HSI) and two GCN presence/absence surveys for the duration of the HMP (anticipated to be 40 years).

5.2.4 A 5-year review meeting will be organised following the undertaking and reporting of Year 5 monitoring. This meeting will take place with the ecologist, the site owner(s) and the maintenance contractor to review the performance of the habitat management measures. Further measures for habitat and/or protected species enhancements will be discussed as part of this review meeting.

5.3 Reporting & Remedial Action

5.3.1 For each year that monitoring is undertaken, a short report will be compiled to present the findings of the monitoring and a comparison of the site condition to the KPIs detailed above. Where the lower limits are not met for any habitat or feature, these will be highlighted, and remedial action will be proposed. Remedial action may comprise an immediate management intervention or it may involve a revision to the management regime. Where further

monitoring is required to check on the efficacy of the remedial action proposed, in addition to the regime noted above, this will be stated within the Monitoring Report.

- 5.3.2 Monitoring Reports will be kept on file and made available to Wrexham County Council, NRW or their representatives upon request, to demonstrate compliance.

6 WORKS SCHEDULE

6.1 Year 1 Works Plan

- 6.1.1 An indicative Year 1 works plan is provided in Table 6.1 below. The plan is set out from January to December for ease of presentation but may commence at any time of the year provided the full schedule is followed.

Table 6.1 Year 1 Works Plan

Month	Habitat / Feature	Action
January / February	Trees and hedgerows	Trimming of existing trees & hedges. Replenish hibernacula and hedge-bottoms with cut material.
April	Native Hedgerows	Check plant health; feed, water, remove INNS.
	Pond	Litter/detritus pick.
June	Grassland	Begin sheep grazing at a rate of 0.5 sheep per LSU for the last two weeks of June.
July	Grassland	Continued sheep grazing at a rate of 0.5 sheep per LSU for the first two weeks of July.
	Native Hedgerows	Check plant health; feed, water, remove INNS.
	Pond	Litter/detritus pick.
October	Native Hedgerows	Check plant health; feed, water, remove INNS. Replace any damaged/failed stock.

6.2 Annual Works Plan

6.2.1 An indicative annual works plan is provided in Table 6.2 below.

Table 6.2 Annual Works Plan

Month	Habitat / Feature	Action
January / February	Trees and hedgerows	Trimming of existing trees & hedges. Replenish hibernacula and hedge-bottoms with cut material. Check plant health; feed, water, remove INNS.
	Pond	Litter/detritus pick.
April	Ditch Banks	Cut one side of the ditch to 100mm height.
	Pond	GCN Monitoring Surveys
June	Pond	Control of emergent vegetation (if required)
	Grassland	Begin sheep grazing at a rate of 0.5 sheep per LSU for the last two weeks of June.
	All Habitats	Habitat Condition Survey
July	Ditch Banks	Cut alternative side of the ditch to 100mm height.
	Grassland	Continued sheep grazing at a rate of 0.5 sheep per LSU for the first two weeks of July.
	Pond	Litter/detritus pick.
November	Native Hedgerows	Coppice and/or lay after Year 10.
	Pond	Control of marginal and bank-side vegetation (if required).

7 ROLES & RESPONSIBILITIES

7.1 Site Owner(s)

7.1.1 The site owner(s) (or their appointed contractor) will be responsible for the creation of the habitats and ecological features details herein and the implementation of this Habitat Management Plan. The site owner(s) will also be responsible for appointing a suitably experienced ecologist to undertake the monitoring as specified within this Management Plan

7.2 Appointed Ecologist

7.2.1 A suitably experienced ecologist will be appointed to undertake the monitoring detailed herein. The appointed ecologist will then be responsible for undertaking the monitoring in full accordance with the methods described in this Management Plan and following all relevant legal/licensing requirements. The appointed ecologist will also be responsible for accurately assessing and reporting the monitoring findings to the site owner(s), with appropriate recommendations relating to ongoing management

8 OWNERSHIP & FUNDING

8.1 Ownership

- 8.1.1 Post-development, the site will remain in the ownership of the applicant's group companies and there is no intention to sell the development to any other party. Management will therefore remain the responsibility of the site owner(s) for the foreseeable future. Any change in ownership or ownership status will be reported as part of the monitoring process.

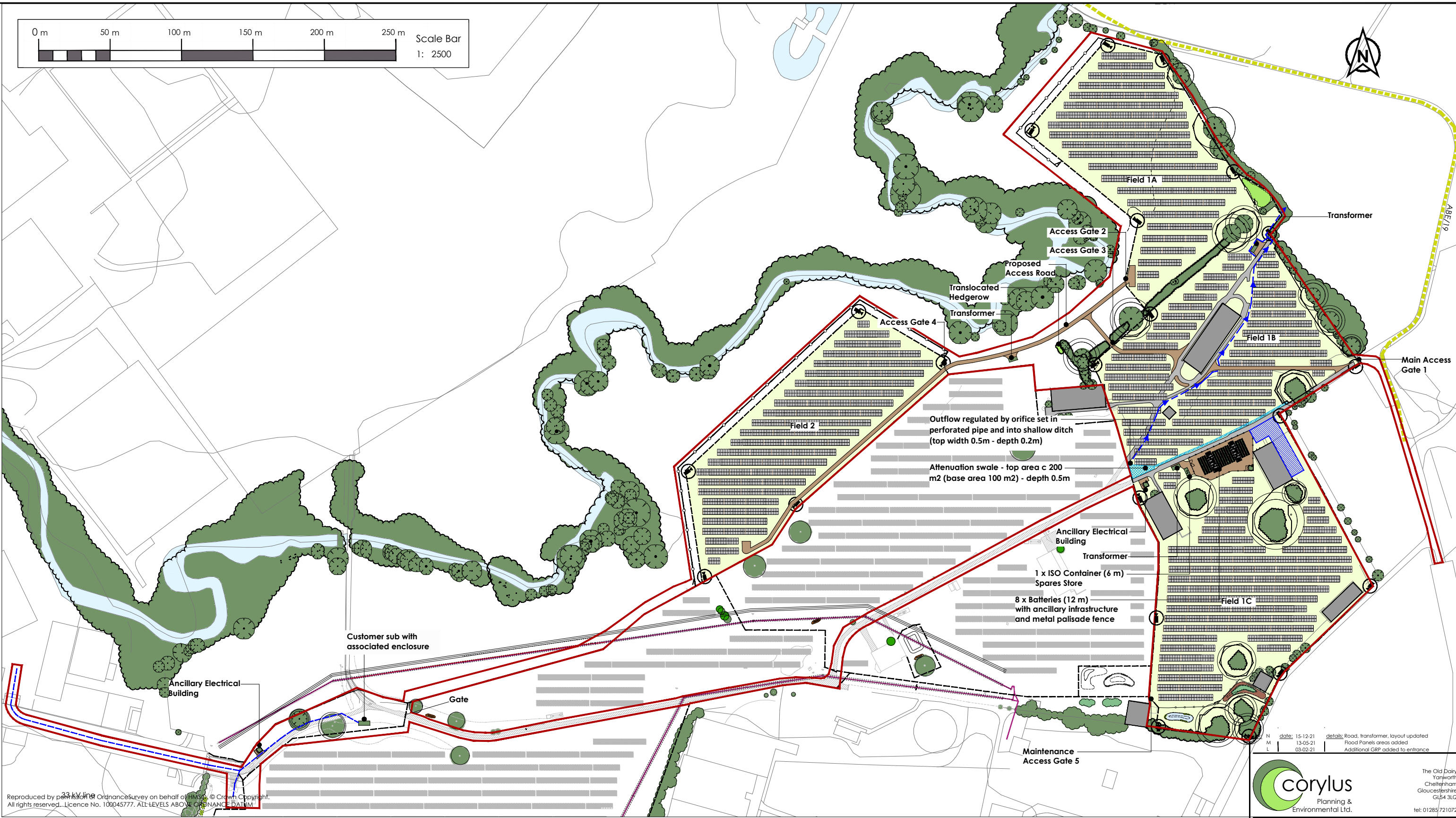
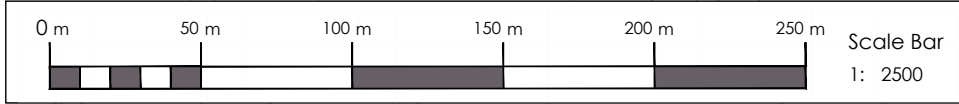
8.2 Funding

- 8.2.1 The implementation of this Habitat Management Plan will be funded by the site owner(s). The management of the site will be funded through the revenues generated by the solar development. These funds will be used to employ a suitably experienced contractor to undertake the maintenance described herein.

FIGURE 1

Proposed Site Layout

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Key:

	Planning Application Boundary		Existing Hedgerow		Battery store
	Soil Storage area		Proposed Planting		Proposed Access Road
	Existing Building		Public Right of Way		Existing site roads
	Cable route		Deer fencing		Palisade fence
	Shallow ditch		CCTV		Attenuation Swale
	Soil Bund				

rev:	K	date:	02-02-21	details:	RP2 updated, PV panels, pond and battery store updated.
	J		28-01-21		Battery store and access + transform / ISO container relocated. Pond and cable route adjusted.
	i		19-01-21		(JLB) Annotations removed, customer control updated.
	H		16-12-20		(JLB) Tables changed to 2 x portrail arrangement
	G		26-11-20		(JLB) Services removed, swales added & other updates.
	F		12-11-20		(JLB) Red line, cable & planting updated
	E		12-11-20		(JLB) Red line, Road & Layout updated
	D		19-10-20		(JLB) Red line and Eco enhancements added
	C		12-10-20		(JLB) Road alignment adjusted
	B		02-10-20		(JLB) Substation moved away from gas main
	A		15-09-20		(JLB) Layout Amended

Planning & Environmental Ltd.

The Old Dairy
Yanworth
Cheltenham
Gloucestershire
GL54 3LQ
tel: 01285 721072

client:	Novus R S Ltd								
project:	Solar Park to the north of Maelor Gasworks								
title:	Design Layout								
scale:	1:2500	date:	06/08/20	drawn by:	JLB	checked by:		size:	A3
Project ref:	258	dwg no:	WR-EX-258-06-1	rev:	N				