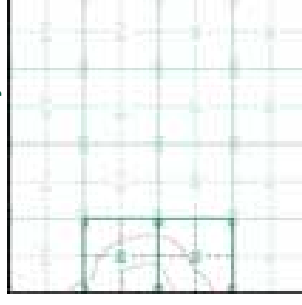


Estimated Soil Chemistry Lead - Slice B



Order Details

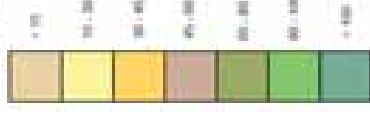
Order Details:
 Customer Ref: 110795354_1_1
 National Grid Reference: 286790, 195470
 Slice: B
 Site Area (Ha): 130.06
 Search Buffer (m): 250

Site Details

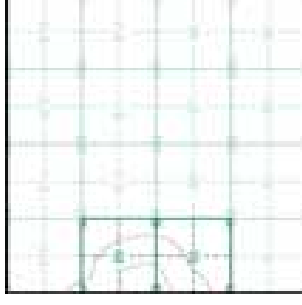
Caerau Parc

Estimated Soil Chemistry Nickel

Soil Concentration (mg/kg)



Estimated Soil Chemistry Nickel - Slice B



Order Details

Order Details:
Customer Ref: 110795354_1_1
National Grid Reference: D36058
Site Area (Ha): 130.06
Search Buffer (m): 250

Site Details

Caerau Parc

APPENDIX G

Plates



View west down the Afan Valley



Covered Reservoir

Project No.	16255	Drawn By	HW	• CIVIL • STRUCTURAL • TRANSPORTATION • GEOTECHNICAL • ENVIRONMENTAL bsp CONSULTING 12 Oxford Street Nottingham, NG1 5BG Tel : (0115) 8402227 - Fax : (0115) 8402228 e-mail : info@bsp-consulting.co.uk Also offices in Derby, Leicester and Sheffield
Client	Northern Powerhouse Developments	Checked By		
		Approved By		
Project	Caerau Parc, Afan Valley, Wales	Scale	NTS	
		Date Drawn	06/02/2017	
Title	General Site Views	Revision		
		Plate No.	16255/P1	



View north (from central area of site) across the Afan Valley



View southwest from the Trig Point

Project No.	16255	Drawn By	HW	CIVIL STRUCTURAL TRANSPORTATION GEOTECHNICAL ENVIRONMENTAL bsp CONSULTING 12 Oxford Street Nottingham, NG1 5BG Tel : (0115) 8402227 - Fax : (0115) 8402228 e-mail : info@bsp-consulting.co.uk Also offices in Derby, Leicester and Sheffield
Client	Northern Powerhouse Developments	Checked By		
		Approved By		
Project	Caerau Parc, Afan Valley, Wales	Scale	NTS	
		Date Drawn	06/02/2017	
Title	General Site Views	Revision		
		Plate No.	16255/P2	



Quarry Geology

Quarry on southern site boundary



Burnt-out Car (southern area of site)

Project No.	16255	Drawn By	HW	CIVIL STRUCTURAL TRANSPORTATION GEOTECHNICAL ENVIRONMENTAL bsp CONSULTING 12 Oxford Street Nottingham, NG1 5BG Tel : (0115) 8402227 - Fax : (0115) 8402228 e-mail : info@bsp-consulting.co.uk Also offices in Derby, Leicester and Sheffield
Client	Northern Powerhouse Developments	Checked By		
		Approved By		
Project	Caerau Parc, Afan Valley, Wales	Scale	NTS	
		Date Drawn	06/02/2017	
Title	General Site Views	Revision		
		Plate No.	16255/P3	



Project No.	16255	Drawn By	HW	CIVIL STRUCTURAL TRANSPORTATION GEOTECHNICAL ENVIRONMENTAL bsp CONSULTING 12 Oxford Street Nottingham, NG1 5BG Tel : (0115) 8402227 - Fax : (0115) 8402228 e-mail : info@bsp-consulting.co.uk Also offices in Derby, Leicester and Sheffield
Client	Northern Powerhouse Developments	Checked By		
		Approved By		
Project	Caerau Parc, Afan Valley, Wales	Scale	NTS	
		Date Drawn	06/02/2017	
Title	View East Across the Afan Valley	Revision		
		Plate No.	16255/P4	

APPENDIX H

Site Plan Showing Current Development Proposals (Figure No. 16255/05)



Project No.	16255
Client	Northern Powerhouse Developments
Project	Caerau Parc, Afan Valley, Wales
Title	Site Plan Showing Current Development Proposals
Taken from drawing supplied by client (unreferenced)	
Drawn By	HW
Checked By	
Approved By	
Scale	NTS
Date Drawn	06/02/2017
Revision	
Figure No.	16255/05

• CIVIL • STRUCTURAL • TRANSPORTATION • GEOTECHNICAL • ENVIRONMENTAL



12 Oxford Street
Nottingham, NG1 5BG
Tel : (0115) 8402227 • Fax : (0115) 8402228
e-mail : info@bsp-consulting.co.uk
Also offices in Derby, Leicester and Sheffield



APPENDIX I

**Extract from BGS 1:10,560 Scale Geological Map
(Figure No. 16255/06)**

APPENDIX J

Conditions and Limitations



Our Ref: GCL/14536/Let1

Your Ref:

Contact: Gwyn Lake

Terra Firma (Wales) Ltd.

Consulting Geotechnical & Geo-Environmental Engineers
Site Investigation Contractors

5 Deryn Court, Wharfedale Road,
Pentwyn, Cardiff CF23 7HA

Tel: 029 2073 5354 Fax: 029 2073 5433

Email: info@terrafirmawales.co.uk

www.terrafirmawales.co.uk

12th December 2017

AECOM

1 Callaghan Square
Cardiff
CF10 5BT

For the attn. of Mr David Jones

Dear David

AFAN VALLEY DEVELOPMENT - LANDSLIP POTENTIAL

Further to today's telephone conversation please find below the information that you require:

The South Wales Coalfield Landslip Survey (Report NoEG80/4) published by the Institute of Geological Sciences Special Surveys Division, Engineering Geology Unit lists the two landslips affecting the site as:

Table 1.0 Summary of Landslips				
Slip No	Location	Grid Ref	Summary Description	Slip Area (Hectares)
17*	0.7km SW of Cymer on the N flank of Foel Fawr	SS 858.955	Dormant shallow translational debris slide in Rhondda Sandstone with flows in toe region	6
18**	Pencastell Bungalow. S side of valley on NW-facing slope, 50m S of Pencastell Bungalow above A4107 Afan Valley Road	SS 859.961	Dormant shallow, degraded and vegetated translational debris slide in superficial deposits, weathered Rhondda Mudstones and Rhondda and Brithdir Sandstone debris. Indistinct vegetated Brithdir sandstone backscar with Brithdir coal approx.30m upslope. Lower parts of slip are cut by a4107 slope.	3

Notes

* Landslip located centrally within site

**Landslip located on sites western boundary

The descriptions given on the previous page indicate that the landslips are shallow translational and not deep seated. Engineering solutions for working on such landslips can be achieved. We acknowledge the need to avoid development on the landslips and where this is unavoidable development will be sympathetic and keep to an absolute minimum.

It should be noted that both landslips are located within some of the weakest rock structures in the South Wales coalfield, the argillaceous strata of the Rhondda Beds, and great care should be taken when working in this strata. Following a detailed ground investigation a sensitive and appropriate solution will be developed with NPT's engineering team to ensure agreement is reached with regards to appropriate engineering solutions.

The landslip potential of this strata has been activated in the main by over steepening of valley sides during the Ice Age and controlled to a large extent by strata dip and groundwater. Any stabilisation scheme would involve some form of shallow groundwater control. The addition of groundwater to the area, whether intentional or accidental, could initiate ground movement.

The issue of ground water will again be picked up during the detailed site investigation and appropriate solutions will be put in place to mitigate intentional or accidental groundwater movements. We will align this with the outcome of the proposed peat survey to minimise any impact on ground water.

It should also be noted that the landslip survey was carried out in the late 1970's and an up to date geomorphological survey of the slips should be carried out to determine their current condition and extent.

It is acknowledged that this will be carried out as part of the detailed ground investigation works package to be instigated following granting of outline planning.

I trust that the above is to your satisfaction, however, if you have any queries or require any further information please do not hesitate to contact me.

Yours sincerely

for: Terra Firma (Wales) Ltd



Dr Gwyn C Lake

CHAPTER 8: BIODIVERSITY

Introduction

8.1 This chapter addresses the potential ecological effects of the proposed mixed-use tourism and leisure development, referred to as Afan Valley Adventure Resort (hereafter referred to as 'the Site'/'the Proposed Development'), on the existing ecological features within the scheme footprint. The chapter includes a summary of the current conditions found within the surveyed area, a valuation of the ecological features and an indication of impacts and mitigation associated with the new development works. The structure of the ecology chapter and the assessment methodology is based on current best practice guidelines described by the Chartered Institute of Ecology & Environmental Management (CIEEM, 2016).

8.2 The scope of the Ecological Impact Assessment (EclA) has been developed based on:

- Consideration of any ecological features, focusing on those for which there is legal or planning policy in favour of protection or enhancement;
- Data on sites of national and county importance within 1-2km of the Site boundary;
- Data on notable flora and fauna; for example, legally protected, nationally rare/scarc, county rare/scarc, Local (Afan Valley and surrounding areas) and UK Biodiversity Action Plan, and other species of conservation concern within 1 - 2km of the Proposed Development boundary; and
- Review of Indicative Parameters Plan & Masterplan (Appendices 5.1 and 5.2 respectively of ES Volume 2) and its effect on ecological features.

8.3 The Site generally consists of large areas of clear felled conifer plantations on an incline that now supports a mosaic of habitats that include Marshy Grassland, Mire, Semi-improved acid grassland and areas of Dry acid and Wet Heath. The conifer plantation felling was the result of the *Phytophthora ramorum* fungus like pathogen causing the commonly known 'Larch disease.' An area of Plantation on Ancient Woodland was located at the northern extent of site, on the steep valley side with the locally designated Afan Valley Mineral Railway Site of Importance for Nature Conservation (SINC) and a small stream, also designated as a SINC, at the north-western boundary and within the north-western part of the Site respectively. The

Caerau North SINC is also directly adjacent to the Site in the south, although is located within the authority boundary of the Bridgend County Borough Council.

Legislation, Planning Policy & Guidance

- 8.4 The following national planning policy relating to nature conservation and biodiversity are considered of relevance to the area surveyed and to the proposed tourist development.

European Legislation

The Conservation of Habitats and Species (Amendment) Regulations 2012 (as amended)

- 8.5 In order to promote the conservation of natural habitats and species the European Commission (EC) drafted two directives known as the Birds Directive (Council Directive 79/409/EEC on the conservation of wild birds, now 2009/147/EC) and the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora).
- 8.6 The Conservation of Habitats and Species (Amendment) Regulations 2010 (HMSO, 2010), known commonly as the "Habitats Regulations" supersede an earlier piece of legislation, the Conservation (Natural Habitats & c.) Regulations 1994. The Habitats Regulations transpose the European directives into UK law and allow for the designation of both Special Protection Areas (SPAs) for birds and Special Areas of Conservation (SACs) for the protection of other species and habitats. These protected areas are collectively known as the Natura 2000 network of sites. Species listed under the Habitats Regulations are known as European Protected Species (EPS).

Wildlife & Countryside Act, 1981 (as amended)

- 8.7 Under Part 1 of the Wildlife and Countryside Act 1981 all birds, their nests and eggs are protected by law and it is an offence, with certain exceptions, to:
- a) intentionally kill, injure or take any wild bird;
 - b) intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; and
 - c) intentionally take or destroy the egg of any wild bird.

- 8.8 Other sections of the Act are also of relevance to the Site and existing ecological features including Schedules 5 and Schedule 9 relating to the protection of animals (such as reptiles and bats) and non-native invasive weeds (such as Himalayan Balsa *Impatiens glandulifera*) respectively.

Environment Act Wales, 2016

- 8.9 Part 1 of the Environment Act Wales' came into force in May 2016 and sets out the approach to planning and managing natural resources at a national and local level with a general purpose linked to statutory 'principles of sustainable management of natural resources' defined within the Act.

Section 6 - Biodiversity and resilience of ecosystems duty

- 8.10 Section 6 of the Act places a duty on public authorities to 'seek to maintain and enhance biodiversity' so far as it is consistent with the proper exercise of those functions. In so doing, public authorities must also seek to 'promote the resilience of ecosystems'.

Section 7 - Biodiversity lists and duty to take steps to maintain and enhance biodiversity

- 8.11 This section lists living organisms and types of habitat in Wales which are considered of key significance to maintaining and enhancing biodiversity in relation to Wales. The Welsh Ministers are required to take all reasonable steps to maintain and enhance the living organisms and types of habitat included in any list published under this section, and encourage others to take such steps.

National Planning Policy

- 8.12 In terms of planning policy, a number of over-arching policies are of relevance not least of which are those described within Planning Policy Wales (PPW), which sets out land use planning policies of the Welsh Assembly Government with Chapter 5 dealing with Conserving and Improving Natural Heritage and Coast. The advice contained within PPW is supplemented for some subjects by Technical Advice Notes (TAN's), with TAN 5 addressing Nature Conservation.

Planning Policy Wales (2016)

- 8.13 This document set out the land use planning policies of the Welsh Assembly Government with Chapter 5 dealing with Conserving and Improving Natural Heritage and Coast. The advice

contained within PPW is supplemented for some subjects by Technical Advice Notes (TAN's), with TAN 5 addressing Nature Conservation.

8.14 TAN 5 identifies a number of key principles, which the town and country planning system in Wales should incorporate those relevant are detailed below:

- *Work to achieve nature conservation objectives through a partnership between local planning authorities, Natural Resources Wales (NRW), voluntary organisations, developers, landowners and other key stakeholders (Integrate nature conservation into all planning decisions looking for development to deliver social, economic and environmental objectives together over time;*
- *Ensure that the UK's international obligations for site, species and habitat protection are fully met in all planning decisions;*
- *Look for development to provide a net benefit for biodiversity conservation with no significant loss of habitats or populations of species, locally or nationally;*
- *Promoting approaches to development which create new opportunities to enhance biodiversity, prevent biodiversity losses, or compensate for losses where damage is unavoidable. Minimising or reversing the fragmentation of habitats and improving habitat connectivity through the promotion of wildlife corridors;*
- *Local planning authorities should seek to protect trees, groups of trees and areas of woodland where they have natural heritage value or contribute to the character or amenity of a particular locality;*
- *The presence of a species protected under European or UK legislation is a material consideration when a local planning authority is considering a development proposal which, if carried out, would be likely to result in disturbance or harm to the species or its habitat.*

Local Planning Policy

8.15 The LDP for Neath Port Talbot was adopted in 2016 superseding the Unitary Development Plan and provides the basis for decisions on land use planning in the County Borough up to 2026. Policies of relevance to the development include:

Policy SP 15

Biodiversity and Geodiversity. Important habitats, species and sites of geological interest will be protected, conserved, enhanced and managed through the following measures:

1. *The identification of the following Internationally and Nationally designated sites within the County Borough to enable their protection:*
 - (a) *Special Areas of Conservation (SACs) and Ramsar Sites;*
 - (b) *Sites of Special Scientific Interest (SSSIs);*
 - (c) *National Nature Reserves (NNRs).*
2. *The identification and protection of sites of regional and local importance;*
3. *The protection of important natural heritage features.*

Policy EN 6

Important Biodiversity and Geodiversity Sites Development proposals that would affect Regionally Important Geodiversity Sites (RIGS), Local Nature Reserves (LNRs), Sites of Interest for Nature Conservation (SINCs), sites meeting SINC criteria or sites supporting Local Biodiversity Action Plan (LBAP) or S42 habitats or species will only be permitted where:

1. *They conserve and where possible enhance the natural heritage importance of the Site; or*
2. *The development could not reasonably be located elsewhere, and the benefits of the development outweigh the natural heritage importance of the Site. Mitigation and/or compensation measures will need to be agreed where adverse effects are unavoidable.*

Policy EN 7

Important Natural Features Development proposals that would adversely affect ecologically or visually important natural features such as trees, woodlands, hedgerows / field boundaries, watercourses or ponds will only be permitted where:

1. *Full account has been taken of the relevant features in the design of the development, with measures put in place to ensure that they are retained and protected wherever possible; or*
2. *The biodiversity value and role of the relevant feature has been taken into account and where removal is unavoidable, mitigation measures are agreed.*

Assessment Methodology

8.16 As described within the updated EclA Guidelines (CIEEM 2016), a key objective of an EclA is to identify ecological features (i.e. habitat, species and ecosystem), which are considered to be important and potentially affected by the project. Ecological features can be important for a variety of reasons and a development project can impact an important ecological feature in any number of possible ways. However, it is only necessary to describe in detail the impacts that are likely to be significant. Where a potential effect is identified, its significance is determined and the effect on the particular feature evaluated as positive or negative at the relevant geographical scale (national, local etc.).

8.17 The potential impacts during construction and operation of the Proposed Development on identified ecological receptors comprise:

- Direct loss of habitats;
- Isolation and fragmentation of habitats;
- Changes in artificial light levels;
- Increased disturbance from construction, traffic and people;
- Changes in hydrology;
- Contamination of watercourses/hydrology.

8.18 Potentially sensitive ecological features are identified through the collation of baseline data from surveys and existing records. Once the features are identified information on their legal and policy, conservation and distribution status, plus any known trends (i.e. population or migratory) are considered to measure their ecological importance.

8.19 All ecological features are described (including conservation status, status on-site, sensitivity, planning and legal protection etc.) and assigned an importance. The scale of importance for ecological resources used in the present assessment is as follows:

- International and European;
- National (Wales);
- Regional (South West Wales);
- County/Local Authority (Neath Port Talbot);
- Local (Afan Valley);

Assessment Criteria

8.20 All ecological receptors identified during the study are described (conservation status, local status, sensitivity, planning and legal protection etc.) and assigned a value based on the guidance of CIEEM (2016). Examples of the criteria used to assign importance for this assessment are presented below:

Table 8.1 Valuation of Ecological Resources

Nature Conservation Value	Examples
International	An internationally designated site or candidate site ((SPA, pSPA, SAC, cSAC, pSAC¹, Ramsar site, etc) or an area which the country agency has determined meets the published selection criteria for such designation, irrespective of whether or not it has yet been notified. Under the Ramsar Convention a wetland is considered internationally important if it regularly holds at least 1% of the individuals in a population of any species (or sub-species) of waterbird, or if it regularly supports 20,000 or more waterbirds (Ramsar, 2008). Regularly occurring, globally threatened species (i.e. International Union for Conservation of Nature (IUCN) Red listed) or species listed on Annex 1 of the Berne Convention. Regularly occurring populations of internationally important species that are rare or threatened in the UK or of uncertain conservation status. A regularly occurring, nationally significant population/number of

¹ SPA (Special Protection Area), pSPA (proposed Special Protection Area), SAC (Special Area of Conservation), cSAC Candidate Special Area of Conservation), pSAC (proposed Special Area of Conservation).

Nature Conservation Value	Examples
	any internationally important species.
National	A nationally designated site (SSSI, NNR, MNR²) or a discrete area, which the country conservation agency has determined meets the published selection criteria for national designation (e.g. SSSI selection guidelines) irrespective of whether or not it has yet been notified. A wetland regularly holding 1% or more of the estimated British population of any species (or sub-species) of waterbird. Regularly occurring populations of UKBAP and Section 7 Priority Species. Regular occurring populations of SSSI citation listed qualifying species.
Regional	Any regularly occurring significant population that is listed in a Local Red Data Book or County Local Biodiversity Action Plan (LBAP) Regularly occurring populations (<1% winter or summer) of a regionally/county important species. Regular occurring populations of Red listed species in the UK or Wales
County	Regularly occurring populations of a locally important/rare species Regularly occurring populations of Amber listed species in the UK or Wales
Local	Regular populations of species that are common and widespread. Regularly occurring populations of Green listed species in the UK or Wales

8.21 All resources valued at above a given threshold of importance (in this case Local is the lowest level) are considered in terms of whether any effects are likely to be ecologically significant or not. Activities associated with the development are likely to cause significant ecological effects and it is therefore necessary to identify associated changes and their implications in

² SSSI (Site of Special Scientific Interest), NNR (National Nature Reserve), MNR (Marine Nature Reserve)

terms of extent, magnitude, duration, timing, frequency and reversibility for valued ecological features.

- 8.22 For the purpose of this EclA, 'significant effect' is an effect that either supports or undermines (positive or negative impact/effect) biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local. In broad terms, significant effects encompass impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution) (CIEEM, 2016). Where development impacts are identified which could have significant effects on a given ecological feature, the 'mitigation hierarchy' of avoidance, mitigation and compensation is applied. In the current assessment the impacts are presented in the absence of and following mitigation. The assessment of impact on a given ecological feature following mitigation (the residual impact) is presented as the overall assessment for that feature.
- 8.23 The assessment of an ecological impact as 'significant' should not be confused with any other definitions of the term significant used elsewhere in this ES and it is recognised that the assessment criteria may be subject to variation between topic chapters. The assessment within the Ecology and Nature Conservation chapter has been undertaken using best practice guidelines (Second Edition, 2016) published by the Chartered Institute of Ecology and Environmental Management (CIEEM).
- 8.24 The CIEEM guidelines (Second edition) (2016) for Ecological Impact Assessment (EclA) represent current best practice and their use as part of this Environmental Statement (ES) is considered appropriate. Terms used to assign value to a given ecological feature and to assess the impact of the Proposed Development within these guidelines may differ from those used within other chapters of this ES.

Consultation

- 8.25 The scope of the technical chapters to be included in the current ES was agreed by the Neath Port Talbot County Borough Council (NPTCBC) and Natural Resources Wales (NRW) via submission of a Scoping Report, submitted in August 2017 (as included in Appendix 1.1 of ES

Volume 2). Prior to submission of the Scoping Report, informal consultation with the ecologist at NPTCBC was undertaken as regards the scope of the ecology survey. Feedback received from this informal consultation was reflected in changes to the proposed surveys – for example an increased number of bat surveys were undertaken at the site. The informal consultation and Scoping Report verified the scope of the surveys undertaken at the site in 2017, the results of which have been used to inform the assessment within this chapter.

Information Sources

- 8.26 In order to provide an ecological context for the site, ecological records were requested from the South East Wales Biodiversity Records Centre (SEWBRc) in September 2016. Records were requested in relation to sites designated for their nature conservation interest (both statutory and non-statutory), as well as records of protected or otherwise notable flora and fauna (The results of this desk study are illustrated in Appendix 8.1 of ES Volume 2). The Ancient Woodland Inventory 2011 (accessed via the Natural Resources Wales (NRW) website³ was reviewed for accurate boundaries of the woodland designations that border site. Consultation with the NPTCBC Ecologist (Becky Sharp) & Steve Roberts, (UK expert in Honey Buzzard *Pernis apivorus*) was undertaken regarding the likely presence of Honey Buzzard and other protected species.
- 8.27 Habitat and species action plans listed in the UK Biodiversity Action Plan (BAP) and the Priority Habitats and Species lists within the Environment Wales Act (2016) were also consulted with regards to species or habitats that are potentially present on the Site or in the surrounding study area. Other sources of information were also utilised as appropriate to identify protected or notable nature conservation sites in the wider area.
- 8.28 An ES (Amec, 2001) and Ecological Assessment (Pryce, 2002) were originally conducted to support the previous planning application for mixed use residential-led development that was granted. The ecological appraisal report included an Extended Phase 1 survey conducted in 2000, followed by targeted bird, protected mammal, herpetile (reptiles & amphibians) and terrestrial invertebrate surveys conducted in 2002. The habitats on-site during these surveys were dramatically different to the habitats currently present due unto the felling that was required to control *Phytophthora ramorum*. Both these documents were reviewed as part of

³ <https://naturalresources.wales/forestry/woodlands-and-the-environment/ancient-woodland-inventory/?lang=en>

desk based survey. However, to inform the current application, the assessment in this chapter has been based upon the baseline surveys undertaken by Soltys Brewster in 2016/2017.

- 8.29 The Extended Phase 1 Habitat survey and targeted protected species surveys undertaken to inform the current assessment were focused on the area within and immediately adjacent to the Site Location Plan (see Appendix 8.2 of ES Volume 2).

Phase I Habitat Survey

- 8.30 Habitat mapping was undertaken over a series of visits between 12th -29th September 2016 by a suitably qualified ecologist⁴ and followed standard Phase 1 Habitat Survey protocol (JNCC 1990) as amended by the Institute of Environmental Assessment (1995). All habitats within the Site were classified and mapped as accurately as possible. All habitats considered to have the potential to support rare, protected or otherwise notable species of flora and fauna were noted, as were any direct signs of these species (e.g. Badger *Meles meles* setts and dung-pits). A map of habitats was drawn up and target notes were used to identify features of particular ecological interest.
- 8.31 Where possible, habitats were cross-referenced to any relevant priority habitats such as those described within the Environment Wales Act (2016) or local habitats adopted by the local Biodiversity Action Plan. Additionally, any species listed as a pernicious weed under Schedule 9, Section 14 of the Wildlife and Countryside Act 1981 (as amended) – for example Japanese Knotweed *Fallopia japonica* and Himalayan Balsam *Impatiens glandulifera* - were also noted and mapped during the field survey.

Protected Species Walkover Survey

- 8.32 A separate site visit targeted at protected/notable species was undertaken in October 2016 by a suitably qualified ecologist⁵. During this survey all habitats considered to have the potential to support rare, protected or otherwise notable species of fauna were noted, and direct signs of such species were searched for and identified (e.g. Raptor pellets etc). The survey also incorporated a subjective, ground-based assessment of the potential of mature trees and any structures on-site to support roosting bats and an appraisal of the Site features for birds. A

⁴ Sharon Pilkington, Full member of the Chartered Institute of Ecology & Environmental Management (CIEEM)

⁵ David Rees, Full member of the Chartered Institute of Ecology & Environmental Management (CIEEM)

map and target notes were used to identify features of particular ecological interest. Where trees or other structures were assessed for bat potential, each was categorised according to the following criteria (Bat Conservation Trust 2016):

- Known or confirmed roost;
- High – A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a regular basis;
- Moderate – A structure or tree with one or more potential roost sites that could be used by bats but are unlikely to support a roost of high conservation status;
- Low – Trees of sufficient size and age to support potential roost features (PRFs) but with none seen the ground or features seen with only very limited roosting potential. Or, a structure with one or more potential roost sites that could be used by individual bats opportunistically;
- Negligible – Trees or structures with negligible habitat features, unlikely to be used by roosting bats.

National Vegetation Classification (NVC) Survey

8.33 Targeted NVC surveys were undertaken in August 2016. These surveys aimed to provide greater detail on the botanical composition of specific habitat types identified on-site in development areas. The NVC survey would classify and describe the vegetation communities present, relate them to relevant Local Biodiversity Action Plan (LBAP) or Priority Habitats described under Section 7 of the Environment Act, 2016. Each stand was sampled in accordance with standard NVC methodology (Rodwell 2006⁶) in which 5 quadrats were sampled for all stands except one (S9 swamp) where deep water made sampling multiple quadrats impractical. Quadrat sizes used for each stand type are shown below:

Quadrat sizes:

- 2m x 2m in grassland communities (Q1-5, 26-30, 36-40, 81-85) heaths (Q6-25, 31-35), mire (Q41-50), swamp (Q86-91) and other low vegetation (Q66-70, 76-80)
- 4m x 4m in tall herb, rush and fern vegetation (Q51-65, 71-75)

The NVC surveys were conducted in August within the accepted main flowering season (June-August).

⁶ Rodwell JS (2006). National Vegetation Classification: Users' Handbook. JNCC, Peterborough.

Data analysis

- 8.34 MATCH software was used to analyse quadrat data combined into floristic tables (as presented in Appendix 8.3 of ES Volume 2). This analysis produces a numerical correlation coefficient on a scale from 0 to 100 for each set of data. It indicates a 'goodness of fit' with published NVC communities and the higher the number, the more confidence there normally is in the result. As a general rule of thumb, vegetation with a coefficient of 40 or less (from 5 quadrat samples) has a weak affinity to the suggested NVC type and it is likely that it may not be possible to classify such vegetation within the NVC framework.
- 8.35 Reference to the published descriptions of NVC communities and sub-communities is always used to confirm a classification suggested by the data analysis.

Evaluation

- 8.36 Following analysis and interpretation of the field data, each vegetation community was subjectively appraised in respect of its relative intrinsic botanical value taking into account a number of criteria, including:
- The perceived nature conservation importance of the vegetation community e.g. uncommon or rare NVC communities, NERC Act Section 42 habitats;
 - Goodness of fit with 'type' NVC communities;
 - Presence of notable plants (Table 8.2) or higher/ lower plant species with restricted ecological amplitude;
 - Botanical diversity

Table 8.2: Criteria used to define notable plants

Broad category	Criterion	Reference
Distribution	Nationally Rare	Preston, Pearman and Dines (2002)
	Nationally Scarce	
Threat	Vascular Plant Red Data List	Cheffings and Farrell (2005)
Other	Legally protection	Schedule 8 of the Wildlife & Countryside Act 1981 (as amended).
	NERC Act Section 42 important species	www.jncc.defra.gov.uk

- 8.37 Botanical nomenclature follows Stace (2010)⁷ for vascular plants and Hill *et al* (2008) for mosses and liverworts.

Birds

- 8.38 Based on the survey completed in 2016, the open nature of much of the Site and the mosaic of grassland and areas of clear fell are likely to support a characteristic upland bird assemblage, including ground-nesting species such as Skylark, Meadow Pippit and possibly Nightjar; whilst the remaining conifer plantation could support such species as Common Crossbill and Red Kite. Based on the scale of the Proposed Development, further bird survey work was required to identify the broad species assemblage and to establish likely presence/absence of particular target species or those that would require particular mitigation measures (e.g. for ground nesting species).
- 8.39 A range of generic and species-specific survey methods are considered appropriate to the Site as described in Gilbert *et al.* (1998).⁸

⁷ Stace C.A. 2010. New Flora of the British Isles (3rd edition). Cambridge University Press.

⁸ Gilbert G. *et al.* 1998. Bird Monitoring Methods. RSPB, Sandy, Beds.

Upland breeding birds

- 8.40 The Survey Method described by Brown and Shepherd for censusing upland waders was undertaken with the necessary adaption to include small passerines (perching birds). The survey was conducted by a team of two experienced surveyors based on a walk-over within 100m of all areas of the Site – in practice this was achieved by an east/west division of the Site between the surveyors (Appendix 8.4 of ES Volume 2). Surveys commenced at dawn and involved a mixture of walked transects and periods of fixed point observation. A total of three breeding bird survey visits were completed; on the 21st April, 18th May and 21st June 2017. Survey visits commenced from dawn (this early start time was an adaptation for passerines).

Evening or dawn surveys for Nightjar

- 8.41 The clear fell habitat present over the majority of site was considered potentially suitable to support Nightjar, and records exist within 1km of site. At least two surveys for this species are required between June and July at either dusk or dawn to listen for ‘churring’ males. The Nightjar surveys on-site were conducted 12th June & 25th July 2017 by a team of 2 surveyors walking transect routes across the site with particular attention given to plantation edge features, commencing 20mins post sunset. Incidental observations of birds made during bat activity surveys were also noted.

Targeted surveys for Short-eared Owl, Hen Harrier & Merlin

- 8.42 Records of Hen Harrier and Merlin have been identified in adjacent habitat to site, within a 1.5km radius, along with suitable on-site breeding habitat for Short-eared Owl. In order to establish likely presence/absence of breeding, all potentially suitable heather/heath/tall grassland habitats were subject to a series of four visits on 25th April, 10th May, 27th June & 3rd July 2017. In practice, surveys for the three species were combined as part of the same site visit. Hen Harrier & Short-eared Owl surveys were conducted between April and late May, whilst two further surveys were conducted to satisfy the survey effort required to establish if Merlin were breeding on-site.

Targeted surveys for Red Kite (to include Goshawk and Honey Buzzard)

- 8.43 Red Kite was noted during the site walkover in 2016 and the plantation woodland at the centre of the Site represents potential (albeit limited) nesting habitat. Survey guidelines indicate that site visits every 3-4 days in March and April incorporating 1-2hrs of fixed point observation are

required in occupied territories. However, for the Site, given that potential nesting habitat is largely restricted to small isolated conifer plantation blocks remaining after the clear-felling, the likelihood of a nest being present and hence the risk of a development impact is limited. On this basis, a series of four visits were undertaken on the 13th & 27th April and 17th & 29th May 2017, each incorporated 2hrs of fixed observation from a suitable elevated vantage point. The vantage point surveys also aimed to identify any nesting behaviour by Honey Buzzard within the plantation, which have previously bred within the Afan Valley. Correspondence with experienced Honey Buzzard surveyor (Stephen Roberts) identified that the presence of Honey Buzzard is unlikely in the small remnant conifer plantation. However, the Red Kite surveyor was vigilant to their possible presence. Due to the small size of the remnant blocks of conifer plantation, a ground based visual inspection of the woodland for evidence of nesting/prey remains was conducted as part of each survey (1h). The combination of these surveys was also able to identify any nesting activity by Goshawk in the woodland.

Reptile surveys

- 8.44 The combination of Purple Moor Grass *Molinia caerulea* habitat, clear-fell and plantation edge habitats are likely to support common reptiles – particularly Common Lizard, which were identified during the 2002 ecological assessment (Pryce, 2002). In order to confirm likely presence/absence, a targeted survey within representative habitat areas was conducted. Coverage of the whole site would not be particularly cost effective on the basis that there are no barriers to reptile movement across the site – i.e. if reptiles are present in a certain habitat in one area, it could be assumed they were present in comparable habitat elsewhere.
- 8.45 Surveys were based on guidelines described by Froglife (1999) and involved deployment and checking of artificial reptile refugia (0.5m x 1.0m squares of roofing felt) across representative habitat areas. These refuges were checked on up to seven separate occasions under suitable weather conditions. Surveys were undertaken anytime between April and September.

Terrestrial Invertebrates

- 8.46 A survey of the terrestrial and flying freshwater invertebrates of the Site was undertaken during the summer of 2017. For invertebrate survey purposes the site was divided into 9 broad sampling areas based on the 2017 Phase 1 Habitats Survey. These are as shown on the Plan included in Appendix 8.5 of ES Volume 2 and comprised as follows:

1. Eastern grasslands: this comprises mainly lowland to semi-upland marshy grassland dominated extensively by purple moor-grass (*Molinia caerulea*), but with extensive bracken (*Pteridium aquilinum*) cover on the side-slopes and plateau, the canopy of which becomes increasingly dominant as the summer progresses. There are some remnants of felled conifer plantations locally, including short standing stumps and discarded brash piles. Small patches of dry heath dominated by ling heather (*Calluna vulgaris*) occur locally, together with small patches of dry acid grassland. Trees and shrubs, mainly broadleaved but including some conifers, occur towards the foot of the side-slopes. There are a number of well-used paths, some of which exhibit bare and compacted soil.
2. Minor ravine: this is a small incised ravine oriented approximately east-west, with significant sandstone exposures at its sides, and with talus scree and fallen boulders at its base. Heathland species such as ling heather and bilberry (*Vaccinium myrtillus*) are locally frequent, together with low and patchy bramble (*Rubus fruticosus* agg) and bracken cover. The ravine is well used as a play area and contains some plastic and other refuse. Bluebell (*Hyacinthoides non-scriptus*) is locally abundant under the bracken cover surrounding the ravine.
3. South-eastern area: this comprises a mosaic of mainly rather disturbed habitats, including areas of soil disturbance. Dry heathland and acid grassland patches occur, together with tall neutral grassland, species-poor marshy grassland, scrub, brambles and ruderal vegetation. Several well-used paths and vehicle manoeuvring areas are present, exposing areas of bare compacted earth and sandy/shale soils.
4. Lake: this comprises a large waterbody oriented approximately east-west, with shelved banks particularly to the east supporting mixed and moderately diverse emergent and marginal vegetation. The waterbody is partially surrounded by mainly willow (*Salix* spp) scrub, some of which extends out into the water, but elsewhere the banks are open semi-upland grassland. To the north-west of the lake there is mainly marshy grassland, together with an area of wet heathland (valley mire).
5. Plantation woodland: this comprises patches of standing plantation woodland, mainly conifer including larch, *Larix* sp. Much of this lies in a

shallow hollow and is surrounded by marshy grassland often dominated by purple moor-grass, together with areas of drier acid grassland and with some extensive patches of both dry and wet heathland. Bracken is abundant to the north and east. There are numerous standing trees, both conifer and broadleaved, as well as short to medium stumps and abundant discarded brash. The latter is often tangled with spreading bramble. Numerous gullies criss-cross the area, a number of which hold water in the early summer months. Several paths skirt around and through the woodland but are not so heavily used.

6. [Northern sidelands:](#) these are chiefly north-facing slopes which have been cleared of conifer plantations, and which now support abundant bracken and low bramble cover with small patches of remnant and developing acid grassland. There is abundant discarded brash. There are also some patches of species-poor neutral grassland, and there are broadleaved trees and shrubs mainly towards the foot of the slopes. There is limited public access onto these slopes.
7. [Pen y Castell:](#) this comprises a small peak rising to about 245m ASL, with exposed sandstone crags. The vegetation is mainly dry heathland and acid grassland, with bracken encroaching. There is a moderately well used footpath and bridleway around the foot of the peak.
8. [Western & central grasslands:](#) this is a very extensive area of open and somewhat exposed semi-upland grassland mainly dominated by purple moor-grass cover. This has developed mainly over cleared of conifer plantations. The former plantation panels have ridged, uneven ground which supports a close mosaic of drier acid grassland and wetter marshy grassland. There are some quite large patches of drier acid grasslands in places, as well as patches of heathland. Small gullies support open water in the early summer. There are one or two large forestry tracks into the area supporting extensive bare and compacted ground, and some low sand/shale cliffs in places, but otherwise there is limited public access.
9. [Stream:](#) a small stream runs down the north-western side-slope from the plateau in a moderately incised channel, flowing over a rocky substrate of sandstone and shale. The banks are of marshy grassland similar to the surrounding area, and there is very little emergent and marginal vegetation.

The stream flow becomes weaker in the late summer, with much of the upper watercourse drying out.

Survey Methods

8.47 The Site was surveyed on four occasions in 2017, once each in May, June, July and August. On each of the four survey occasions all parts of the Site were accessed and were subject to sweep-sampling using a 60cm diameter sweep-net. Where appropriate, invertebrates were also recorded by means of vegetation beating (into the upturned sweep-net), refugia-turning (e.g. of logs, large stones etc) and direct observation of invertebrates. The surveys took place on the following dates:

- 19th May 2017: Sunny, warm; about 40% cloud; slight breeze; 17°C
- 21st June 2017: Very hot and sunny; 10% cloud; still; 28°C
- 19th July 2017: Sunny, warm; about 50% cloud; slight breeze; 20°C
- 29th August 2017: Sunny, warm; about 40% cloud; slight breeze; 18°C

8.48 Samples were mainly collected dry, although some soft-bodied species were subsequently transferred to 70% ethanol solution to preserve their identification features.

8.49 Pan-traps and pitfall traps were also laid out on the Site on 21st -23rd June and 29th -31st August in the locations shown on the Plan included in Appendix 8.5 of ES Volume 2. At each of these locations, two 40cm square white plastic bowls were laid out on the ground, each containing about 5cm depth of water mixed with detergent and salt. Near to each bowl a series of three pitfall traps were also set out at approximately 50cm spacings. These comprised standard 7cm diameter plastic drinking cups set in flush to the ground surface and filled to approximately 5cm depth with water as used in the pan-traps. 10cm squares of 1cm² wire mesh was laid over each pitfall trap to deter accidental entry and drowning by small mammals. The pan and pitfall traps were left *in situ* for 48 hours on each survey occasion. Captured invertebrates were sieved out and preserved in 70% ethanol solution. All traps were removed from the Site after use.

8.50 A 15W actinic moth-trap was operated on two occasions on the Site in the two locations shown on the Plan included in Appendix 8.5 of ES Volume 2 to collect nocturnal moths and other flying invertebrates. This comprised an ALS Heath-type trap operated from a lithium battery and equipped with a dawn/dusk light-sensor switch. The trap was operated at location MV1

on the night of 21 June and at location MV2 on the night of 29th August 2017. All moths were retained alive and where possible were released after identification at the site on the following day. Some specimens were retained where these required close examination.

- 8.51 Invertebrates were mainly collected from the terrestrial *Mollusca*, *Crustacea*, *Arachnida* and *Insecta*. A wide range of taxonomic groups were retained from within these phyla, but there was inevitably some neglect of groups which are either taxonomically difficult or which lie outside of the expertise of the surveyor. Such groups included, for example, aphids, parasitic wasps, phorid flies and linyphiid spiders. However, the range of taxa which was collected was considered sufficiently broad to enable a confident assessment of the overall invertebrate value of the Site.
- 8.52 Invertebrate species were identified to species level wherever possible. Critical species were determined by dissection, and genital preparations were made where necessary.
- 8.53 The rarity of invertebrate species was assessed by reference to published and unpublished sources including the relevant national Red Data Books (RDBs), National Reviews and distribution atlases etc. The priority lists of the UK Biodiversity Action and its Welsh equivalent were also consulted, as were the lists set out in the published guidelines for the designation of Sites of Importance for Nature Conservation (SINCs) in South Wales (WBP 2008)⁹.

Bats

- 8.54 The majority of the Site is comprised of unenclosed upland and some remaining plantation blocks, which is not typically associated with providing suitable opportunities for roosting bats and only limited foraging opportunities. The habitats on-site were considered to be Low potential for foraging bats (based on Bat Conservation Trust 2016 Guidelines) and in correspondence with the NPTCBC ecologist, a series of three manual activity surveys supplemented by three separate automated detector surveys (Anabat SD2 and Anabat Express units) were completed as per the BCT 2016 guidelines¹⁰. According to the BCT 2016 Guidelines the low habitat suitability for bats requires a single survey per season (spring – April/May, summer – June/ July/ August, autumn – September/October), supplemented by

⁹ Wales Biodiversity Partnership (WBP 2008) Wildlife Sites Guidance Wales: A Guide to Develop Local Wildlife Systems in Wales. Wales Biodiversity Partnership/Welsh Assembly Government.

¹⁰ Bat Conservation Trust (2016) *Bat Surveys – Good Practice Guidelines*. Bat Conservation Trust, London.

five consecutive days of automated detector surveys per season. The automated detector surveys were conducted in May, July & September 2017 in accordance with the guidelines, with manual transect surveys conducted in the summer (June & August) and in Autumn (September). See Table 8.3 (below) for dates and weather conditions. Weather conditions were not a limitation to the survey. The manual transect survey involved a team of three surveyors undertaking separate walked transects across the site (Appendix 8.6 of ES Volume 2). These surveys commenced observation at sunset and ran for up to 120 minutes, using Pettersson D-240x, Bat box Duet and Peersonic ultrasound detectors and suitable recording equipment. All calls were recorded and identified on computer-based sonogram analysis software (Wavesurfer & BatClassify).

Table 8.3: Date and weather conditions of bat activity surveys undertaken

Date	Weather conditions (Temperature, cloud cover, wind and rainfall conditions)
27 th June 2017	16°C, 85 % cloud cover, light wind, no rain.
24 th August 2017	14°C, 20 % cloud cover, light wind, no rain
25 th September 2017	16°C, 25 % cloud cover, light wind, no rain.

- 8.55 The automated detector surveys undertaken on-site comprised the deployment of 2 Anabat SD2 and 4 Anabat Express detectors (6 total) at predetermined locations around the site in varying habitats (See Table 8.4 below and Appendix 8.7 of ES Volume 2 for habitat description and locations) to record bat activity. All calls were recorded and identified on computer-based sonogram analysis software (Analook).

Table 8.4: Automated Anabat dates & Location Summary

Anabat	Habitat	Consecutive Recording Dates
A1	Conifer Plantation within a woodland ride.	10 th – 15 th May 2017 27 th June – 3 rd July 2017 7 th -10 th September 2017
A2	Margin of small conifer plantation block.	10 th – 15 th May 2017 27 th June – 3 rd July 2017 7 th -10 th September 2017
A3	Open Molinia habitat centre of site.	10 th – 15 th May 2017 27 th June – 3 rd July 2017 7 th -10 th September 2017
A4	Clear fell exposed hilltop at southern most extent of site.	10 th – 15 th May 2017 27 th June – 3 rd July 2017 7 th -10 th September 2017
A5	Western most grassland.	10 th – 15 th May 2017 27 th June – 3 rd July 2017 7 th -10 th September 2017
A6	Standard Oak trees below Pen Y Castell (northern extent of site.	10 th – 15 th May 2017 27 th June – 3 rd July 2017 7 th -10 th September 2017

- 8.56 A single breeze block structure was located at the eastern extent of the Site and was located adjacent to a communications mast. The structure was considered to be of low bat roosting potential and was surrounded by sub optimal foraging habitat for bats. A single dusk emergence survey was conducted on the structure by two surveyors on the 20th June 2017. This survey followed BCT: Bat Survey Guidelines (2016) as far as practicable and commenced 15 minutes prior to sunset and ran for 90 minutes after sunset. Peersonic Full spectrum

detectors were used to record and identify bat calls. All calls were recorded and identified on computer-based sonogram analysis software (Wavesurfer & BatClassify).

Baseline Conditions

Desk Study

- 8.57 The ecological baseline was established by identifying the valued and sensitive ecological features within the boundary of the Site and in adjoining areas by a combination of desk study and field surveys as described in preceding sections. The desk study consultation via the South-East Wales Biodiversity Records Centre (SEWBRc) included the extent of the Site and surrounding 1.5km radius. The results of this desk study are illustrated in Appendix 8.1 of ES Volume 2. The field surveys were confined to the habitats within and immediately adjacent to the Site.
- 8.58 The following ecological features were identified as being present within or in close proximity to the survey area and to have the potential to be impacted by the Proposed Development. They were assigned value based on their status in policy, conservation status, distribution, trends, rarity, potential value and professional judgement/interpretation.

Statutory and non-statutory nature conservation designations and designated sites

- 8.59 The data provided by SEWBRc identified that the site is not covered by any statutory nature conservation designations and no such sites were present within the data search radius. However, a number of locally designated Sites of Importance for Nature Conservation (SINC) - were located directly alongside the red-line boundary with a small stream – also designated as a SINC located within the Site (See Appendix 8.1 of ES Volume 2). The small stream within the site is designated, along with all watercourses within NPT as a SINC since Rivers and Streams are listed as habitats of principal importance in Wales (Environment Wales Act, 2016), although no detailed description of the watercourse was included with the desk study records. The Afan Mineral Railway alongside the north-eastern boundary is designated on the basis of supporting a mixture of native woodland, brownfield habitat mosaic and Bracken communities. The Caerau North SINC, located directly to the south of the Site is designated for the mosaic of Marsh/Marshy grassland, fen, dry modified bog, wet modified bog, sphagnum blanket bog, semi-improved acid grassland, wet dwarf shrub heath, broad-leaved

semi-natural woodland and acid dry dwarf shrub heath habitat it supports. The SEWBRcC data search identified an area of Plantation on Ancient Woodland located at the northern extent of Site on the steep valley side (See Plan in Appendix 8.1 of ES Volume 2). The plantation that was planted on the Site had been felled and standard broadleaf woodland trees were the only remnant woodland.

Protected species records

- 8.60 Desk study data identified a number of protected and notable species within 1.5km of the Site with a variety of bird, mammal, amphibian, reptile and invertebrate species recorded. Notable bird species recorded included Goshawk *Accipiter gentilis*, Hen Harrier *Circus cyaneus*, Sky Lark *Alauda arvensis*, Honey Buzzard *Pernis apivorus*, Barn Owl *Tyto Alba*, Northern Lapwing *Vanellus vanellus*, Ring ouzel *Turdus torquatus*, Curlew *Numenius arquata*, Hobby *Falco subuteo*, Merlin *Falco Columbarius*, Golden Plover *Pluvialis apricaria* and Grasshopper Warbler *Locustella naevia*. Other notable species included Common Lizard *Zootoca vivipara*, Adder *Vipera berus*, Slow-worm *Anguis fragilis*, Otter *Lutra lutra*, Pipistrelle species *Pipistrellus sp.* and Brown Hare *Lepus europaeus*. Records from within the Proposed Development boundary included Lesser Redpoll *Acanthis cabaret*, Snipe *Gallinago gallinago* and Common Crossbill *Loxia curvirostra*. All of these species could be of relevance to the Site given the habitats/ecological features present and the open/unenclosed nature of the Site, allowing relatively easy access for mobile species (birds, bats etc.).

Previous report review

- 8.61 A review of the Environmental Statement (Amec, 2001) and Ecological Assessment (Pryce, 2002) conducted to support a previous planning application on the Site in 2001 & 2002 identified that the habitats on-site were dramatically different to those present currently on-site (2017). The reports identified the site being covered by dense coniferous woodland dominated by Sitka Spruce *Picea sitchensis*, Lodgepole Pine *Pinus contorta* and larch *Larix sp.*, with some large areas of wet acid grassland dominated by Purple Moor-grass *Molinia caerulea*. Other habitats identified include woodland rides, deciduous scrub, acid grassland/dwarf-shrub heath mosaics, standing open water, ditches and stands of bracken. Approximately 4 years ago (ca. 2012/2013) the majority of the woodland was felled as a result of the spread of *Phytophthora ramorum*.
- 8.62 The habitat surveys conducted in 2000 & 2002 identified two UK Biodiversity Action Plan (BAP) habitats which occur within the site area which included:

- Purple Moor-grass and Rush Pastures;
- Upland Heathland.

8.63 The surveys also identified Local BAP habitats additional to the UK BAP habitats listed above, which have been proposed by NPTCBC and Bridgend County Borough (BCB) Councils for action and which occur within the site area, including:

- Purple Moor-grass and Rush Pastures (Bridgend CBC & NPT CBC);
- Dwarf-shrub Heath (NPT CBC);
- Upland Heathland (Bridgend CBC).

8.64 A bird survey conducted between May and June 2002 identified a total of 43 species utilising the site, with 30 showing evidence of breeding on-site. The majority of these species were associated with large areas of conifer plantation that once dominated the Site and were only of limited relevance to the small stands of conifer plantation that remain on-site.

8.65 The 2001 invertebrate surveys identified that the species diversity was considered generally to be rather limited. However, a good selection of localised species were recorded from one or two key locations, with the report concluding that 'locally, the Site is likely to be of moderate importance for invertebrate communities' (Pryce, 2002).

Extended Phase 1 Habitat Survey

8.66 The distribution and extent of habitats within and adjacent to the Site with accompanying target notes and habitat mapping is contained in Appendix 8.2 of ES Volume 2.

8.67 Given the size of the survey area and the extent to which some adjacent habitats form transitions as they merge, the habitat descriptions below are relatively generic and may differ slightly in different parts of the Site. It should also be noted that the site is complex in areas and mapping boundaries are approximate. Great care was taken to classify habitats according to the JNCC definitions in the Handbook for Phase 1 Habitat Survey although some of the habitats did not closely match the JNCC descriptions and in such cases professional judgement was used to classify them. A new habitat category labelled 'marshy grassland and bracken mosaic' was created to describe some areas of the Site. The majority of the habitats and their ecological values will be discussed in the NVC section of this chapter (paragraphs 8.102 to 8.133), with the exception of the conifer plantation and standing water habitat. A

summary table listing the ecological importance of site habitat features is included as Table 8.10.

Coniferous plantation

- 8.68 Much of the survey area was evidently formerly wooded with extensive blocks of softwood forestry. Where these remain, they are variably dense to thin, and populated by mature trees typically 15-18m high. A number of exotic species are present and Scots Pine *Pinus sylvestris* and Sitka Spruce *Picea sitchensis* are particularly common. Less frequently, broad-leaved trees native to the area including Rowan *Sorbus aucuparia* and Pedunculate Oak *Quercus robur* have naturally colonised into the conifers.
- 8.69 Retained woodland is generally in poor condition and in some places large numbers of trees have died or are in a state of advanced decline, creating open areas where young conifers have started to grow. Bracken *Pteridium aquilinum*, Bramble *Rubus fruticosus* agg., Purple Moor-grass *Molinia caerulea* and Rosebay Willowherb *Chamerion angustifolium* are typical of the woodland floor in such places.
- 8.70 Elsewhere, remnant heath is found below the trees, typically characterised by mixtures of Bracken, Bilberry *Vaccinium myrtillus*, Heather *Calluna vulgaris*, Broad Buckler-fern *Dryopteris dilatata*, Wavy Hair-grass *Deschampsia flexuosa* and various large pleurocarpous mosses.
- 8.71 Due to the dead and degraded nature of the conifer plantation with limited botanical interest, and its small isolated nature within the Afan Valley, which has large predominant stands of conifer plantation, the feature was considered to be a feature of Negligible ecological importance.

Dense/continuous scrub

- 8.72 Dense scrub is relatively rare, with two small stands close to pools near Croeserw. A small stand of mature Grey Willow *Salix cinerea* subsp. *oleifolia* overhangs the pools and is home to numerous epiphytic mosses and liverworts including the locally uncommon liverwort *Colura calyptrifolia*. Nearby, a drier stand of scrub includes abundant Bramble, invading former open ground with associated Bracken, young Grey Willow and Himalayan Balsam *Impatiens glandulifera*.

Scattered scrub

- 8.73 Scattered and sparse scrub is occasional across the survey area where it is most characteristically associated with the edges of clear-felled plantation. It comprises mixtures of very common species including Bramble, Grey Willow, Gorse *Ulex europaeus* and Western Gorse *U. gallii*.

Scattered broad-leaved trees

- 8.74 Immature broad-leaved trees are quite common at the fringes of the survey area, typically growing at the foot of slopes near roads and buildings. Rowan and Pedunculate Oak are very common and presumably are self-sown, together with Ash *Fraxinus excelsior* which is scarcer. More mature trees, including Beech *Fagus sylvatica*, Sweet Chestnut *Castanea sativa* and many oaks are found on sheltered north-west facing slopes where they have been retained following clear-felling of surrounding forestry. Many of the trees have been damaged during the logging and others may have succumbed to the shock of sudden exposure. Consideration of bat potential associated with these trees is described in paragraph 8.149.

Scattered coniferous trees

- 8.75 Numerous young self-sown softwood species are present across the Site, including small saplings regenerating from seed in recently clear-felled ground. Larger individuals are associated with steep sheltered slopes below Pen y Castell and the fringes of the Site near Cymmer and Glyncymmer.

Recently-felled coniferous woodland

- 8.76 Although large areas of the Site previously supported coniferous plantation, regeneration of vegetation following clear-felling has generally produced habitats best described as marshy grassland, or a mosaic of Bracken and marshy grassland. However, one area below Pen y Castell has been very recently felled and considerable brash left on the ground, without clear progression to any other kind of habitat.

Semi-improved acid grassland

- 8.77 Dry acid grassland is mainly restricted to steep, north to north-east facing slopes near Cymmer. It grows over formerly forested ground, occurring also within a mosaic with dense Bracken and small areas of dry dwarf shrub heath.

- 8.78 It is characteristically species-poor and includes abundant Common Bent *Agrostis capillaris* and Wavy Hair-grass, together with various large ferns (Broad Buckler-fern, Male-fern *Dryopteris filix-mas* and Lady Fern *Athyrium filix-femina*), occasional Soft-rush and sprawling mosses (*Rhytidiadelphus squarrosus*, *Hypnum jutlandicum*, *Polytrichum juniperinum*). Where Wavy Hair-grass is constant and dominant and Bilberry and Heather are occasional associates it is likely to have affinities with the National Vegetation Classification (NVC) U2 *Deschampsia flexuosa* grassland community.
- 8.79 Typically, the acid grassland community that forms mosaics with other kinds of habitat over clear-felled ground is dominated by Common Bent and may not have close affinities with any particular NVC grassland type.

Semi-improved neutral grassland

- 8.80 There is little such grassland on the Site, except for one area of rough grassland likely to be referable to MG1 *Arrhenatherum elatius* grassland. Within the sward False Oat-grass *Arrhenatherum elatius* dominates alongside prominent Common Bent, Red Fescue *Festuca rubra*, Common Ragwort *Senecio jacobaea*, Meadow Vetchling *Lathyrus pratensis*, White Clover *Trifolium repens*, Rosebay Willowherb and Creeping Cinquefoil *Potentilla reptans*. It is unmanaged and is being invaded by Bramble, Grey Willow and Himalayan Balsam.

Marshy grassland

- 8.81 By far the most extensive kind of habitat on the Site, marshy grassland is a rather diffuse category which includes grassland that has developed following wholesale felling of conifers. It includes all grasslands where Purple Moor-grass and/or large rushes (Soft-rush and/or occasionally Compact Rush *Juncus conglomeratus*) attain at least 25% cover.
- 8.82 In practice, the range of marshy grassland across the survey area includes extensive areas dominated by Purple Moor-grass with few associates, as well as those where Soft-Rush is abundant among stumps and brash and often accompanied by such species as Common Bent, Wavy Hair-grass, Yorkshire-fog *Holcus lanatus*, Creeping Soft-grass *H. mollis*, Tormantil *Potentilla erecta*, Foxglove *Digitalis purpurea* and Western Gorse. In more sheltered places large patches of Himalayan Balsam are common within the sward. Self-sown young conifers and occasional small saplings are present in places. These communities may be hard to classify as they have developed through disturbance events, but some tracts may have

affinities with M25 *Molinia caerulea* – *Potentilla erecta* mire, M23 *Juncus effusus/acutiflorus*-*Galium palustre* rush-pasture and MG10 *Holcus lanatus*-*Juncus effusus* rush-pasture.

- 8.83 Marshy grassland frequently occurs in a mosaic with large patches of dense Bracken and this has been mapped as a separate habitat.

Poor semi-improved neutral grassland

- 8.84 Only one small area of such habitat was mapped, within a number of small walled former pastures below Pen y Castell. The sward is ungrazed and species-poor, dominated as it is by Yorkshire-fog within a matrix of Cock's-foot *Dactylis glomerata*. Other more infrequent associates include Soft-rush, Creeping Thistle *Cirsium arvense*, Common Bent, Common Sorrel *Rumex acetosa*, Himalayan Balsam, Male-fern and Lady Fern.

Dense bracken

- 8.85 Although Bracken is widespread all over the survey area it most frequently occurs in a mosaic with various forms of marshy grassland which has been mapped and classified as a separate habitat type. Typically, the stands are very species-poor, often comprising almost pure Bracken. Where Bramble occurs below the fronds, the community is likely to be referable to the NVC W25 *Pteridium aquilinum* – *Rubus fruticosus* underscrub community. Where Bluebell *Hyacinthoides non-scripta* grows below the Bracken as a vernal dominant, as it does in some stands with a northerly aspect, it may have strong affinities to the *Hyacinthoides non-scripta* sub-community (W25a) which is of greater conservation interest than most W25. Other pure stands may be referable to U20 *Pteridium aquilinum* – *Galium saxatile* community, a ubiquitous kind of vegetation derived from the invasion of Bracken into acid grassland.

Scattered bracken

- 8.86 Bracken is mostly found on the Site in large, densely rhizomatous patches but scattered Bracken is also found locally in marshy grassland developing over relatively recently cleared forestry.

Tall ruderal

- 8.87 A small low-lying area of tall ruderal vegetation is present below Pen y Castell and is dominated by Himalayan Balsam in a near-pure stand.

Dry dwarf shrub heath – acid

- 8.88 Small stands of dry dwarf shrub heath are distributed across the survey area, occurring especially in track cuttings and banks and around the rocky outcrop of Pen y Castell and the road bank below. All stands appear entirely unmanaged and support Heather in the building to degenerate stage of its life-cycle.
- 8.89 Heath characterised by abundant Heather, Bell Heather *Erica cinerea*, Western Gorse and Purple Moor-grass occupies exposed areas on the plateau and may be referable to H8 *Calluna vulgaris* – *Ulex gallii* heath or H10 *Calluna vulgaris* – *Erica cinerea* heath. Bilberry is prominent in stands of dry heath in cool and moist situations, such as those on north-facing slopes around Pen y Castell and the northern fringes of the survey area above Cymmer. Alongside Bilberry and Heather, Wavy Hair-grass, Sheep's-fescue *Festuca ovina*, Male-fern, Lady Fern and the robust mosses *Hypnum jutlandicum*, *Polytrichum commune*, *Pleurozium schreberi* and *Dicranum scoparium* are characteristic and this heath may be referable to the upland communities H12 *Calluna vulgaris* – *Vaccinium myrtillus* heath and/or H18 *Vaccinium myrtillus* – *Deschampsia flexuosa* heath. Fragments of Bilberry heath also occur widely across the site in retained and former plantation and within mosaics of dry acid grassland and Bracken.

Wet dwarf shrub heath

- 8.90 Wet dwarf shrub heath occurs in similar places to its dry counterpart and in some instances closely resembles it. Heather remains the most frequent ericoid but Cross-leaved Heath *Erica tetralix* replaces Bell Heather and Western Gorse and is common alongside Purple Moor-grass. Deer-grass *Trichophorum germanicum* is also very characteristic of the wet heath but is not always present in large numbers. Other associates include Tormentil and Sheep's Fescue. *Sphagnum* mosses are typically much less preferential than they should be in wet heath vegetation but *S. subnitens* is occasionally present. Some of the stands may be examples of M15 *Scirpus cespitosus* – *Erica tetralix* wet heath.

Valley mire

- 8.91 A small stand of mire vegetation occurs on deep, wet peat in a depression near two pools (Plate 8). Its most distinctive features are an abundance of Common Cotton-grass *Eriophorum angustifolium* and extensive carpets of *Sphagnum* (*S. fallax*, *S. subnitens*, *S. palustre* and *S. fimbriatum*). Other species include Cross-leaved Heath, Soft-rush, Purple Moor-grass, Velvet

Bent *Agrostis canina*, Bulbous Rush *Juncus bulbosus* and large cushions of *Aulacomnium palustre* and *Polytrichum commune*. It is not clear whether it is referable to any particular NVC community. At its edges it gives way to impoverished marshy grassland dominated by Purple Moor-grass.

Inundation vegetation

- 8.92 This habitat occupies low-lying ground by a pool where it is likely to be intermittently inundated when water levels are high. Prominent species in this vegetation, which gives way on slightly higher ground to marshy grassland, include Common Spike-rush *Eleocharis palustris*, Sharp-flowered Rush *Juncus acutiflorus*, Slender Rush *J. tenuis*, Soft-rush and Water-pepper *Persicaria hydropiper*. A few clumps of the variegated garden cultivar of Reed Canary-grass *Phalaris arundinacea* 'Picta' are also established here.

Standing water

- 8.93 Two relatively deep pools lie in a depression where they are likely to intersect the water table and receive run-off from higher ground nearby. As a result, water levels appear likely to fluctuate greatly. Both pools are of an unknown depth and are fringed by tussocky Purple Moor-grass-dominated marshy grassland and Grey Willow scrub. Water quality appears good and the pools support populations of plants and mosses indicative of acid, nutrient-poor water: Bog Pondweed *Potamogeton polygonifolius*, Bottle Sedge *Carex rostrata*, Sphagnum denticulatum and Bulbous Rush. Although this habitat supports no significant botanical interest it is likely to function as water source and habitat resource for a variety of mammal, bird and invertebrate species and such is considered to be a feature of Local ecological importance.

Running water

- 8.94 A single small stream rises on the Site and flows downhill in a north-westerly direction through formerly forested ground. It is little more than half a metre wide and flows in a very shallow gully obscured by overhanging Soft-rush, Purple Moor-grass and Yorkshire-fog. The water appears clean and unpolluted and is shallow, in a stony bed with few physical features. It supports negligible populations of aquatic vascular plants in the channel but certain common bryophytes are frequent, especially *Pellia epiphylla* and *Scapania undulata*. All watercourses within NPT are designated as SINC's, due to Rivers and Streams being listed as habitats of

principal importance in Wales (Environment Wales Act, 2016), and as such the feature is considered to be of County ecological importance.

Inland cliff – acid/neutral

- 8.95 Prominent sandstone exposures several metres high feature around the top of Pen y Castell. These face mainly to the north, the east and the west and the near-horizontally bedded rocks have numerous fractures and ledges, providing sheltered conditions for communities of ferns, mosses and liverworts. Dry dwarf shrub heath vegetation occurs around and over the exposures. The inland cliff rock and its associated botanical communities were associated to meet SINC criteria and as such are of County ecological importance.

Quarry

- 8.96 Excavated ground is present in a number of places around the survey area. It is unclear which kind of rock was quarried although the dominant bedrock in the area is hard sandstone. One is of recent origin (near the communications mast) but most of the others are long-disused small strip-quarries and pits that now support structurally mixed vegetation (dry heath, scrub, acid grassland and Bracken) around small outcrops of exposed rock and associated heaps of talus and spoil.

Spoil

- 8.97 Two small areas of spoil lie just below Pen y Castell and appear to have been derived from the demolition of small stone-built agricultural structures nearby. The spoil consists of large flakes and fragments of sandstone flattened to a low mound. It supports populations of common ferns (Male-fern, Maidenhair Spleenwort *Asplenium trichomanes* and Lady Fern) and mosses (*Pseudoscleropodium purum*, *Hypnum cupressiforme* and *Dicranum scoparium*). Common calcicolous¹¹ species have also colonised material derived from broken concrete.

Wall

- 8.98 A small former field system south of Pen y Castell is characterised by intact and partially defunct field drystone walls, constructed from the local sandstone. Similarly, stone retaining walls are also built into raised ground nearby. Where these walls have a cool and sheltered northerly aspect, they are home to strong communities of bryophytes and ferns, anchored in

¹¹ Species which thrive in lime rich soil

crevices between the stones. Characteristic species include Male-fern, Lady Fern, *Rhytidiadelphus squarrosus*, *Diplophyllum albicans* and *Dicranum scoparium*. More exposed wall tops support heathland species such as Heather, Bilberry, Wavy Hair-grass, Sheep's-fescue and Heath Bedstraw *Galium saxatile*.

Bare ground

- 8.99 Bare ground is present around the site in the main tracks, which comprise mixtures of crushed rock, soil and locally, forestry brash. Many of the secondary tracks have been disused since clearance and have been colonised by species of nearby marshy grassland and so are mapped as that habitat.

Invasive Weeds

- 8.100 The Phase 1 survey identified substantial populations of Himalayan Balsam *Impatiens glandulifera* within the eastern extent of site. Himalayan Balsam is a highly invasive species and under Schedule 9, Section 14 of the Wildlife and Countryside Act 1981 (as amended) it is an offence "to plant or otherwise encourage" their growth. This could include cutting the plant or roots and disturbing surrounding soil if not correctly managed. Other invasive species at lower frequency within the site included Japanese Knotweed *Fallopia japonica* and Montbretia (Target Notes 28, 30 – see Appendix 8.2 of ES Volume 2).

Important or Notable habitats

- 8.101 In the context of this report, *important or notable habitats* are considered to be those which are of a sustainable size and which meet any of the following criteria:
- Habitats which have a high intrinsic ecological value i.e. they support a diverse range of vascular plant and/or faunal species;
 - Mature or semi-natural habitats in built-up areas;
 - Any UK BAP Priority Habitats or Habitats of Principal Importance in Wales (Section 7 Priority Habitats).
 - Local BAP Habitats considered to have significant extent and/or ecological interest

National Vegetation Classification Survey

- 8.102 Some of the vegetation types on the Site could be classified within the NVC (see floristic tables and quadrat data in Appendix 8.3 of ES Volume 2) but much of the survey area contained vegetation whose floristics and structure had been strongly influenced by former afforestation. The associated figures (Appendix 8.3 of ES Volume 2) show the distribution of all plant communities on the Site.

Environment Act Wales Section 7 Priority Habitats

- 8.103 Four different vegetation communities meeting criteria (as defined by JNCC) for Environment Act Wales Section 7 Priority Habitats of Principal Importance for the purpose of maintaining and enhancing biodiversity in Wales were classified in the course of the assessment.

Upland Heathland

- 8.104 Dry dwarf shrub heath conforming to H8 *Calluna vulgaris* – *Ulex gallii* heath was present in patches at the eastern side of the Site. It was best developed close to the Welsh Water compound there, where it was represented by the H8a Species-poor sub-community. This kind of heath (Q6-10) was characterised by constant and prominent Heather *Calluna vulgaris*, Bell Heather *Erica cinerea* and Western Gorse *Ulex gallii* in stands that were typically building to mature and under 30cm high. Other preferentials included Purple Moor-grass *Molinia caerulea* (not a characteristic member of the type community) and Tormentil *Potentilla erecta*. In bare patches between the dwarf shrubs a range of small lichens and bryophytes were frequent.
- 8.105 Stands of the community with a cooler aspect or more exposed situation (Q11-15) were classified as the W8e *Vaccinium myrtillus* sub-community where Bilberry *Vaccinium myrtillus* replaced much of the Bell Heather and Wavy Hair-grass *Deschampsia flexuosa* was abundant.
- 8.106 H8 heath is essentially a community of freely-draining acid soils in warm oceanic parts of the British Isles and is most frequent in coastal districts of SW England and Wales.
- 8.107 Other tracts of dry heath were associated with steep, north-facing slopes above Cymmer (Q21-25 and 36-40) and around the rocky knoll of Pen-y-Castell where heath occurred in a mosaic with ill-defined vegetation characterised by Bracken *Pteridium aquilinum* and Soft-rush *Juncus effusus*. This H12a *Calluna vulgaris* - *Vaccinium myrtillus* heath; *Calluna vulgaris* sub-

community was typically defined by a co-abundance of Heather, Bilberry and Wavy Hair-grass. However, a degenerate stand under and close to retained conifers above the school had lost much of its Heather and Bilberry was particularly prominent. All stands were rich in bryophytes, supporting common species typical of cool and sheltered situations. Around Pen-y-Castell (Q31-35) disturbance from off-road motorbikes and the possible effects of wildfires had promoted a grassier form of the sub-community where Sheep's-fescue *Festuca ovina* and Sweet Vernal-grass *Anthoxanthum odoratum* were common.

- 8.108 H12 heath is the commonest kind of heather-dominated vegetation occurring in the sub-montane zone (between 200 and 600m) in cooler northern and western parts of the British Isles (Averis et al 2004)¹². The H12a sub-community is the 'typical' form, with no distinguishing species other than those that define the community itself. In contrast to H8 heath it is confined to districts (or particular slopes) where the winter temperatures are low, favouring the prominence of Bilberry over more warmth-demanding dwarf shrubs such as Bell Heather and Western Gorse.
- 8.109 Across the Site's plateau, small stands of building to mature-stage wet heath were also present where shallow peat soils occurred, especially on gently dipping north-facing slopes and on tracksides (Q16-20). All of these had the floristics of M15d *Trichophorum germanicum* - *Erica tetralix* wet heath (*Vaccinium myrtillus* sub-community). These were rendered visually conspicuous (in August) by the presence of abundant Heather, Cross-leaved Heath *Erica tetralix* and locally, Deer-grass *Trichophorum germanicum*. Other characteristic species included Green-ribbed Sedge *Carex binervis*, Purple Moor-grass, Bilberry, Brown Bent *Agrostis vinealis* and Wavy Hair-grass.
- 8.110 M15 wet heath develops over oligotrophic, wet or seasonally waterlogged peat or peaty mineral soils within tracts of blanket mire, on hillsides and over moraines. It is particularly associated with thin or better drained areas of ombrogenous¹³ peat (Averis et al 2004). It can also extend onto deep peat where drainage, grazing, burning or other disturbance has damaged or modified the original mire vegetation. It is a widespread community of low to moderate altitudes in the north and west of Britain. M15d is the driest and grassiest of the four

¹² Averis A.M, Averis A.B.G, Birks H.J.B., Horsfield D., Thompson D.B.A. and Yeo M.J.M. 2004. An Illustrated Guide to British Upland Vegetation. Joint Nature Conservation Committee, Peterborough.

¹³ A mire that receives most of its water directly from rainfall

sub-communities and stands can be characterised by unusually high cover of Purple Moor-grass (Rodwell 1991)¹⁴.

Upland Flushes, Fens and Swamps

- 8.111 One small stand of vegetation near the pools was classified as M6c *Carex echinata* – *Sphagnum fallax/denticulatum* mire; *Juncus effusus* sub-community. It occurred on wet peaty ground in a depression (Q46-50) and was visually distinctive due to the prominence of Common Cotton-grass *Eriophorum angustifolium* and extensive cover of *Sphagnum* species (especially *S. fallax*). Other constant or preferential species included Purple Moor-grass, Soft-rush, Velvet Bent *Agrostis canina*, Cross-leaved Heath and large hummocks of *Polytrichum commune* and *Aulacomnium palustre*.
- 8.112 The M6 mire is the most widespread soligenous mire¹⁵ in the British uplands. It usually occurs in wet hollows, at seepage lines, on flushed slopes, in shallow gullies and along stream margins, all places with slowly moving acid groundwater. It is a sub-montane community, found in Wales up to 500 metres altitude or more. It nearly always lies over acid and moderately nutrient-rich deep, wet and peaty soils and can be differentiated from the very similar looking M23 *Juncus-Galium* rush-pasture by extensive cover of *Sphagnum* mosses. The four sub-communities of M6 are defined by the sedge or rush species that dominate the sward. In M6c Soft-rush is characteristically prominent.

Other vegetation

- 8.113 None of the other kinds of vegetation met the definitions of any Section 7 Priority Habitats of Principal Importance in Wales. Because much of the Site has been cleared of conifers in recent years, vegetation left in these areas appears to be recovering and developing and so could not be classified within the NVC framework. Each broad category of vegetation is briefly described below.

Acid grassland

- 8.114 The U2a *Deschampsia flexuosa* grassland; *Festuca ovina* – *Agrostis capillaris* sub-community occurred on a very steep north-facing slope where stumps indicated cleared conifer plantation

¹⁴ Rodwell J.S. (Ed.) 1991. British Plant Communities Volume 4: Aquatic communities, swamps and tall-herb fens. Cambridge University Press.

¹⁵ Irrigated by groundwater moving down a slope

(Q81-85). It was very species-poor and dominated by Wavy Hair-grass, Common Bent *Agrostis capillaris* and Heath Bedstraw *Galium saxatile*. Although some stands of U2 grassland are included within the Section 7 Important Habitat of Lowland Acid Grassland, this one would not qualify. Maddock (2008)¹⁶ states that: (the) “definition of lowland acid grassland is problematical but here it is defined as both enclosed and unenclosed acid grassland throughout the UK lowlands (normally below c300m). It covers all acid grassland managed in functional enclosures; swards in old and non-functional enclosures in the upland fringes, which are managed as free-range rough grazing in association with unenclosed tracts of upland, are excluded.”

Neutral grassland

- 8.115 A small area of relatively herb-rich but unmanaged MG1e *Arrhenatherum elatius* grassland: *Centaurea nigra* sub-community (Q1-5) occurred on a bank near the Welsh Water compound. This coarsely-structured, scrubby sward was characterised by constant False Oat-grass *Arrhenatherum elatius*, Cock’s-foot *Dactylis glomerata*, Yorkshire-fog *Holcus lanatus*, Ribwort Plantain *Plantago lanceolata* and Common Bird’s-foot-trefoil *Lotus corniculatus*. A few calcicoles such as Mouse-ear Hawkweed *Pilosella officinarum* and Glaucous Sedge *Carex flacca* also grew at the edge of the community where imported limestone chippings had been laid down for a vehicular track.
- 8.116 Other neutral grassland in a derelict walled pasture below Pen-y-Castell appeared to be a remnant of improved grazing pasture and was very species-poor. This sward (Q26-30) could not be classified as an NVC type and has been mapped simply as *Holcus – Agrostis - Rumex* grassland. The sward was dense and dominated by Yorkshire-fog together with lesser quantities of Common Bent, Sweet Vernal-grass, Red Fescue *Festuca rubra* and Common Sorrel *Rumex acetosa*.

Purple Moor-grass vegetation

- 8.117 An extensive tract of Purple Moor-grass dominated vegetation (mapped as Dense *Molinia*) occupied much of the eastern plateau (Q66-70) and elsewhere. This type of vegetation could not be placed satisfactorily in any NVC community although the presence of occasional Heather indicated that it may have been derived from a formerly extensive and now-gone tract

¹⁶ Maddock A. (Ed). 2008. UK Biodiversity Action Plan: Priority Habitat Descriptions (revised October 2011). <http://jncc.defra.gov.uk/page-5706>

of upland dry heath. High cover of Purple Moor-grass left little room for other associates, although *Tormentil Potentilla erecta* and the liverwort *Calypogeia fissa* were also widespread. In parts of the Site where conifers had been clear-felled the community also occurred in a complex mosaic with other vegetation types, including Bracken *Pteridium aquilinum*, Bramble *Rubus fruticosus* agg. and rushes *Juncus* spp.

Flush

- 8.118 Near the pools, flushed ground supported a different kind of Purple Moor-grass dominated vegetation with floristics matching the M25 *Molinia caerulea* – *Potentilla erecta* mire; *Erica tetralix* sub-community. This vegetation (Q41-45) occurred over flushed peaty ground and was defined by co-dominant Purple Moor-grass and Soft-rush. It differed significantly from other superficially similar vegetation elsewhere on the Site in supporting strong populations of *Sphagnum subnitens* and several other species of *Sphagnum*. It also supported sparse plants of Cross-leaved Heath but otherwise was very species-poor.
- 8.119 The M25 mire occurs mostly in the cool and wet western lowlands where it often marks out seepage zones and flushes or extends onto the fringes of ombrogenous bogs. Only species-rich forms of M25 are included within the Purple Moor-grass and Rush Pastures Section 7 habitat.

Bracken

- 8.120 Dense stands of vegetation either dominated or co-dominated by Bracken occurred all over the site as well as in mosaics with other kinds of vegetation but targeted sampling (Q71-75) could not place many stands within NVC communities. Extensive stands around the margins of the eastern plateau (Q61-65) were relatively species poor but supported constant Bracken, Bramble, Indian Balsam *Impatiens glandulifera* and Rosebay Willowherb *Chamerion angustifolium* in a dense matrix. These stands were considered to be a moderately good fit with the OV27 *Chamerion angustifolium* community. OV27 is a widespread 'weedy' community of damp, fertile soils on disturbed, often burned ground. Clear-felling woodland opens up the ground to high light levels and soil disturbance promotes nutrient release from humus (Rodwell 2000)¹⁷.

¹⁷ Rodwell J.S. (Ed.) 2000. British Plant Communities Volume 5: Maritime communities and vegetation of open habitats. Cambridge University Press.

- 8.121 At least one stand of Bracken on the northern slopes was characterised by co-dominance of Bramble and the presence of Bluebell Hyacinthoides non-scripta below the fronds of Bracken (Q51-55). It was classified as W25 Pteridium aquilinum – Rubus fruticosus underscrub, a very widespread community of woodland rides and edges on free-draining acid soils. It is possible that other stands of W25 occur on the Site within mosaics of different vegetation types.

Swamp

- 8.122 Two very small stands of swamp vegetation were found at the edge of one of the permanent pools. Neither was large enough to qualify as Upland Flushes, Fens and Swamps Section 42 habitat. The draw-down zone at one end supported an example of S19 *Eleocharis palustris* swamp (Q86-90) on damp mud. Apart from Common Spike-rush *Eleocharis palustris*, which dominated the stand, only Creeping Bent *Agrostis stolonifera*, Water-purslane *Lythrum portula*, Water-pepper *Persicaria hydropiper* and an unidentified species of water-starwort¹⁸ were frequent associates. This area clearly experiences fluctuating water levels.
- 8.123 S19 is a common community of standing or running water up to 50cm deep and it occurs at the edges of lakes, pools and along watercourses (Rodwell 1995)¹⁹.
- 8.124 In deeper water in the same pool a small stand of the distinctive-looking S9 *Carex rostrata* swamp was present (Q91). Apart from Bottle Sedge *Carex rostrata*, only Bog Pondweed *Potamogeton polygonifolius* and Sphagnum denticulatum were present. S9 is common mainly in upland standing water with low to medium water nutrients and peat or other organic substrates.

Vegetation mosaics

- 8.125 Large tracts of the western hill plateau were characterised by poorly-defined secondary vegetation where coniferous woodlands had been felled in the past, leaving tree stumps and brash. Generally, this vegetation was very heterogeneous and could not be classified within the NVC framework. Much of it supported mosaics of vegetation defined by the prominence of Bracken, Purple Moor-grass, Soft-rush and/or Common Bent *Agrostis capillaris*. Within this there were also patches of dense Bramble and Indian Balsam. Occasionally, discrete heathy patches occurred, with sparse Bilberry, Heather or Bell Heather but these areas were not large

¹⁸ No fruits were present to enable determination to species

¹⁹ Rodwell J.S. (Ed.) 1991. British Plant Communities Volume 4: Aquatic communities, swamps and tall-herb fens. Cambridge University Press.

or well developed enough to define as heathland. Quadrats 76-80 were sampled within a typical area of this *Agrostis – Juncus – Molinia* vegetation. Where Bracken was also widespread the community was mapped as *Agrostis – Juncus – Molinia – Pteridium* vegetation or where there was less Purple Moor-grass but more Bramble and Bracken, the *Agrostis – Pteridium – Rubus* type. All of these communities/associations were very species-poor.

- 8.126 A damper kind of secondary vegetation occurred on the clear-felled slope west of Pen-y-Castell and was mapped as an M23 - *Agrostis – Pteridium* mosaic. In this association Soft-rush was especially abundant and denser patches of it occurred with a range of other damp-loving species including Greater Bird's-foot-trefoil *Lotus pedunculatus*, Hoary Willowherb *Epilobium parviflorum*, seedlings of Grey Willow *Salix cinerea subsp. oleifolia* and large numbers of Indian Balsam plants. Sampling of rush-dominated elements of this mosaic (Q56-60) confirmed a reasonable fit with M23 *Juncus effusus/ acutiflorus-Galium palustre* rush-pasture.
- 8.127 M23 rush-pasture is a very common and widespread western community characteristic of acid to neutral wet peaty mineral soils or stagnogleys on gently sloping ground. It is also very characteristic of ill-drained and improved or reverted pasture.

Notable Species

- 8.128 Appendix 8.3 of ES Volume 2 lists all species recorded in the course of the survey within quadrats. No species of conservation importance i.e. meeting any of the criteria set out in Table 8.2 were seen anywhere in the survey area.

Evaluation of NVC Habitats

- 8.129 Given the site's history of extensive afforestation it is not surprising that long-term, undisturbed kinds of vegetation were found to be scarce. The majority of vegetation within the Site is developing across recently clear-felled areas and is of negligible to low intrinsic botanical value.
- 8.130 Other parts of the hill in close proximity to Croeserw support degraded forms of vegetation that could have been the result of the impact of long-term major disturbance events, such as wildfire on more semi-natural upland edge vegetation.

- 8.131 The steep slopes and rocky outcrops (especially Pen-y-Castell) at the northern and eastern edges of the Site do support relatively intact examples of dry heath which are rare elsewhere. Wet heath is also present patchily across the plateau in low-lying areas where thin peat has accumulated, often on tracksides or shallow slopes. Both of these kinds of vegetation are of moderate to high botanical value.
- 8.132 The two small pools in the east are a locus for small areas of other moderately interesting vegetation associated with the pool margins and seepage lines and wet low-lying peaty ground nearby.
- 8.133 Tables 8.5 and 8.6 summarise the evaluation of intrinsic botanical value of all of the recorded NVC sub-communities and other vegetation found in the survey area as shown in the associated figures. Valuations are relative to the Site and vegetation of the local area. A summary of the ecological importance of the surveyed habitats – based on the criteria described in the Legislation, Planning Policy and Guidance section of this chapter – is presented in Table 8.5.

Table 8.5: Summary of intrinsic botanical value of vegetation qualifying as Section 7 Priority Habitats

NVC type	Relative value	Rationale
H8 dry heath (both sub-communities)	Moderate to high	Qualifying NVC type in the Section 7 Important Habitat: Upland Heathland; Good to reasonable examples present; Both sub-communities have very restricted extent within the survey area; Degradation of some stands through neglect/scrub invasion and or recent wildfire.
H12a dry heath	Moderate to high	Qualifying NVC type in the Section 7 Important Habitat: Upland Heathland; Good to poor examples present; Restricted to north-facing slopes and Pen-y-Castell Degradation of some stands through neglect/scrub invasion.

H12a heath – <i>Pteridium</i> mosaic	Moderate	H12 is qualifying NVC type in the Section 7 Important Habitat: Upland Heathland; Only on top/side of Pen-y-Castell; Good example of H12 on steep northern and western slopes but heath is degraded by trampling and disturbance from off-road motorbikes on southern side.
M15d wet heath	Moderate to high	Qualifying NVC type in the UKBAP Priority Habitat: Upland Heathland; Numerous small examples present; Most examples are in good condition.
M6c mire	Moderate to high	Qualifying NVC type in the UKBAP Priority Habitat: Upland Flushes, Fens and Swamps; Only one small example present in survey area, in good condition; <i>Sphagnum</i> -rich, supports plant species rare elsewhere on-site.

Table 8.6: Summary of intrinsic botanical value of other vegetation types

Vegetation type	Relative value	Rationale
M23- Agrostis- <i>Pteridium</i> mosaic	Low to moderate	Variable vegetation that is moderately species-rich in places; Indian Balsam very common.
M25a mire	Moderate	Species-poor vegetation dominated by Purple Moor-grass; Limited to one seepage line/flush.
MG1e neutral grassland	Low	Relatively herb-rich example of ubiquitous grassland type; Degraded by neglect and scrub invasion.
OV27 open vegetation	Negligible	Extensive tract of species-poor vegetation; Example of widespread 'weedy' NVC community; Degraded by invasion of Bramble and frequent Indian Balsam.

S9 swamp	Low-moderate	Restricted kind of vegetation; Very small example.
S19 swamp	Low-moderate	Restricted kind of vegetation; Very small example; Degraded by introduction of horticultural plants e.g. <i>Phalaris arundinacea</i> 'Picta'.
W25 underscrub	Low	Exact extent uncertain; Species-poor vegetation probably derived from burning of heathland; Supports population of Bluebell.
U2a acid grassland	Low	Wholly grass-dominated; Secondary sward over clear-felled ground.
U2- <i>Pteridium</i> mosaic	Negligible-Low	Secondary sward over clear-felled ground; Invasion by Bracken.
Dense Molinia	Negligible	Purple Moor-grass dominates to the point of excluding nearly all other plants; Probably derived from burning of upland heath.
Dense Pteridium	Negligible	Bracken dominates to the point of excluding nearly all other plants; Possibly derived from burning of upland heath.
Agrostis-Juncus	Negligible	Ill-defined, species-poor vegetation; Secondary sward over clear-felled ground.
<i>Agrostis-Holcus-Rumex</i> neutral grassland	Negligible	Grass-dominated species-poor vegetation; Probably derived from improved pasture.
Agrostis-Juncus-Molinia	Negligible	Ill-defined, species-poor vegetation; Secondary sward over clear-felled ground.
Agrostis-Juncus-Molinia-Pteridium	Negligible	Ill-defined, species-poor vegetation; Secondary sward over clear-felled ground.

Agrostis- Pteridium- Rubus	Negligible	Ill-defined, species-poor vegetation; Secondary sward over clear-felled ground.
Impatiens- Molinia- Juncus- Chamerion	Negligible	Ill-defined, species-poor vegetation; Supports numerous Indian Balsam plants.
Unclassifiable scrub	Negligible	Small stand of Grey Willow scrub; Species-poor.

Bird Surveys

Upland Breeding Bird

8.134 Desk study information received from SEWBRc detailed records of a number of bird species within 1.5km of the Site with twelve Wildlife and Countryside Act 1981 (as amended) Schedule 1 species (Common Crossbill, Honey Buzzard, Goshawk, Fieldfare, Redwing, Wryneck, Hobby, Osprey, Barn Owl, Red Kite, Merlin and Peregrine). The habitats on the Site and migratory nature of these birds meant the majority of these species were of little relevance to the candidate site. Nightjar & Golden Plover were also identified during the data search and are migratory Annex I EC Birds Directive 1979. Large number of species listed as of conservation concern i.e. UKBAP, RSPB -red/amber status (Kestrel, Cuckoo, Skylark, Lapwing, Ring Ouzel). See Appendix 8.8 of ES Volume 2 for full species details.

8.135 Breeding bird surveys undertaken in 2017 (21st April, 18th May and 21st June 2017) and incidental records identified in alternative surveys on the Site recorded a total of 42 species on-site. A full species list can be found in Appendix 8.8 of ES Volume 2.

Target Bird Surveys

8.136 Species specific breeding bird surveys were undertaken for a number of notable and important bird species – Nightjar, Merlin, Short-eared Owl, Hen Harrier and Red Kite. These surveys were also supplemented by incidental records obtained during other site visits.

Merlin, Short-eared Owl & Hen Harrier

- 8.137 The surveys for Merlin, Short-eared Owl & Hen Harrier identified no evidence of breeding on-site, and no records of incidental foraging/hunting behaviour was recorded. The Site provided suitable foraging habitat but limited suitable areas that could be utilised by nesting birds. The disturbance from dog walkers and off-road bikes across the majority of site also limited its suitability. The site was considered to be of negligible ecological importance for these species.

Red Kite (to include Goshawk & Honey Buzzard)

- 8.138 The desk study identified nesting Red Kite within 1km radius of the Site. However, no evidence of breeding by any of the species was identified on the Site. Incidental records of foraging behaviour by Red Kite were noted over and adjacent to site during protected species survey visits. No observations of Goshawk or Honey Buzzard were recorded on the Site. The site was considered to be of negligible ecological importance for these species.

Nightjar

- 8.139 The Nightjar surveys conducted on the Site identified multiple 'churring' and displaying males (flying around, wing-clapping & calling) along with female birds during both surveys (12th June & 25th July 2017), along with incidental observations recorded during the on-site bat surveys. The majority of the activity was associated with the first survey conducted in June 2017 when at least 8 individual male birds were separately distinguishable from their 'churring' (Appendix 8.9 of ES Volume 2). The Nightjar activity and territories on the Site were quite difficult to pinpoint/estimate due to the birds actively displaying to females and ranging across site in territorial disputes.
- 8.140 The second survey was conducted at the latter part of the Nightjar survey period (25th July 2017) and territorial activity was noticeably reduced. Two separately distinguishable 'churring' males were identified during the survey (Appendix 8.9 of ES Volume 2). These results suggest that a maximum number of 8 pairs of Nightjar currently breed on-site. Nightjar are Annex I EC Birds Directive 1979 and are on the Amber list of Birds of Conservation Concern in Wales (2016). The 2004 Status and Distribution of Nightjar in the UK²⁰ estimated the population to be 280 breeding pairs in Wales. However, this is likely to have increased in the subsequent years due to large expanses of conifer plantation being felled due to the spread of

²⁰ Conway, G., Wotton, S., Henderson, I., Langston, R., Drewitt, A., Currie, F. (2004) Status and distribution of European Nightjars *Caprimulgus europaeus* in the UK in 2004. BTO 2007.

Phytophthora ramorum, increasing viable breeding habitat. The estimation of 8 breeding pairs on-site is greater than 1% of the estimated national breeding population (2004 figures); and as such the Site was considered to represent a feature of ecological importance at the National scale.

Upland Breeding Birds

- 8.141 The European Ornithological Atlas Committee (EOAC) criteria (Appendix 8.10 of ES Volume 2) for categorising breeding status has been used to attempt to identify species that are probably breeding, possibly breeding or confirmed as breeding within or in close proximity to the Site boundary.
- 8.142 Using these criteria, three species were confirmed breeding on-site including Meadow Pipit, Stonechat and Carrion Crow (see Appendix 8.10 of ES Volume 2 for locations). A further 14 species probably breed and 22 species possibly bred within or near to the Site boundary. The remaining 6 species (of the 45 recorded) are unlikely to have bred on-site due to a lack of suitable nesting habitat. Appendix 8.10 uses standard abbreviations to indicate the location of a particular species sighting.
- 8.143 A number of protected or notable bird species were recorded on the Site during the 2017 survey season. Three Wildlife & Countryside Act 1981 (as amended) Schedule 1 species, Crossbill, Peregrine & Red Kite, were observed feeding/foraging on or over the Site. Crossbill was the only species considered to be probably breeding on the Site, within the conifer plantation due to their continued presence on the Site. Ten UK Biodiversity Action Plan (UKBAP) species were also recorded on-site, including Skylark, Cuckoo, Reed Bunting, Dunnock, Tree Pipit & Common Grasshopper Warbler that were considered either to be probably/possibly breeding on the Site. Eleven Section 7 Priority Species Birds of the Environment (Wales) Act were recorded on the Site. The bird species were the same as listed above for the UKBAP species with the addition of Kestrel, which was considered highly unlikely to breed on the Site. In addition to this 9 RSPB Red list²¹ and 11 Amber list species were recorded on-site (See Table 8.7).

²¹ I. Johnstone & S. Bladwell. (2016). Birds of Conservation Concern in Wales 3: The population status of birds in Wales. RSPB.

Table 8.7: List of notable species recorded during the breeding bird surveys. (CO=Breeding Confirmed, PR=Breeding Probable, PO=Breeding Possible, NO= Confirmed absence through dedicated survey, UN= Limited or no suitable habitat on-site).

Species	Scientific Name	Schedule 1	UKBAP	Section 7	Red List	Amber	Breeding
Common Crossbill		☐					PR
Red Kite		☐				☐	NO
Peregrine		☐					NO
Skylark			☐	☐		☐	PR
Common Cuckoo			☐	☐	☐		PO
Reed Bunting			☐	☐		☐	PR
Dunnock			☐	☐			PO
Tree Pipit			☐	☐		☐	PR
Common Linnet			☐	☐	☐		PO
Lesser Redpoll			☐	☐		☐	PO
Herring Gull			☐	☐	☐		NO
Common Starling			☐	☐	☐		PO
Common Grasshopper Warbler			☐	☐	☐		PR
Kestrel				☐	☐		NO
Willow Warbler					☐		PR
Whitethroat					☐		PO
Whinchat					☐		PR
Meadow Pipit						☐	CO
Lesser Redpoll						☐	PO
Long-tailed Tit						☐	PO
Green Woodpecker						☐	PR
Mistle Thrush						☐	PR
Mallard						☐	PO

8.144 The most common species encountered on the Site were Meadow Pipit in the open grassland areas; Willow Warbler in the woodland blocks and Wren in the scrub/tusssocky areas. Skylark were also identified throughout the grassland areas with the majority of their territories associated with the large expanses of open grassland to the west of the Site. It was difficult to

estimate the number of Skylark territories on the Site, although it was estimated up to 12 territories exist within the western grassland and 3 territories within the eastern grassland (Appendix 8.11 of ES Volume 2). It must be noted that the eastern grassland had been affected by multiple arson events in the spring/summer 2017 months.

- 8.145 To assess the ecological significance of the breeding birds on-site, the species have been split into ground nesting and tree/scrub nesting birds (excluding Nightjar which is discussed separately), due to the distinct habitats represented on the Site supporting varying species i.e. grassland and conifer plantation habitats.

Ground Nesting Birds

- 8.146 Overall, the site supports a range of common upland breeding birds, some of which are of conservation concern status and are threatened by continued population declines. However, alternative upland habitats utilised by these birds on the Site are available in the Afan Valley. The ground nesting bird interest at the site was considered to be of Local ecological importance based on the resource it represents to breeding birds and the distribution of similar habitat in the surrounding area.

Tree/Scrub Nesting Birds

- 8.147 Overall, the Site supports a range of common canopy/scrub nesting birds. However, flocks of Crossbill (Schedule 1 Species) were also identified. Some bird species were identified on-site as being of conservation concern status and are threatened by continued population declines. However, alternative upland habitats utilised by these birds on the Site are available in the Afan Valley, and areas of the conifer plantation on the Site were in a state of decline offering diminished nesting opportunities. The tree/scrub nesting bird interest at the Site was considered to be of Local ecological importance based on the resource it represents to the bird species and the distribution of similar habitat in the surrounding area.

Bats

- 8.148 Desk study information received from SEWBReC identified no records of bats on-site but did identify a number of bat roosts within 1.5km of the Site predominantly associated with Pipistrelle sp. located within the small village environments. The 2002 Ecological Assessment noted individual Common Pipistrelle bats were foraging along the roadside (A4107) at the northern boundary of the Site.

- 8.149 The trees on the Site were generally restricted to the blocks of conifer plantations that were originally planted as a commercial timber harvesting crop. These trees were assessed from the ground (assisted by close focus binoculars) to identify Potential Roost features (PRF). All these trees were considered to be of low bat roosting potential due to the limited bat roosting features associated with the species located within the woodland blocks i.e. Scots Pine *Pinus sylvestris* and Sitka Spruce *Picea sitchensis*.
- 8.150 The broadleaf trees in the PAWS, which were considered to be low/moderate potential (based on day-time appraisal of PRF (as above) are located on sheltered north-west facing slopes below Pen-Y-Castell. These trees included species such as Pedunculate Oak *Quercus robur* and Ash *Fraxinus excelsior*, which were of low/moderate bat roosting potential, and are to be retained as part of the Proposed Development, with no construction in close proximity.
- 8.151 A single breeze block structure was located at the eastern extent of the Site and was associated with the communications mast. The structure was a simple cube design and was regularly subjected to vandalism. The structure was generally dark and airy due to the absence of an access door with limited roosting opportunities internally. No evidence of roosting bats was identified, although it was considered to be of low bat roosting potential, supporting limited features that could be used by bats on an irregular basis. As such a further single dusk survey was conducted on 20th June 2017 to confirm the likely presence/absence of roosting bats at the structure.
- 8.152 During the dusk survey no bats were identified emerging from the structure with only a single Common Pipistrelle bat recorded commuting/forging north of the structure by both surveyors during the entirety of the survey. Weather conditions did not affect the survey results with no rain, light winds and temperatures ranging between 24°C at the start of the survey and 21°C at the end of the survey experienced.
- 8.153 The one structure on the Site and the majority of the trees on the Site did not offer suitable bat roosting opportunities, the exception being the standard trees along the northern boundary that are to be retained as part of the development. Alternative suitable habitat is present within the adjacent villages and wooded valleys, and as such the site was considered to be of negligible ecological importance to roosting bats.

Activity Survey Results: Surveyor

- 8.154 A series of three bat activity surveys (3 dusk) by a team of three surveyors were undertaken on-site between June and September 2017 to ascertain bat activity levels. Walked transects were undertaken on the following dates 27th June, 24th August, 25th September 2017 and followed the routes shown in Appendix 8.6 of ES Volume 2. During the evening activity surveys weather conditions were considered to be of no constraint to the survey. The results of these walked transect surveys are shown in Appendix 8.6 of ES Volume 2 and summarised below.
- 8.155 In general, the bat activity was considered to be low across the majority of the Site, with low number of bat passes recorded during the transect activity surveys. The recorded bat calls were considered to be produced by a limited range of bat species. This was considered to be consistent with the open exposed nature of the Site and the habitats present; along with the existing records identified during the SEWBReC data search.
- 8.156 The highest bat activity (most number of bat passes/observations) was generally associated with the eastern transect (transect 1) that borders the plantation woodland block and is the closest transect to the adjacent town of Cymmer and Croeserw. It was evident that woodland blocks are utilised as a foraging habitat by a small number of bats predominantly comprised of Common Pipistrelle, that are likely to roost in the adjacent urban structures (records of bat commuting from the built up areas just after sunset). The second highest activity was associated with the north western transect (transect 3) with the majority of the activity associated with the lower valley slopes located west of Pen Y Castell in close proximity to the remnant standard broadleaf trees and vegetated valley below. The lowest activity was consistently associated with transect 2 located on the southern extent of the Site in the predominantly open and exposed grassland areas.
- 8.157 It was apparent that the majority of the calls on the Site were made by commuting and foraging Common Pipistrelle with 79% of all the calls recorded during the activity transect surveys created by the species. The remaining calls were comprised of Soprano Pipistrelle, *Myotis sp.* (indicative of Daubenton's bat) and Noctule. The *Myotis sp.* were only recorded along the northern and eastern extent of the Site and were associated with the plantation woodland and the lower northern slopes of the steep valley in close proximity to the standard broadleaf trees and vegetated valley below.

- 8.158 The number of passes recorded during the surveys did not vary by a large extent between the different months they were conducted in. The August and September surveys recorded a comparable total of 45 and 50 passes respectively, whilst the June survey had a maximum count of 60 passes. The increase in passes was associated with the eastern transect around the plantation and in close proximity to the built-up areas. In general, the bat activity in the open exposed areas was associated with linear paths and running water.

Automated Detector surveys

- 8.159 Anabat SD2 and Anabat express units were deployed as indicated in Appendix 8.7 of ES Volume 2 with description of the results in Table 8.8. In total three species of bats were positively recorded including Common & Soprano Pipistrelle and Noctule. However, a variety of other calls were recorded in smaller numbers that could not be identified with 100% confidence. This included unidentified large bats and *Myotis sp.*. The *Myotis sp.* calls were indicative of Daubenton's bat. The majority of the bat passes on-site recorded by the automated detectors were produced by Common Pipistrelle, with between 84-98% of each detector recording consisting of Common Pipistrelle calls. It should be noted that the number of bat passes does not necessarily correlate with bat numbers.
- 8.160 It was evident that the automated detector locations with the highest bat activity (largest number of bat passes) was associated with the standard broadleaf trees located at the northern extent of site (Anabat A5), followed by the blocks of plantation woodland (Anabat A6). During the three activity periods Anabat location A5 had 65% of all the bat calls recorded associated with it, whilst Anabat A6 had 29% of all the bat calls recorded associate with it. In total these two locations contributed 94% of all the calls recorded. The maximum number of bat passes recorded in a single location was 693 passes (bat activity index = 1414.29) recorded by the standard trees at the northern extent of site during the September session (Table 8.8). Anabat A5 consistently recorded the highest number of bats throughout the three-recording period apart from during the June/July session where the woodland plantation recorded the greatest number of passes. It was evident during the September survey that the poor weather conditions experienced on the Site affected the effectiveness of the detectors to record bats, with the exposed areas of the Site recording constant noise and disturbance (wind and rain) (Anabat A1 & A4). However, the maximum bat passes were also recorded during this session on the lower sheltered slopes of the northern valley indicating the value of this foraging resource in adverse weather conditions.

Table 8.8: Summary of Anabat Data

* Constant noise recorded filling up CF card prematurely ending recording session.

** Species abbreviations – *Cp* Common Pipistrelle, *Sp* Soprano Pipistrelle, *My* *Myotis* Species, *Noc* Noctule, *Pip* (unidentified Pipistrelle) & *Large* (unidentified large bat)

Anabat Location	Dates	No. Bat Passes	Bat Index	Bat Species
A1	10/05/17 – 15/05/17	0	0	-
	27/06/17 – 03/07/17	33	64.71	<i>Cp, Sp</i>
	07/09/17 – 11/09/17	1	2.04	<i>Cp</i>
A2	10/05/17 – 15/05/17	1	2.11	<i>Cp</i>
	27/06/17 – 03/07/17	50	98.04	<i>Cp, Sp, Noc, My</i>
	07/09/17 – 11/09/17	N/A*	N/A*	-
A3	10/05/17 – 15/05/17	1	1.90	<i>My</i>
	27/06/17 – 03/07/17	5	9.23	<i>Cp</i>
	07/09/17 – 11/09/17	1	2.17	<i>My</i>
A4	10/05/17 – 15/05/17	1	3.27	<i>Cp, Sp</i>
	27/06/17 – 03/07/17	36	66.67	<i>Cp, Sp, Noc, My</i>
	07/09/17 – 11/09/17	N/A*	N/A*	-
A5	10/05/17 – 15/05/17	591	1244.21	<i>Cp, Sp, Noc, Large</i>
	27/06/17 – 03/07/17	180	352.94	<i>Cp, Sp, My</i>
	07/09/17 – 11/09/17	693	1414.29	<i>Cp, Sp, My, Large, Pip</i>
A6	10/05/17 – 15/05/17	18	37.89	<i>Cp, My</i>
	27/06/17 – 03/07/17	621	1217.65	<i>Cp, My, Pip</i>
	07/09/17 – 11/09/17	7	14.29	<i>Cp, Sp</i>

8.161 Overall, the Site was considered to provide foraging and commuting habitat for a limited range of bat species dominated by ‘hawking’ species, those adapted for more open environments (e.g. Pipistrelle). The distribution of bat species across South Wales varies with Common and Soprano Pipistrelle species widespread throughout and *Myotis* species and Noctule bat more restricted in their distribution.

8.162 Noctule and Soprano Pipistrelle bats are listed as priority species on the UK Biodiversity Action Plan, and Common and Soprano Pipistrelle and Noctule bats are on the Section 7 list of priority species of the Environment (Wales) Act (2016).

- 8.163 Based on the low levels of activity and limited number of species recorded over the course of the surveys, the majority of the Site would be considered to have negligible ecological value for bats. However, the northern extent of the Site, which possessed the more diverse habitats and areas of woodland plantation and standard trees had greater bat activity (foraging/commuting) associated with it. The northern extent of the Site was also more sheltered than the exposed open southern habitats, offering a sheltered foraging/commuting resource. Given the increased activity in these areas the Site was considered to be of local ecological importance to foraging bats.

Reptiles

- 8.164 Desk study information received from SEWBRc identified records of Common Lizard, Adder and Slow-worm within a 1.5km of site. The 2002 Ecological Assessment also identified an incidental record of Common Lizard in an area of rush pasture just north of Brynheulog estate on the south of the Site.
- 8.165 Reptile survey undertaken in 2017 confirmed the presence of Common Lizard on-site. A map indicating general location of reptile refugia on the Site is located in Appendix 8.12 of ES Volume 2. A summary of the surveys is shown in Table 8.9. Common Lizard were recorded in all areas. Generally, the observations made were incidental records of basking lizard on the tree stumps, branches and rocks, and not lizards utilising the refugia due to the abundance of natural basking features. Interpretation of the reptile records was based on the key reptile site selection population size class criteria detailed in the Froglife Advice Sheet 10 – Reptile Survey (Froglife 1999). These criteria assign a population classification size class (Low, Good or Exceptional) based on the highest number of sightings in a single visit (Common Lizard 22 animals) use of these criteria indicate that the surveyed area supports an 'excellent' 22 population of Common Lizard.
- 8.166 Based on the results of the targeted presence/absence survey, a population of Common Lizard on-site was considered likely in all areas of suitable habitat given the lack of significant barriers to movement on the Site. The presence of other common reptile species such as Slow-worm and Adder was also considered probable in other marginal habitats on the Site in potentially lower numbers, due to the presence of their records within the surrounding area.

²² Based on categories described by Froglife, 1999

8.167 Due to the large extents of suitable reptile habitat offered by the Site it was considered to have an ecological importance to reptiles at a local scale. All common reptiles are protected against killing and injury under the Wildlife and Countryside Act 1981 (as amended) with both Common Lizard and Adder listed on the UKBAP and Section 7 Priority Species).

Table 8.9: 2017 Reptile Survey Results

Visit	Date	Time	Temp oC	Weather	Common Lizard				Cum	Notes
					Female	Male	Juv	Unkown sex		
1	20.07.2017	10:00 AM	14.0	Mostly Cloudy	3	5	5	3	16	Slight bit of rain approx 20 mins, sun appeared immediately after
2	24.07.2017	9:15 AM	17.0	Partly Cloudy	1	3	3	2	9	Sunny and high temps. Strong breeze kept air cool
3	26.07.2017	3:00 PM	12.0	Cloudy, windy	1	0	3	2	6	Weather was cloudy and windy with the sun breaking through briefly
4	28.07.2017	9:30 AM	17.0	Sunny, partly cloudy	2	4	5	2	13	Sunny with some clouds, fairly breezy
5	15.08.2017	1:00 PM	15.0	Sunny	6	9	5	2	22	Sunny, breezy.
6	24.08.2017	10:00 AM	15.0	Partly Cloudy, Sunny	8	11	1	2	22	Mainly sunny, partly cloudy. Air temperature cold from strong breeze, feels warm
7	30.08.2017	12:00 PM	16.0	Partly cloudy	5	5	3	2	15	Mainly cloudy, some sun breaking through
8	11.09.2017	12:00 PM	13.0	Showery, partly sunny	2	0	1	0	3	High winds, feels were warm but air temperature cold.
TOTAL	-	-	-	-	28	37	26	15	106	

Terrestrial Invertebrates

8.168 In addition to original survey, access was sought to existing records of invertebrates held by the South-East Wales Biological Records Centre (SEWBRc), the main repository for biological records in the region. Records were sought both for the Site itself and for the surrounding area within a radius of 2km.

8.169 The data search yielded some 288 separate records of invertebrates for the search area, comprising about 70 species. Species of conservation interest are set out in Table 8.10. The species shown in **bold** have previously been recorded from within 1km of the centre of the Site.

Table 8.10: Existing Invertebrate Records from within 2km of the Site

Protected & Priority Species		
<i>Acronicta psi</i>	Grey Dagger Moth	S7, UKBAP
<i>Acronicta rumicis</i>	Knot Grass Moth	S7, UKBAP
<i>Agrochola helvola</i>	Flounced Chestnut Moth	S7, UKBAP
<i>Apamea remissa</i>	Dusky Brocade Moth	S7, UKBAP
<i>Arctia caja</i>	Garden Tiger Moth	S7, UKBAP
<i>Boloria selene</i>	Small Pearl-bordered Fritillary	S7, UKBAP
<i>Caradrina morpheus</i>	Mottled Rustic Moth	S7, UKBAP
<i>Ceramica pisi</i>	Broom Moth	S7, UKBAP
<i>Cirrhia icteritia</i>	Sallow Moth	S7, UKBAP
<i>Coenonympha pamphilus</i>	Small Heath Butterfly	S7, UKBAP
<i>Diarsia rubi</i>	Small Square-spot Moth	S7, UKBAP
<i>Ecliptopera silaceata</i>	Small Phoenix Moth	S7, UKBAP
<i>Erynnis tages</i>	Dingy Skipper Butterfly	S7, UKBAP
<i>Eugnorisma glareosa</i>	Autumnal Rustic Moth	S7, UKBAP,
<i>Euphydryas aurinia</i>	Marsh Fritillary Butterfly	WCA5, S7, UKBAP
<i>Euxoa nigricans</i>	Garden Dart Moth	S7, UKBAP
<i>Hepialus humuli</i>	Ghost Moth	S7, UKBAP
<i>Hipparchia semele</i>	Grayling Butterfly	S7, UKBAP
<i>Hoplodrina blanda</i>	Rustic Moth	S7, UKBAP
<i>Lasiommata megera</i>	Wall Butterfly	S7, UKBAP
<i>Leucania comma</i>	Shoulder-striped Wainscot Moth	S7, UKBAP
<i>Litoligia literosa</i>	Rosy Minor Moth	S7, UKBAP
<i>Lycia hirtaria</i>	Brindled Beauty Moth	S7, UKBAP
<i>Melanchra persicariae</i>	Dot Moth	S7, UKBAP
<i>Mniotype adusta</i>	Dark Brocade Moth	S7, UKBAP
<i>Perizoma albulata</i>	Grass Rivulet Moth	S7, UKBAP
<i>Spilosoma lubricipeda</i>	White Ermine Moth	S7, UKBAP
<i>Spilosoma lutea</i>	Buff Ermine Moth	S7, UKBAP
<i>Stilbia anomala</i>	Anomalous Moth	S7, UKBAP
<i>Tyria jacobaeae</i>	Cinnabar Moth	S7, UKBAP

<i>Xanthorhoe ferrugata</i>	Dark-barred Twin-spot Carpet Moth	S7, UKBAP
<i>Xestia agathina</i>	Heath Rustic Moth	S7, UKBAP
<i>Xestia castanea</i>	Neglected Rustic Moth	S7, UKBAP
Other Species of Conservation Concern		
<i>Agriphila latistria</i>	White-streak Grass-veneer Moth	RD2 (UK)
<i>Atolmis rubricollis</i>	Red-necked Footman Moth	RD2 (UK)
<i>Crambus pratella</i>	Scarce Grass-veneer Moth	RD2 (UK)
<i>Deileptenia ribeata</i>	Satin Beauty Moth	RD2 (UK)
<i>Eupithecia expallidata</i>	Bleached Pug Moth	RD2 (UK)
<i>Eupithecia trisignaria</i>	Triple-spotted Pug Moth	RD2 (UK)
<i>Eupithecia virgaureata</i>	Golden-rod Pug Moth	RD2 (UK)
<i>Evergestis pallidata</i>	Chequered Pearl Moth	RD2 (UK)
<i>Furcula bicuspis</i>	Alder Kitten Moth	RD2 (UK)
<i>Hypona crassalis</i>	Beautiful Snout Moth	RD2 (UK)
<i>Hyponodes humidalis</i>	Marsh Oblique-barred Moth	RD2 (UK),
<i>Ischnura pumilio</i>	Scarce Blue-tailed Damselfly	RD1 (UK)
<i>Lampropteryx otregiata</i>	Devon Carpet Moth	RD2 (UK)
<i>Mompha divisella</i>	Neat Cosmet Moth	RD2 (UK)
<i>Mythimna turca</i>	Double-line Moth	RD2 (UK)
<i>Xylota jakutorum</i>	Hoverfly	RD2 (UK)
Local Species		
<i>Abraxas sylvata</i>	Clouded Magpie Moth	Local species
<i>Abrostola tripartita</i>	Spectacle Moth	Local species
<i>Anarta myrtilli</i>	Beautiful Yellow Underwing Moth	Local species
<i>Callophrys rubi</i>	Green Hairstreak Butterfly	Local species
<i>Cordulegaster boltonii</i>	Golden-ringed Dragonfly	Local species
<i>Diarsia florida</i>	Fen Square-spot Moth	Local species
<i>Epirrhoe galiata</i>	Galium Carpet Moth	Local species
<i>Epirrhoe tristata</i>	Small Argent & Sable Moth	Local species
<i>Hemistola chrysoprasaria</i>	Small Emerald Moth	Local species
<i>Lestes sponsa</i>	Emerald Damselfly	Local species
<i>Orthetrum cancellatum</i>	Black-tailed Skimmer Dragonfly	Local species
<i>Orthetrum coerulescens</i>	Keeled Skimmer Dragonfly	Local species
<i>Orthosia gracilis</i>	Powdered Quaker Moth	Local species
<i>Papestra biren</i>	Glaucous Shears Moth	Local species
<i>Pterapherapteryx sexalata</i>	Small Seraphim Moth	Local species

<i>Sympetrum danae</i>	Black Darter Dragonfly	Local species
<i>Tholera cespitis</i>	Hedge Rustic Moth	Local species
<i>Timandra comae</i>	Blood-Vein Moth	Local species
<i>Triphosa dubitata</i>	Tissue Moth	Local species

Key

WCA5 – Wildlife & Countryside Acts 1981, Schedule 5 (“UK protected species”)

S7 = Environment (Wales) Act 2016, Species of Conservation Concern in Wales (“Section 7 species”)

UK BAP = UK Biodiversity Action Plan Priority Species

RD1(UK) = UK Red Data Book listing based on IUCN guidelines (“Red Data Book Species”)

RD2(UK) = UK Red Data Book listing not based on IUCN guidelines (“Nationally Rare or Nationally Scarce Species”)

- 8.170 The Site contains habitats which are potentially suitable for breeding by most of the above species, although with some exceptions such as Marsh Fritillary butterfly.

Survey Results

- 8.171 A full list of the invertebrate species recorded is given in Appendix 8.13 of ES Volume 2. Some 243-invertebrate species have been positively identified from the Site to date, of which 38 are accorded some level of conservation interest. The recorded distribution of notable invertebrate species is shown in Appendix 8.5 of ES Volume 2.

Protected & Red Data Book Species

- 8.172 None of the species recorded from the site are listed on either Schedule 2 of the Conservation of Habitats & Species Regulations 2017 (‘European Protected Species’) or on Schedule 5 of the Wildlife & Countryside Act 1981, as amended (‘UK Protected Species’).
- 8.173 None of the recorded species are listed in any current published Red Data Book²³ (‘Red Data Book Species’).

²³ Red Data Book species are assessed and graded against world standardised criteria as set out by the IUCN (SSC 2012). Typically, they occur in fewer than 15x 10km squares in the UK.

Section 7 Species (Priority Species in Wales)

8.174 Some 15 of the recorded species are listed in Section 7²⁴ of the Environment (Wales) Act 2016, as shown in Table 8.11 below.

Table 8.11: Section 7 Listed Species Recorded from the Site

<i>Apamea remissa</i>	Dusky brocade moth
<i>Boloria selene</i>	Small pearl-bordered fritillary
<i>Ceramica pisi</i>	Broom moth
<i>Coenonympha pamphilus</i>	Small heath butterfly
<i>Diarsia rubi</i>	Small square-spot moth
<i>Ecliptoptera silacea</i>	Small phoenix moth
<i>Hipparchia semele</i>	Grayling butterfly
<i>Leucania comma</i>	Shoulder-striped wainscot moth
<i>Litoligia literosa</i>	Rosy minor moth
<i>Melanchra persicariae</i>	Dot moth
<i>Mniotype adusta</i>	Dark brocade moth
<i>Spilosoma lubricipeda</i>	White ermine moth
<i>Spilosoma lutea</i>	Buff ermine moth
<i>Tyria jacobaeae</i>	Cinnabar moth
<i>Xanthorhoe ferrugata</i>	Dark-barred twin-spot carpet moth

8.175 All of the species listed in Table 8.11 have previously been recorded within 2km of the Site (SEWBRc data). The majority comprise moth species which were attracted to light-traps operated on the Site at night, with the exception of the day-flying cinnabar moth which was recorded both as adults and larvae, the latter on the foodplant, *Senecio* spp.

8.176 The three butterfly species were all observed during the day-time. Small heath butterfly was recorded several times within the extensive plateau grasslands and is undoubtedly breeding on the Site. A single individual of grayling butterfly was seen on the bare, rock-strewn forestry track running through the same area, which is a typical habitat for this species, whilst a single small pearl-bordered fritillary butterfly was seen amongst the marshy grassland on the north-

²⁴ In Wales the s.7 list of the EWA 2016 supersedes the s.42 list of the Natural Environment & Rural Communities Act 2006, which in turn replaced the 'Priority Species' lists of the UK Biodiversity Action Plan (UK BAP: UKSG 1995; UKBG 1998-1999) and its Welsh equivalent (WPB 2016).

west part of the plateau. The Site contains habitats which appear suitable for breeding by both these species, so they are assumed to be resident.

Nationally Rare & Scarce Species

- 8.177 Five of the recorded species have been listed as 'Nationally Scarce'²⁵ in the Species Reviews published by the Joint Nature Conservation Committee (JNCC) and its predecessors, as shown in Table 8.12 below

Table 8.12: Nationally Scarce Species Recorded from the Site

<i>Atolmis rubricollis</i>	Red-necked footman moth
<i>Deileptenia ribeata</i>	Satin beauty moth
<i>Eupithecia virgaureata</i>	Goldenrod pug moth
<i>Mythimna turca</i>	Double-line moth
<i>Xylota jakutorum</i>	Hoverfly

- 8.178 All of the species listed in Table 8.12 have previously been recorded within 2km of the Site (SEWBRc data). The majority comprise moth species which were attracted to light-traps operated on the Site at night, although the Site does support habitats which would be suitable for breeding by these species. The hoverfly *Xylota jakutorum* is believed to be associated with the larval galleries of the pine weevil (*Hylobius abietis*) which was also found at two locations on the Site, suggesting that it is also likely to be resident.

Local Species

- 8.179 Some 18 of the recorded species are listed by various sources as being local either in the UK, Wales, South Wales or the Neath Port Talbot county borough. Seven of the species were listed as conservation priorities in one or other of the various Local Biodiversity Action Plans (LBAPs) which were previously drawn up by the South Wales unitary authorities during the period 2000-2010.

²⁵ 'Nationally Scarce' species are considered to be nationally rare or uncommon in the UK, but are typically not as rare as RDB species: These species are usually separated into 'Nationally Rare Na' species, which have been recorded in 15-30x 10km squares of the UK; and 'Nationally Scarce Nb' species have been recorded in 31-100x 10km squares of the UK, although they may just be listed as 'Nationally Scarce' where the data is insufficient to make this distinction.

Table 8.13: Local Species Recorded from the Site

<i>Abrostola tripartita</i> *	Spectacle moth
<i>Anarta myrtili</i> *	Beautiful yellow-underwing moth
<i>Andrena humilis</i>	Buff-tailed mining bee
<i>Androniscus dentiger</i>	Woodlouse
<i>Callophrys rubi</i> *	Green hairstreak butterfly
<i>Cantharis thoracica</i>	Soldier beetle
<i>Cordulegaster boltonii</i> *	Golden-ringed dragonfly
<i>Craniophora ligustri</i>	Coronet moth
<i>Deltote pygarga</i>	Marbled white-spot moth
<i>Denticucullus pygmina</i>	Small wainscot moth
<i>Epirrhoe tristata</i> *	Small argent & sable moth
<i>Hemistola chrysoprasaria</i>	Small emerald moth
<i>Korscheltellus fusconebulosa</i>	Map-winged swift moth
<i>Lestes sponsa</i> *	Common emerald damselfly
<i>Pardosa monticola</i>	Thin-legged wolf spider
<i>Plagodis dolabraria</i>	Scorched wing moth
<i>Stictoleptura rubra</i>	Red longhorn beetle
<i>Sympetrum danae</i> *	Black darter dragonfly

Species shown in **bold** have previously been recorded from within 2km of the Site (SEWBRc data).

Species with an asterisk ('*') have previously been listed in one or other of the published South Wales LBAPs.

8.180 The Site supports habitats which appear broadly suitable for breeding by all of the species listed in Table 8.13.

Assessment of the Whole Site

8.181 The Site is assessed in relation to the criteria set out at Appendix 8.13 of ES Volume 2. Overall the catch numbers of invertebrates were comparatively small, with many of the species being encountered only as singletons or as only very low numbers of individuals. The Site is large, however, meaning that the total species list generated over the course of a series of visits throughout a summer season is quite a large and moderately diverse one, with a good representation of notable species.

8.182 It is noted that the majority of the Site comprises habitats which are relatively low in terms of plant species (ie purple moor-grass and bracken dominated stands, and semi-natural acid grasslands) which tend to support comparatively few invertebrate species. These habitats are, however, supplemented by the presence of habitats and features which give greater plant species and structural diversity, such as patches of dwarf-shrub heath, small wetlands, a large lake, rock outcrops, small watercourses and temporary pools, and remnant plantation woodlands. There is also some considerable localised structural microdiversity in the areas of cleared plantation resulting from remnant forestry features such as drainage channels, planting ridges, standing stumps, deadwood and brash piles etc, which also are of added value to invertebrates.

8.183 The survey results for the whole Site are analysed as follows:

8.184 Criteria for the identification of Sites of Importance for Nature Conservation (SINCs) in the Neath Port Talbot County Borough context are based on those set out by WBP (2008), the invertebrate criteria being listed at Section S5. This states that selection preference should be given to:

- *“Any site which supports a species which is listed in the UK Red Data Book, or listed on the Section 42 List [of the Natural Environment & Rural Communities Act 2006, now superseded by Section 7 of the Environment (Wales) Act 2016] with the specific requirement for site protection action.”*
- *“Any site which supports an important assemblage or population(s) of ‘Nationally Scarce’ species. To be determined in consultation with appropriate experts.”*
- *‘Important assemblages’ are not defined in the guidance and are therefore open to expert interpretation.*

8.185 The SINC selection criteria also encompass any sites which support species recorded from ten or fewer 10km grid squares in Wales, or from four or fewer sites in the vice-county area, as well as any site which supports a *“significant population or assemblage of Local Priority Species listed in a Local Biodiversity Action Plan”*.

8.186 Further detailed criteria are also set out for Lepidoptera (butterflies & moths), Odonata (dragonflies & damselflies) and Orthoptera (grasshoppers, crickets etc).

8.187 Under these criteria the site would qualify for SINC designation for the following features:

1. Presence of 15 'Section 7' list species recorded (threshold is 1 species).
2. Presence of 4(5) 'Nationally Scarce' species recorded (threshold is unspecified)²⁶.
3. Presence of small pearl-bordered fritillary, together with grayling and small heath butterflies as 'supporting species' (threshold is 1 species from Table 6a of WBP 2008).
4. Presence of emerald damselfly, and golden-ringed and black darter dragonflies (as 'Contributory Species').

8.188 On this basis the site would readily qualify as a potential SINC for invertebrates in the Neath Port Talbot county borough context and the invertebrate assemblage was considered of County ecological importance.

Otters

8.189 No evidence of Otters (e.g. spraints, footprints etc.) were identified along the partially visible water courses on the Site. However, SEWBReC records for the species are located in the Valley located to the north and are associated with the River Afon. Even though the watercourse on the Site eventually flows into the River Afon below, it was considered highly unlikely that Otter use the Site as a forging resource due to the steep nature of the Site and physical separation from the valley (A4107 Brytwyn Rd segregates site from valley). The steep watercourses on the Site only had small visible sections that weren't heavily shaded; choked by *Juncus sp.*; and were generally comprised of stony substrate and were 'spatey' in nature due to their upland location. The watercourses were considered not to be suitable habitat to accommodate holts and rest sites, and are not a rich forging resource; and as such the Site was considered to be of negligible ecological importance to Otter²⁷

²⁶ Double-line moth (*Mythimna turca*) is usually excluded as a qualifying feature for SINC in Neath Port Talbot county borough, where it remains a comparatively common and widespread species (L Palmer, NPT Biodiversity Officer: pers comm, Dec 2017).

²⁷ The scoping out of a dedicated Otter survey was discussed with the NPT ecologist in project meetings in October 2017.

Badger

- 8.190 No desk study records of Badger *Meles meles* were identified within 1.5km of the Site and no evidence of Badger activity on the Site (i.e. setts, latrines/dung pits and/or feeding signs) was recorded on-site during the suite of surveys conducted on the Site. However, an incidental observation of a single Badger was recorded during a Nightjar survey located at the eastern extent of the Site on a path that dissects the plantation woodland blocks. The Badger was thought to be foraging on the Site given the lack of sett building evidence and worn paths.
- 8.191 The Site was considered to offer very limited suitable foraging and sett building habitat. However, the ground vegetation (Bracken etc.) within the woodland blocks can potentially obscure singular hole outlier setts. The lack of Badger activity recorded across the site and limited foraging and sett building habitat meant, along with more suitable habitat within the valley meant the Site is considered to be of negligible importance.
- 8.192 No SEWBRc records of Water Vole *Arvicola amphibious* exist within 1.5km of the Site and no evidence of Water Vole were identified along the visible sections of the watercourses i.e. burrows, latrines/droppings or feeding signs.
- 8.193 The small watercourses on the Site were generally heavily shaded, choked by *Juncus* sp., were comprised of stony substrate, and 'spatey' in nature due to their upland location. Water voles are known to exist on a wide range of water habitat types in Wales, and particularly on minor watercourses, ponds and wetland areas including upland marsh and bog habitat. However, given the lack of desk study records of this species in the surrounding area coupled with the lack of suitable habitat, the Site was considered to be of negligible ecological importance to the species.

Brown Hare

- 8.194 Desk study records of Brown Hare were identified within 1.5km of the Site. However, no sightings or evidence of Brown Hare or Rabbits were identified on the Site during the suite of surveys conducted. Even though there is evidence of upland records of Brown Hare the species is generally considered to have a preference for lowland habitats. The site is considered to offer limited suitability for Brown Hare and their occasional presence could not be ruled out. However, the lack of evidence, alternative habitat in close proximity to the Site

and disturbance from the public means the site was considered to be of negligible ecological importance to the species.

Summary of valued ecological features

8.195 A summary of the ecological features described as part of the baseline and their value at a geographical scale are summarised in Table 8.14. Only those features identified of importance at Local or above have been included considered further in this assessment. Features considered of Negligible ecological importance have not been considered further.

Table 8.14: Summary of Valued Ecological Features (Baseline)

Feature	Ecological Importance at Geographical Scale
<i>Protected sites</i>	
On-site watercourse SINC	County
The Afan Mineral Railway SINC	County
Caerau North SINC	County
Plantation on Ancient Woodland	Local
<i>Habitats</i>	
Conifer Plantation	Negligible
Upland Heathland (H8 (both sub-communities) & H12a (Dry Heath & <i>Pteridium</i> mosaic)	County
M15d Wet Heath	County
M6c Mire	County
M23- <i>Agrostis-Pteridium</i> mosaic	Local
M25a Mire	Local
MG1e Neutral Grassland	Local
OV27 Open Vegetation	Negligible
S9 Swamp (S9 & S19)	Local
W25 Underscrub	Negligible
U2a Acid Grassland	Local

U2- <i>Pteridium</i> mosaic	Negligible
Dense <i>Molinia</i>	Negligible
Dense <i>Pteridium</i>	Negligible
<i>Agrostis-Juncus</i>	Negligible
<i>Agrostis-Holcus-Rumex</i> neutral grassland	Negligible
<i>Agrostis-Juncus-Molinia</i>	Negligible
<i>Agrostis-Juncus-Molinia-Pteridium</i>	Negligible
<i>Agrostis-Pteridium-Rubus</i>	Negligible
<i>Impatiens-Molinia-Juncus-Chamerion</i>	Negligible
Unclassifiable scrub	Negligible
Standing Water	Local
Species	
Bats (roosting)	Negligible
Bats (foraging/commuting)	Local
Upland Breeding Birds (Assemblage – Ground Nesting)	Local
Upland Breeding Birds (Assemblage – Tree/Scrub Nesting)	Local
Nightjar	National
Reptile	Local
Invertebrates	County
Badger	Negligible
Otter	Negligible
Water Vole	Negligible
Brown Hare	Negligible

Assessment of Potential Impacts

8.196 The following section considers the overall effect of the Proposed Development on the ecological features, assessing the negative effects that arise from construction and operation of the scheme and any positive environmental effects of mitigation and habitat creation measures.

- 8.197 When considering a significant ecological impact on each of the identified valued ecological features, consideration has been given to factors such as whether the impact is likely to be positive or negative, extent, magnitude (size) of the impact, duration, timing and frequency and reversibility.
- 8.198 Only the ecological features that are considered to be of importance at or above 'Local' have been included in the ecological impact assessment. The predicted impact for each ecological feature has been assessed on the basis of the worst-case scenario and without mitigation in the first instance. In the case of any adverse effects, appropriate mitigation measures are considered.
- 8.199 The effects are considered based on application of the CIEEM Guidelines (2016)²⁸ and for the purposes of this assessment, will be separated into short-term activities such as site clearance and construction and long-term effects associated with an operation of the visitor attraction based on the proposed Parameters Plan and Concept Masterplan (see Appendices 5.1 and 5.2 respectively of ES Volume 2). The assessment of impacts presented in these sections is in the absence of any mitigation measures, which are summarised in the Mitigation Measures section which follows thereafter. The residual impacts, following mitigation are also presented. As described in paragraphs 8.22 and 8.24, assessment of impacts has been based on application of CIEEM guidelines in order to establish any significant (adverse or beneficial) impacts on ecological features. However, in order to present a consistent description of impacts across topic chapters, the terminology used to describe impacts in the following sections has been simplified to describing effects as Minor, Moderate or Major. Professional judgement has been used to extrapolate the assessment based on the CIEEM guidelines to align with one of these three categories.

Site Clearance and Construction

- 8.200 The following measures are considered as integral to this stage of the scheme and the assessment of impacts is based on the assumption that they would be implemented.

²⁸ CIEEM (2016) Guidelines for Ecological Impact Assessment in the United Kingdom. Second Edition.

- Vegetation clearance, ground works and soil strip;
- Set up of contractor's compounds and site security fencing;
- Re-routing/re-profiling of watercourse;
- Change in hydrology;
- Change in disturbance levels from increased presence of people and vehicles;
- Changes in artificial lighting; and,
- Excavation of ground for foundation and laying of infrastructure

Designated Sites

On-site Watercourse SINC

8.201 A single small stream was evident on the Site and as such is designated as a SINC in Neath Port Talbot. The stream rises in the western extent of site and flows off-site to the north. The stream is to be retained as part of the development. However, it is likely that the stream will have to be re-profiled and redirected, and potentially culverted as part of the Proposed Development. Re-profiling and culverting is likely to result in a significant adverse impact on this feature as the majority of the section within the site would be affected and the stream effectively lost as a physical feature on the Site. This would represent a major adverse impact.

The Afan Mineral Railway SINC

8.202 The Afan Mineral Railway SINC lies directly adjacent to the northern boundary of the Site and is segregated by the A4107. No direct impacts will befall this SINC during the construction stage of the project. However, the designation could potentially be indirectly affected by construction activities contaminating watercourses & and surface runoff (hydrology) from the site above in the absence of mitigation (control measures). In the absence of a direct impact, a significant adverse impact is considered unlikely. However, an adverse impact in the short term could result from indirect effects and the risk of a minor adverse impact in the short term could not be precluded.

The Caerau North SINC

- 8.203 The Caerau North SINC lies directly adjacent to the southern boundary of the Site. No direct impacts will befall this SINC during the construction stage of the project and a significant adverse impact was considered unlikely. However, the designation could potentially be indirectly affected by construction activities changing hydrology and possibly introducing contaminated substances as a result of construction activities. Increased nutrient loading (nitrogen deposition associated with increased vehicle movements/activity) could also have the potential to impact on this Site. However, this was thought to be minimal given the prevailing wind. Further details relating to air quality are contained within Chapter 6 of this ES. In the absence of mitigation (control measures) to maintain the hydrological status quo and minimise discharge of contamination into any running water, a minor adverse impact in the short term could not be precluded.

Plantation on Ancient Woodland

- 8.204 The creation of the Site access road, located at the north-western extent of site (as shown on the Concept Masterplan in Appendix 5.2 of ES Volume 2), will result in the loss of habitat associated with the Plantation on Ancient Woodland underneath the footprint of the access road. However, the majority of the designations footprint will be retained and, on this basis, a significant adverse impact was considered unlikely although permanent habitat loss would occur within the road footprint. This is considered to represent a minor adverse impact on this feature in the short term.

Habitats

Upland Heathland

- 8.205 The majority of the upland heathland habitat is located along the steep slopes located on the northern extent of site (H12a), with smaller areas located along the eastern extent of site (H8) (Appendix 8.3 of ES Volume 2). The construction phase will retain the northern habitats with scope to retain the eastern habitats as shown in the Parameters Plan and Concept Masterplan in Appendices 5.1 and 5.2 respectively of ES Volume 2. With the retention of the heathland in these areas, a significant adverse impact is considered unlikely. However, a minor adverse impact is likely on the basis that some of the eastern habitats are lost as part of the Proposed Development.

Wet Heath

- 8.206 During the construction phase there will be a significant loss of the wet heath (M15d) habitat on the Site through the initial soil strip, and the construction phase is certain to result in a significant adverse impact on this feature. From the Parameters Plan (see Appendix 5.1 of ES Volume 2) it is unclear whether there will be a small retention of marginal stands of habitat, as such any retention will be minimal in area and isolated and will not be considered further in the chapter. However, the loss of the majority of the habitat is considered to represent a Major adverse impact.

Mire (M6c & M25a)

- 8.207 The mire habitats are located around the standing water located at the eastern extent of Site (Appendix 8.3 of ES Volume 2) and are to be retained in part although changes in land use and hydrology to the north and south of the standing water are likely to result in a net loss of these communities. This is likely to result in a significant adverse impact. The retained habitats could also potentially be indirectly affected by construction activities changing hydrology and introducing contaminating substances as a result of construction activity. In the absence of mitigation (control measures) to maintain the hydrological status quo and minimise discharge of contamination into water table (pollution incident resulting from spillage of fuel or construction materials), a moderate adverse impact in the short term could not be precluded.

Agrostis-Pteridium mosaic (M23)

- 8.208 The creation of the Site access road, located at the north western extent of the Site (see the Parameters Plan and Concept Masterplan included in Appendices 5.1 and 5.2 respectively of ES Volume 2), will result in the loss of habitat associated with the *Agrostis-Pteridium* habitat underneath the footprint of the access road, with this part of the Site likely to be subject to groundworks to establish a Landscaped Access Zone and new tree planting, as shown on the Parameters Plan. This is almost certain to result in the loss of most, if not all of this existing habitat mosaic and a significant adverse impact is likely.
- 8.209 Overall, the loss of the road footprint and groundworks to create the Landscaped Access Zone will result in a major adverse impact on this feature.

Neutral Grassland (MG1e)

- 8.210 A small area of neutral grassland was located at the eastern extent of site. It is currently unclear whether the Proposed Development will retain this feature. However, there is scope within the Masterplan given its marginal location away from infrastructure and if retention was possible, a significant adverse impact is unlikely. However, the small extent of this habitat and its location at the eastern entrance to the Site is such that it is likely to be indirectly affected by construction activities.
- 8.211 In the absence of a detailed landscape plan an adverse impact could not be precluded and a minor adverse impact is considered likely.

S9 Swamp (S9 & S19)

- 8.212 The small area of swamp is located at the eastern edge of the standing water (Appendix 8.3 of ES Volume 2) and are to be retained as part of the development and on this basis a significant adverse impact is unlikely. However, the habitat could potentially be indirectly affected by construction activities changing hydrology and introducing contaminating substances as a result of construction activity. In the absence of mitigation (control measures) to maintain the hydrological status quo and minimise discharge of contamination into water table (pollution incident resulting from spillage of fuel or construction materials), a minor adverse impact in the short term could not be precluded.

Acid Grassland

- 8.213 The acid grassland (U2a) habitat is located along the steep slopes located on the northern extent of the Site. The construction phase will retain the northern habitats (see the Parameters Plan and Concept Masterplan included in Appendices 5.1 and 5.2 respectively of ES Volume 2). A significant adverse impact on these communities is considered unlikely due to their location although a minor adverse effect in the short term could not be precluded in the absence of appropriate avoidance/control measures to limit construction activity or storage of materials in this area.

Standing Water

- 8.214 The existing standing water pond located within the eastern extent of site habitat will be retained as described for Swamp communities and as such, a significant adverse impact was considered unlikely. However, as described in previous sections, the risk of an indirect adverse

impact (e.g. via pollution, change in hydrology, run off etc.) could not be precluded in the absence of appropriate mitigation measures, and as such a minor adverse impact was considered possible.

Fauna

Bats (foraging/commuting)

- 8.215 The bat foraging resource was considered to be of local ecological importance. The majority of the Proposed Development is situated on the open expanses where the minimal bat activity was recorded due to the exposed nature of the habitat and the lack of structural vegetation (trees/scrub). The alpine & forest village (see Parameters Plan and Concept Masterplan included in Appendices 5.1 and 5.2 respectively of ES Volume 2) is situated in/on the conifer plantation, which will result in the loss of trees to accommodate the ski slope & infra structure and lodges and access roads. The conifer plantation and margins had the second highest associated activity during the automated detector surveys (see Table 8.8). The northern slopes located west of Pen- Y-Castell had the highest associated bat activity due to the proximity of the vegetated valley below and standard trees. The Proposed Development will only result in minimal loss of habitat around this location to accommodate the access road with the standard broadleaf woodland retained.
- 8.216 The construction phase will not result in significant habitat loss along the northern slopes and will partially retain some of the conifer plantations habitats where the greatest bat activity was identified, and as a consequence a significant adverse impact on bat activity was unlikely. The construction works will only have a minimal direct impact on the suitable foraging habitat of the bat assemblage on the Site and on this basis a minor adverse impact is likely to occur in the short term (construction phase).
- 8.217 However, in the absence of mitigation and/or control measures there is potential for a minor adverse impact in the short term through increased lighting and noise within the development site boundary and along woodland and stream boundary features. Species such as *Myotis sp.* are relatively intolerant of artificial lighting and if parts of the Site were to be lit at night (e.g. construction compound), this could result in local avoidance/habitat fragmentation for these species. The majority of the bat activity on the Site was attributed to *Pipistrelle sp.*, which are relatively tolerant of artificial light and even known to exploit this resource. In the absence of mitigation and/or control measures, a minor adverse impact in the short/medium term is considered probable for the light intolerant species.

Ground Nesting Birds

- 8.218 The Proposed Development will result in the majority of the upland habitat on the Site being lost due to the soil strips and earth works to accommodate the site infrastructure, only the steep northern slopes will be retained. However, these potentially will undergo disturbance and some earth works to accommodate the access road. The loss of the majority of the ground nesting habitat will result in a significant adverse impact on the feature of local ecological significance. A major adverse impact on this feature is almost certain to arise.

Tree/Scrub Nesting Birds

- 8.219 The Proposed Development will result in the loss of areas of conifer plantation to accommodate the alpine & forest village (see the Parameters Plan and Concept Masterplan included in Appendices 5.1 and 5.2 respectively of ES Volume 2). The exact area to be lost is unknown at this stage of the design development although is likely to represent the majority of scrub and trees within the development area. Alternative habitats will be retained at the periphery of the Site (for example at Pen y Castell) although the increased level of disturbance, combined with habitat loss are such that a significant adverse impact is likely. In the absence of mitigation, the loss of areas of plantation and marginal scrub will result in a major adverse impact on the feature of local ecological importance in the short/medium term.

Nightjar

- 8.220 The Proposed Development will result in the loss of all the habitats that the Nightjar were recorded in during the surveys, through the soil strip and earth works to accommodate the site infrastructure. The remaining habitat left on the Site will be on steep somewhat exposed slopes that were not favoured by the species, as evident from their absence in the surveys. The loss of all the nesting habitat for this species will result in a significant adverse impact on this feature. This would represent a major adverse impact on a feature considered of National ecological importance.

Reptile

- 8.221 Field surveys undertaken in 2017 confirmed the presence of a Common Lizard population of 'excellent' population size classification (See Froglife 1999 for criteria) assessed as being of local ecological value. Given the populations identified on-site and the fact that the Proposed Development layout will result in the loss of the majority of suitable reptile habitat on-site, with

the exception of the habitat retained along the steep northern slopes it is considered that development works will have a significant adverse impact in the absence of mitigation. This would represent a major adverse impact on a feature of Local ecological importance.

- 8.222 In addition to habitat loss, the proposed site clearance and ground preparation works represent a risk of direct mortality for reptiles in the absence of mitigation. All common reptiles are protected against killing and injury under the Wildlife and Countryside Act 1981 (as amended).

Invertebrates

- 8.223 The total invertebrate species list generated over the course of the surveys was quite large and moderately diverse one, with a good representation of notable species. It is noted that the majority of the Site comprised habitats that supported comparatively few invertebrate species (e.g. purple moor grass). However, these habitats were supplemented by the presence of habitats and features which give greater plant species and structural diversity, such as patches of dwarf-shrub heath, standing water, small watercourses and temporary pools, and remnant plantation woodlands.

- 8.224 The development construction will result in the loss of the majority of habitats on the Site and as such is considered certain to have a significant adverse impact on the invertebrate assemblage present in the absence of mitigation. This would represent a major adverse impact on a feature of County ecological importance.

Operational Impacts

- 8.225 The operational stage assumes that all structures are constructed and functional, that attenuation ponds are in place and new planting completed as illustrated on the scheme Parameters Plan and Concept Masterplan (see Appendices 5.1 and 5.2 respectively of ES Volume 2) and in the landscape strategy included in the Landscape and Visual Impact Assessment (Chapter 11 of this ES). As with the consideration of construction impacts, the assessment in this section does not include for mitigation measures – these are described in the Mitigation Measures section (paragraphs 8.246 to 8.305). The operational stage will take into consideration the following likely impacts on areas of retained habitats & ecological features within and adjacent to the Site boundary:

- Increased disturbance from people and traffic;
- Increased rate in runoff of surface water;
- Increased risk of pollution events/spillages; and,
- Increased disturbance from artificial lighting & noise

Designated Sites

On-site Watercourse SINC

- 8.226 During the construction phase, the designated watercourse would have been re-profiled/re-routed and potentially culverted in areas, with no additional physical disturbance in the operational phase. However, indirect effects are still a possibility. Given the nature of the development, the risk of fuel or oil spillage into the watercourse would also increase, and the possibility of a significant adverse indirect impact could not be precluded in the absence of mitigation, although this is considered unlikely.

The Afan Mineral Railway SINC

- 8.227 The Afan Mineral Railway SINC lies outside the site boundary and is segregated by the A4107. A direct significant adverse impact is considered unlikely and the SINC does not require a change in management, the potential for a significant indirect impact was considered to be minimal. However, in the absence of mitigation relating to site run-off from above, the possibility of a significant adverse impact on the habitats (either via pollution or increased nitrogen deposition from run-off) could not be precluded. In the absence of mitigation, a minor adverse effect could not be precluded but was considered unlikely.

The Caerau North SINC

- 8.228 No direct impacts will befall the Caerau North SINC during the operational stage of the development. However, the designation could potentially be indirectly affected by changes to hydrology (from the maturing tree buffer planting on the southern extent of site (see the Concept Masterplan included in Appendix 5.2 of ES Volume 2), and site run off/pollution events contaminating hydrology from the site above. Increased nutrient loading (nitrogen deposition associated with increased vehicle movements/activity) could also have the potential to impact on this site. An increase in tourist visitor footfall on the designation also

has the potential to damage the habitats in the absence of management. In the absence of mitigation, a minor adverse effect was considered possible.

Plantation on Ancient Woodland (PAW)

- 8.229 No direct adverse impact will affect the PAW during the operational stage. The woodland habitat will have a programme of enhancement and buffer planting, including trees of regional provenance included as part of the construction phase, which will mature through the operational phase. The historic seedbed below will also be allowed to germinate and colonise the bare slopes, which could have beneficial impact locally although this is unlikely to be significant. However, in the absence of a management plan for the newly established vegetation/planting and control of pedestrian traffic, a minor adverse impact on the habitats could not be precluded.

Habitats

- 8.230 With the exception of the small areas of Upland Heathland, Wet Heath, Acid Grassland, Standing Water, Swamp and, Mire along the northern and eastern extent of the Site (see the Parameters Plan and Concept Masterplan included in Appendices 5.1 and 5.2 respectively of ES Volume 2) all of the existing habitat features within the development boundary would have been removed during the Site construction phase and no additional habitat loss would occur as a result of the operation of the scheme.
- 8.231 The landscape planting around site will not mitigate the type or extent of loss of the majority of habitats within the construction phase. However, soft landscaping will be designed to provide ecological resources within the application boundary in the long term as a shelter, foraging and commuting habitat resource for a number of mammal, invertebrate, bird and reptile species. Given the scale and intended function of new planting, compared to the habitat loss during construction, this is unlikely to represent a significant positive (beneficial) operational impact.

Retained Habitats - Upland Heathland, Mire, Swamp, Neutral Grassland & Acid Grassland

- 8.232 No direct impacts will affect these habitats during the operational stage of the Proposed Development. However, the habitat could potentially be indirectly affected by surface water run-off pollution events and increased nutrient loading (nitrogen deposition associated with increased vehicle movements/activity) could also have the potential to impact the habitat. As

described for the Pen y Castell area, uncontrolled pedestrian access could also have damaging effects on retained habitats. In the absence of mitigation, the risk of a significant (major) adverse impact on retained areas could not be precluded

Standing Water

- 8.233 No direct impacts will affect the habitat during the operational stage of the development. However, the habitat could potentially be indirectly affected by changes to hydrology (from infrastructure and the maturing tree buffer planting), and site run off/pollution events. In the absence of mitigation, a significant adverse impact is unlikely although a minor adverse impact could not be precluded.
- 8.234 The Concept Masterplan (Appendix 5.2 of ES Volume 2) incorporates the creation of a number of attenuation ponds in selected areas of the Site as part of the adopted drainage/hydrology strategy (see Parameters Plan (Appendix 5.1 of ES Volume 2)). These attenuation ponds would aim to replicate the existing greenfield run-off rate for surface water so as to avoid any potential downstream effects (see Chapter 15 Water Environment and the Afan Valley WFD assessment Appendix 15.2). These attenuation ponds would increase the amount of standing water habitat at the Site although their primary function will be for surface water attenuation rather than biodiversity value. In the absence of design measures to allow for retention of water over a prolonged period (i.e. so that ponds are permanently wet) and provision of marginal vegetation, they are unlikely to represent a beneficial feature for biodiversity at the Site.

Grassland

- 8.235 The Concept Masterplan (see Appendix 5.2 of ES Volume 2) allows for the provision of a number of areas of open space and soft landscaping areas around the Proposed Development. However, no detail exists for the function of these areas and as such it is unlikely to represent a significant positive (beneficial) operational impact given the amenity nature of this habitat and the likely requirement for a short sward.

Trees and Scrub

- 8.236 Review of the landscape strategy included in Chapter 11: Landscape and Visual Impact Assessment of this ES, identifies areas of proposed tree planting across the site as part of the soft landscaping and buffer planting. This planting will result in a net increase in the tree & scrub habitat available on the Site. However, the density of the new tree planting will have to

be reviewed before it is considered to provide a significant beneficial impact although a moderate positive effect in the medium-long term is likely given the general lack of mature native tree species on the Site and in close proximity.

Fauna

Bats

- 8.237 The site clearance and construction phase will have resulted in the removal of much of the sub-optimal bat foraging habitat on the Site and partial removal of areas of more suitable and productive foraging habitat (conifer plantation). As such no further direct impact is considered likely. The planting of broadleaf and conifer woodland as part of the Proposed Development, soft landscaping (see Chapter 11) will provide additional features suitable for foraging bats in the medium to long term as the planting scheme matures although in the short term, a significant beneficial impact is unlikely.
- 8.238 The second highest amount of bat activity recorded on the Site was associated with the location of the forest village (see Concept Masterplan in Appendix 5.2 of ES Volume 2) and as such indirect operational impacts such as site lighting can have an adverse effect on light intolerant bats species (*Myotis sp.*) in the absence of mitigation measures, although a significant adverse impact is considered unlikely as the main use of the Site was by Pipistrelle species, which are known to be relatively tolerant of artificial lights.
- 8.239 Overall a moderate positive (beneficial) impact is considered likely in the medium – long term as new soft landscaping planting matures offering more suitable foraging habitat.

Ground Nesting Birds (including Nightjar)

- 8.240 Vegetation clearance, soil strip and construction will have resulted in the removal of the majority of the existing nesting and foraging resource within the operational boundary and no additional losses would be associated with the operation stage. However, construction and development activities on the Site are considered likely to increase the provision of predator vantage points overlooking adjacent habitat areas (including retained habitat along the northern boundary) and may result in an increase in nest predation of ground nesting bird species in close proximity to the Site boundary although this impact is considered unlikely to be significant.

- 8.241 The operational phase of the Proposed Development is also likely to cause further disturbance to nesting birds present in retained areas (e.g. northern site boundary) and in adjoining habitats (North Caerau SINC). This increased disturbance of retained habitats is unlikely to represent a significant adverse impact although a minor adverse effect is probable in the absence of mitigation.

Tree/Scrub Nesting Birds

- 8.242 No further loss of tree and scrub habitat will be associated with the operational phase of the Proposed Development. A net gain in both the conifer and broadleaf tree resource across the site is expected as part of the soft landscaping strategy (see Chapter 11) offering suitable alternatives resources for the tree/scrub nesting birds to utilise, although the density and thus suitability of these planted and retained trees is yet to be finalised.
- 8.243 Visitor disturbance within the retained woodland areas (forest and alpine village) is likely to have an adverse effect on the suitability of these trees as viable nesting habitat in the absence of mitigation measures and a significant beneficial impact is unlikely. However, overall a minor positive (beneficial) impact is considered likely in the medium - long term due to the increased nesting resource.

Reptiles

- 8.244 Works associated with Site operation would not result in any additional habitat loss. However, the operational phase of the Proposed Development is likely to represent further disturbance to reptiles present in retained areas (e.g. Pen-Y-Castell/Northern extent of site) and in adjoining habitats at the southern boundaries of the Site (North Caerau SINC). This increased disturbance of retained habitats is unlikely to represent a significant ecological impact, although a minor adverse effect is probable in the absence of mitigation.

Invertebrates

- 8.245 Vegetation clearance, soil strip and construction will have resulted in the removal of the majority of the existing resources for invertebrates within the operational boundary (with the exception of the northern extents of the Site and some isolated retained features (standing water & remnant standard conifer plantation trees), and no additional losses would be associated with the operation stage. Overall, the result of the operational phase of the

Proposed Development is considered unlikely to result in any further significant adverse impacts over and above the construction stage. The new soft landscaping planting would, in the medium – long term provide a resource for common/generalist species although an adverse effect is likely to persist post construction based on the overall extent of habitat loss.

Mitigation Measures

- 8.246 In identifying the type and extent of mitigation through the site clearance, construction and operation stages, consideration has been given to the scale of the works within the Site boundary in line with the proposed Parameters Plan and Concept Masterplan layout & Parameters Plans (see Appendices 5.1 and 5.2 of ES Volume 2).
- 8.247 The impact assessment presented in the Assessment of Potential Impacts section of this chapter above, is provided on the basis that no mitigation would be applied. The following sections address each of the valued ecological receptors and describe the measures to be adopted through site clearance, construction and operation to minimise as far as practicable the effects of the Proposed Development.
- 8.248 In informing the mitigation strategy for the Proposed Development, due consideration has been given to the relative value of the northern retained boundary habitats and isolated retained features within the eastern extent of the site, weighed against the area of land required to deliver the Proposed Development to the necessary standards. The steep northern slopes of site, and isolated eastern features (standing water, mire etc.) would be retained and managed as part of the development, although all other habitat features within the Site boundary will be removed during the construction phase. On this basis, habitat retention and creation (new planting) within the Site boundary could not effectively mitigate alone for the loss of habitats during construction & operation.
- 8.249 Discussions with NPTCBC and BCBC have identified a shortfall in available off-site compensatory land within their ownership that can compensate for the loss of habitats on the Site and mitigate the loss of protected species on the Site (Nightjar (viable virgin nesting habitat) & Reptiles (viable receptor sites)). The nature of the Afan Valley is such that much of the adjacent land in the valley is owned by NRW (as commercial forestry) and as such discussions with NRW are ongoing regarding a parcel of land called Corrwg Bank located between Cymmer and Glyncorrwg. The site is located north of the Application Site, and an Extended Phase 1 Habitat Survey was conducted on the 25th & 28th March 2018, along with a

Protected Species Walk Survey to establish suitability of the habitats on the Site to support ground nesting birds (including Nightjar) and reptiles, and inform any management strategies to increase carrying capacity as part of the mitigation strategy for the Application Site.

8.250 The surveys identified the Corrwg Bank site was comprised of stands of coniferous and semi natural woodland, which must be maintained at least 20% tree cover with large areas of dwarf shrub heath and bracken. In its present state, the Corrwg Bank mitigation site was considered to be suitable for supporting reptile and ground nesting bird populations, including Nightjar, although no records exist for these protected species on-site. Existing site features and habitats have limited potential in terms of new creation and/or alteration, and the continuation of current habitat management would be recommended to maintain site conditions as they are with the addition of Bracken management to ensure that the dense Bracken does not spread, degrading the habitat quality and subsequent suitability as mitigation areas. However, there are some limited enhancement strategies targeted toward increasing carrying capacities (Nightjar & Reptiles) of the compensation sites which could be used. Appendix 8.15 contains the full report relating to the mitigation sites (Corrwg Bank and Solar Farm). Discussions with NRW & NPT regarding the mechanism to deliver appropriate long-term management will now be progressed. It is likely that any detailed management prescription would be conditioned as part of any planning approval and would need agreement from NRW & NPT/CBC.

8.251 An area of land located directly south of the Application Site (within in the county of BCBC) is within the control of the Applicant and has been identified as contributing to the off-site compensatory site to offset the losses on the Site. This site within the Applicant's ownership was previously awarded full planning permission for a Solar Farm (Ref:P/14/543/FUL) by BCBC. However, there are no current intentions to construct the Solar Farm and instead the whole site area will be utilised as a receptor site for the Proposed Development. This site will be from here on referred to as the 'Solar Farm site'. The site is comprised of a mosaic of habitats including clear fell conifer plantation, continuous bracken, acid grassland, sphagnum blanket bog, dwarf shrub heath and scattered trees/scrub. The habitats within this parcel of land are of a similar composition to the Application Site, with a comparable assemblage of bird species including Nightjar identified as part of the Solar Farm survey work (Pryce Consultant Ecologists, 2014)²⁹. No reptiles were found on this land parcel during surveys in 2014.

²⁹ Foel Fawr Solar Array, Caerau, Maesteg. Ecological Assessment. Report issued 6th August 2014

- 8.252 An updated Extended Phase 1 Habitat survey was conducted at the Solar Farm site between 22nd – 23rd February 2018, with an additional protected species walkover conducted on the 13th March 2018. The surveys identified the Solar Farm site as of similar habitat composition to the Application Site dominated by marshy grassland, shrub heath, scrub, Bracken with some sphagnum blanket bog. These habitats were generally considered to be currently suitable to support an existing reptile population (an incidental Common Lizard sighting recorded near the Caerau estate) and ground nesting birds including small numbers of Nightjar. There was considered to be some limited scope to alter the habitats on-site to benefit these species through the introduction of habitat management, and to limit human disturbance to increase the carrying capacity for reptiles and ground nesting birds (i.e. Nightjar) (see Appendix 8.15 of ES Volume 2 for full report relating to the mitigation sites).
- 8.253 The Solar Farm site is currently unmanaged, and a management plan would be required to be developed in collaboration with NPTCBC & BCBC with the aims of restoring and managing the habitats present to create/maintain a more diverse vegetation structure to provide habitat for a greater range of species (plants, invertebrates, reptiles & birds) and increase carrying capacities from these enhancement measures.
- 8.254 The compensation measures outlined above have not yet been fully agreed and secured. The Solar Farm site is within the Applicant's control and can be delivered and managed as part of the off-site receptor/compensation sites requirement. However, delivery of management and the details of this for the Corrwg Bank site within NRW ownership has not been agreed as of yet and further discussions to secure this off-site compensation area are required, and as such the site is omitted from this current assessment until agreement has been reached with NRW.
- 8.255 For ease of reference, a table is presented at the end of this section (Table 8.15) that summarises the impacts of the scheme on each of the valued ecological receptors in the absence of, and following, mitigation.
- 8.256 The mitigation measures described within this section have been devised to retain elements of the key biodiversity resources identified at the Site and to contribute to the maintenance of biodiversity locally. Delivery of the mitigation measures described in subsequent sections could be incorporated into an Ecological & Landscape Management Plan for the site, the detail of which could be controlled via planning condition and would be agreed with the local planning authority.

8.257 The mitigation strategy developed and incorporated into the Proposed Development incorporates the following key features:

- a) Instruction of a permanent Ecological Clerk of Works (ECoW) to oversee and document the complex ecological mitigation required on the Site;
- b) No open excavations over 1.2m deep left overnight;
- c) No lighting of the retained northern habitats or retained conifer plantation where practicable or night works in this area;
- d) New tree/shrub planting along the northern boundaries and around the retained conifer plantation in the north east to maintain, enhance and strengthen the bat foraging and commuting habitat present there. The tree species planted will be appropriate to the Site and conditions (see Chapter 11 for details);
- e) Provision of mature planting along northern PAWS and within retained conifer plantation to reduce fragmentation to ensure bats species have enhanced foraging and commuting routes;
- f) Where practicable Northern PAWS and Conifer plantation to either retained as dark corridors or to include strategic dark corridors for foraging and commuting bats;
- g) Clearance of scrub and grassland areas within the Site boundary will be undertaken outside the bird breeding season (March-August inclusive) where possible and prior to earthworks or topsoil stripping grassland areas on the Site will be cut short prior to the breeding bird season to deter ground nesting species. Where cutting is undertaken in the nesting season, works to be preceded by a walk-over by a suitably experienced surveyor (ornithologist) and any nest locations marked and avoided (together with a 2-3m buffer);
- h) Phased clearance of scrub and any grassland areas, first cut to 300mm with a period of at least 48hr prior to full clearance to allow any reptiles present time to disperse to adjacent habitats;
- i) Reptile fencing to be erected to compartmentalise site to assist with translocation programme;
- j) Reptile fencing erected to prevent any movement of reptiles into works areas;
- k) Provision of log-pile habitat, within the northern retained habitats and Solar Farm site (client owned) to increase carrying capacity (reptiles);
- l) Adoption of a sensitive lighting strategy to minimise new lighting along known bat foraging/commuting routes i.e. northern boundary PAW and eastern retained conifer plantations;

- m) Provision of bat boxes on retained trees within the northern PAWS and retained conifer plantation woodland;
- n) Provision of bird boxes in northern PAWS and conifer plantation habitat to provide replacement for loss of nesting resource on-site);
- o) Japanese Knotweed & Himalayan Balsam eradication management plan;
- p) Dense scrub and woodland to be searched prior to clearance as a precautionary measure to identify any single hole outlier (Badger) setts;
- q) Integration of appropriate pollution prevention and control measures into the drainage strategy proposed for the development. Potential run-off from the Site minimised during construction and operation phases to prevent adverse impacts. Draining of surface water to sustainable drainage systems (SuDS) employed. Further information is provided in WFD assessment (as per Appendix 15.2 of ES Volume 2). To ensure the delivery of appropriate mitigation measures during the construction phase it is proposed that a Construction Environmental Management Plan (CEMP) be prepared by the appointed contractor. The CEMP would be agreed with the Local Planning Authority prior to the commencement of construction works on the Site; and
- r) To ensure the delivery of the above mitigation an Ecological & Landscape Management Plan would be prepared to detail the mitigation proposed and the appropriate timings of works. This would require input from scheme contractors, ecologists and landscape architects.

8.258 As previously indicated, the scale of the Proposed Development is such that habitat retention (in the northern extent of the Site and in localised areas at the eastern extent of site), management and new planting within the Site boundary could not effectively mitigate alone for the loss of habitats during construction and operation.

8.259 For the avoidance of doubt, the residual impact assessment presented at the end of the Summary and Conclusions section of this chapter does not include any consideration of the off-site compensation that are yet to be agreed with the local authorities and NRW for Corrwg Bank, although the use of the Solar Farm site is included (this land is within the Applicant's control and is deliverable as part of the mitigation strategy).

Protected sites

On-site Watercourse SINC

- 8.260 The single small stream on the Site was designated as a SINC as part of Neath Port Talbot policies. The stream rises in the western extent of the Site and flows off-site to the north. Re-profiling and culverting is likely to result in a significant adverse impact on this feature as the majority of the section within the site would be affected and the stream effectively lost as a physical feature on the Site.
- 8.261 During the construction phase the designated watercourse would have been re-profiled/re-routed and potentially culverted in areas, with no additional physical disturbance in the operational phase. However, indirect effects are still a possibility. Given the nature of the Proposed Development, the risk of fuel or oil spillage into the watercourse would also increase.
- 8.262 The proposed CEMP will include measures to protect the retained running water habitat during the construction phase such as avoiding surface water run-off, pollution incidents etc. A Sustainable Drainage System (SuDS) will also be implemented to maintain the existing quantity and quality of water entering the feature. This mitigation will ensure no significant impact on the SINC will occur during construction works. Integration of appropriate pollution prevention and control measures into the Proposed Development will also ensure no operational impact in the long term on this feature. The WFD Assessment conducted as part of Chapter 15 (see Appendix 15.2 of ES Volume 2) concluded that these mitigation measures are suitable to prevent deterioration of surface and groundwater bodies.
- 8.263 In the short term a major adverse impact is predicted due to the re-engineering of the stream reducing to moderate in the long term based on the maturing of planting around the re-profiled stream and in the presence of an effective drainage & pollution prevention strategy to be adopted.

The Afan Mineral Railway SINC

- 8.264 The Afan Mineral Railway SINC lies directly adjacent to the northern boundary of the Site and is segregated by the A4107. No direct impacts will befall this SINC during the construction stage of the Proposed Development. However, the designation could potentially be indirectly

affected by construction activities contaminating watercourses & and surface runoff (hydrology) from the Site above.

- 8.265 The proposed CEMP will include measures to protect the retained running water habitat during the construction phase such as avoiding surface water run-off, pollution incidents etc. A Sustainable Drainage System (SuDS) will also be implemented to maintain the existing quantity and quality of water entering the feature. This mitigation will ensure no significant impact on the SINC will occur during construction works. Integration of appropriate pollution prevention and control measures into the Proposed Development will also ensure no operational impact in the long term on this feature, (see WFD Assessment in Appendix 15.2 of ES Volume 2 for further details).
- 8.266 Overall a minor adverse impact is possible in the short term reducing to Neutral in the long term with the implementation of the CEMP and SuDS.

The Caerau North SINC

- 8.267 The Caerau North SINC lies directly adjacent to the southern boundary of the Site, with part of the designation located within the boundary of the Solar Farm site. No direct impacts will befall this SINC during the construction stage of the Proposed Development. However, the designation could potentially be indirectly affected by construction activities changing hydrology and contaminating hydrology from the site above. Tourist visitor footfall on the designation also has the potential to damage the habitats in the absence of management.
- 8.268 A management plan to protect the part of the SINC within the boundary of the Solar Farm site as mitigation land will be formulated in conjunction with the local authorities. The principles of the management plan developed for the Solar Farm site could also be applied (by BCBC) to the wider area of the SINC. The CEMP produced for the Application Site will include measures to protect the retained running water habitat during the construction phase such as avoiding surface water run-off, pollution incidents etc. A Sustainable Drainage System (SuDS) will also be implemented to maintain the existing quantity and quality of water entering the features. The Air Quality ES chapter (see Chapter 6) details modelling of nitrogen oxide concentrations on the Site in close proximity to the SINC including the nitrogen deposition assessment for comparison with the annual mean NO_x objective. This concludes that the annual mean NO_x objective is met in all assessment years. As such given these predictions, the distances involved and the prevailing wind direction (i.e. from south west), the risk of increased nitrogen

deposition at the SINC is considered minimal (this factor will not be considered further in any of the other ecological features). The above mitigation will ensure no significant impact on the SINC will occur during construction works, and integration of appropriate pollution prevention and control measures in the Proposed Development will also ensure no operational impact in the long term on this feature.

- 8.269 Overall a minor adverse impact is predicted in the short term reducing to Neutral in the long term based on effective management of the SINC.

Plantation on Ancient Woodland

- 8.270 The creation of the Site access road, located at the north-western extent of the Site, will result in the loss of habitat associated with the Plantation on Ancient Woodland underneath the footprint of the access road. However, the majority of the designations footprint will be retained. The PAWS can also be indirectly affected by site run-off (either via pollution), and an increase in tourist visitor footfall on the designation.
- 8.271 The woodland habitat will have a programme of enhancement and buffer planting, including trees of regional provenance included as part of the construction phase, which will mature through the operational phase. The historic seedbed below will also be allowed to germinate and colonise the bare slopes.
- 8.272 The implementation of a management plan along with the proposed CEMP, which will include measures to protect the retained running water habitat during the construction phase such as avoiding surface water run-off, pollution incidents etc., will help protect the retained habitat. A Sustainable Drainage System (SuDS) will also be implemented to maintain the existing quantity and quality of water entering the features. A management plan for the designation for the long-term protection of the PAWS will be implemented and will be formulated in conjunction with the local authority and NRW.
- 8.273 Overall a minor adverse impact is predicted in the short term reducing and finally changing to a moderate positive (beneficial) impact in the long term based on the maturing of tree planting.

Retained Habitats - Upland Heathland, Mire, Swamp, Neutral Grassland & Acid Grassland

- 8.274 The majority of the above habitats are located on the steep slopes located on the northern extent of the Site and as such will remain undeveloped. The remaining habitats are located within the eastern extent of site around the standing water which is to be retained as an ecological feature (see the Parameters Plan included in Appendix 5.1 of ES Volume 2).
- 8.275 No direct impacts will affect these habitats during the operational stage of the development. However, the habitat could potentially be indirectly affected by site run off/pollution events contaminating hydrology from the Site above. An increase in tourist visitor footfall on the habitat potentially damaging it is also possible.
- 8.276 A management plan to protect the retained habitats will be formulated in conjunction with the local authorities, along with the proposed CEMP, which will include measures to protect the retained running water habitat during the construction phase such as avoiding surface water run-off, pollution incidents etc. A Sustainable Drainage System (SuDS) will also be implemented to maintain the existing quantity and quality of water entering the feature. The above mitigation will ensure no significant impact on the habitats will occur during construction works, and integration of appropriate pollution prevention and control measures in the Proposed Development will also ensure no operational impact in the long term on this feature.
- 8.277 Overall a minor adverse impact is predicted in the short term reducing to neutral impact in the long term as the habitat is effectively managed.

Standing Water

- 8.278 The existing standing water pond located within the eastern extent of the Site habitat will be retained within the Proposed Development, and as such no direct significant impact will occur on this feature. The Concept Masterplan (see Appendix 5.2 of ES Volume 2) will incorporate the creation of a number of attenuation ponds in selected areas of the Site as part of the adopted drainage/hydrology strategy. However, as their ability to hold water for a prolonged period of time is currently unknown, their contribution to the habitat resource will be discounted.

- 8.279 The habitat could also potentially be indirectly affected by construction works changing hydrology and site run off/pollution events contaminating hydrology from the Site above during both the construction and operational phase.
- 8.280 The proposed CEMP, will include measures to protect the retained standing water habitat during the construction phase such as avoiding surface water run-off, pollution incidents etc. A Sustainable Drainage System (SuDS) will also be implemented to maintain the existing quantity and quality of water entering the features. The above mitigation will ensure no significant impact on the habitat will occur during construction works, and integration of appropriate pollution prevention and control measures in the Proposed Development will also ensure no operational impact in the long term on this feature.
- 8.281 Overall a minor adverse impact is predicted in the short term reducing to neutral in the long term, based on the effective management of the habitat.

Additional Habitat Creation within development boundary

- 8.282 The landscape strategy and proposed Concept Masterplan (see Appendix 5.2 of ES Volume 2) identify areas of proposed tree planting and grassland seeding across site. No detail regarding extent and species composition is presently available to review. However, this provision of grassland habitat will not offset the significant losses resulting from the construction. The planted trees will provide a net gain in this resource on the Site providing a moderate positive (beneficial) effect in the medium-long term.

Fauna

Bats

- 8.283 The site clearance and construction phase will have resulted in the removal of much of the sub optimal bat foraging habitat on the Site and partial removal of areas of more suitable and productive foraging habitat (conifer plantation). As such no further direct adverse impact is considered likely in the operational phase.
- 8.284 The planting of broadleaf and conifer woodland as part of the Proposed Development soft landscaping and creation of attenuation ponds on the Site (undetermined ecological value) will provide a net gain in suitable foraging habitat for a number of bat species in the medium to long term as the planting scheme matures. This use of the Site habitats is likely to be

dominated by light tolerant hawking species such as *Pipistrellus* and *Nyctalus*, although attenuation pond habitat would be also likely to support use by Daubenton's bats in darker boundary areas. This net increase in foraging habitat is considered likely to result in moderate positive (beneficial) impact in the long term as the habitats develop and the bats find this new resource.

8.285 One of the main issues potentially affecting bats is fixed site lighting, which can have disruptive implications on the foraging and commuting behaviour on bat species sensitive to artificial light. Mitigation will include the adoption of a sensitive lighting strategy to minimise new lighting along known bat commuting routes and foraging areas and will be achieved through a number of measures including maintaining 'dark corridors' along the northern boundary, and where possible around the forest village, using directional or cowled lanterns to limit light spill where standard street lighting is proposed near these areas. On this basis, the operational site lighting is unlikely to have a significant adverse impact on bat activity across the Site.

8.286 Overall the foraging impact is likely to be minor adverse in the short term. In the medium – long term, a moderate positive impact is considered likely.

Ground Nesting Birds (including Nightjar)

8.287 Vegetation clearance, soil strip and construction will have resulted in the removal of the majority of the existing nesting and foraging resource within the Site boundary with only the steep slopes of the northern valley side retained, which had less ground nesting bird activity associated with it. No additional losses would be associated with the operation stage.

8.288 The operational phase of the Proposed Development is also likely to cause further disturbance to nesting birds present in retained areas (e.g. northern site boundary) and in adjoining habitats (North Caerau SINC).

8.289 In order to minimise impacts as far as practicable and comply with the legislation, clearance of scrub and grassland areas within the Application Site boundary would be undertaken outside the bird breeding season which typically runs from March to August inclusive. This will include a short cut on all grassland areas within the development boundary to render them unsuitable for ground nesting bird species. However, given the nature and scale of the Proposed Development, it is unlikely all clearance works will be able to be completed within the appropriate season. As such where cutting is undertaken in the nesting season, works will

be preceded by a walk-over by a suitably experienced surveyor (ornithologist) and any nest locations marked and avoided (together with a 2-3m buffer). Nightjar are known to nest on bare ground and as such any vegetation clearance will have to incorporate a combination of deterrents to stop the birds from nesting.

- 8.290 The creation of soft landscape planting areas across the Site will not offset the grassland habitat lost as part of the construction activities. The retained habitats and attenuation ponds are all likely to provide foraging and shelter opportunities for some of the bird species noted within the assemblage known to occur at the Site although the upland nature of the assemblage is likely to fundamentally change within the development areas due to the removal of the large areas of open upland habitats.
- 8.291 The Solar Farm site, located immediately south of the Application Site, is proposed as compensation for the loss of the on the Site upland habitats as part of a wider suite of off-site compensation areas (yet to be finalised). The site is of similar habitat composition to those lost on the Application Site with a similar assemblage of nesting bird species (including confirmed presence of Nightjar during 2014 surveys), and as such the site by itself does not compensate for the loss of habitat. However, management of the Site and its habitats will enhance the habitats for ground nesting birds with the aim of increasing its carrying capacity (see report in Appendix 8.15 of ES Volume 2).
- 8.292 The Site and surrounding area supports a range of summer visiting and resident bird species, which are considered vulnerable to disturbance by the construction and operational stages of the Proposed Development.
- 8.293 The Proposed Development is considered certain to result in a major adverse impact on the upland ground nesting bird assemblage present on-site through habitat loss. Operational impacts associated with levels of disturbance are also likely to result in an adverse impact on the bird assemblage on retained and adjacent habitats and on-site.
- 8.294 The overall effect of the Proposed Development is considered to have a major adverse impact at the local scale, as the grassland/ground nesting species (Meadow Pipit, Cuckoo, Skylark, Nightjar etc.) will be largely lost and species prone to disturbance will be displaced into surrounding habitat areas and replaced by typical urban species as the planting matures within the development footprint. The off-site Solar Farm compensation site will not fully mitigate

the loss of the ground nesting bird (including Nightjar) habitats in the Application Site, due to the similar habitat and bird assemblage present in both sites. However, the introduction of a habitat management programme will increase the carrying capacity of the Site providing alternative habitats for displaced birds, partially reducing the impact. Securing and agreeing the management on the Corrwg Bank site has the potential to further reduce the effects although some residual adverse impact locally is likely to persist.

Tree/Scrub Nesting Birds

- 8.295 The Proposed Development will result in removal of the majority of the tree and scrub areas in the Site to accommodate the alpine & forest village. The exact area to be lost is unknown at this stage of the design development. Tree and scrub habitats will be retained at the periphery of the Site (for example at Pen y Castell) although the increased level of disturbance will adversely impact these areas without mitigation.
- 8.296 No further loss of tree and scrub habitat will be associated with the operational phase of the development. However, a net gain in both the conifer and broadleaf tree resource across the Site is expected as part of the soft landscaping strategy offering suitable alternatives resources for the tree/scrub nesting birds to utilise, although the density and thus suitability of these planted and retained trees is yet to be finalised.
- 8.297 Visitor disturbance within the retained woodland areas associated with the woodland activities (forest and alpine village) is likely to have an adverse effect on the suitability of these trees as viable nesting habitat.
- 8.298 Overall in the short term a major adverse impact is considered likely due to the habitat loss, changing in the medium-long term to a minor positive impact as the planted trees and scrub mature within the soft landscaping increase the nesting resource.

Reptiles

- 8.299 The loss of habitat associated with the scheme would be certain to result in a significant adverse impact in the absence of mitigation. All common reptiles are protected against killing and injury under the Wildlife and Countryside Act 1981 (as amended) and typically this translates to excluding them from areas of development where they could be at risk or to capture and transfer them to areas outside the development. For this scheme, given the nature

and scale of the Proposed Development a combination of both approaches is considered the most cost-effective solution as insufficient suitable existing habitat is to be retained on the Site.

8.300 Prior to construction, a phased reptile clearance/translocation exercise would be undertaken within all suitable reptile habitat within the site boundary. These works would proceed in a progressive manner from the north-western boundary (site access) south and eastwards and would be aided through compartmentalisation of the scheme with the installation of reptile fencing. Essentially, a successful translocation is likely to require the following elements:

- Identification and enhancement (as appropriate) of adjacent retained habitats so as to increase carrying capacity – such areas include the retained northern extent of the Site and the off-site Solar Farm site;
- Cutting grassland vegetation and heath to 200 mm
- Installing reptile proof fencing along compartment boundaries
- Deployment of artificial at a high density of 50 – 100/ha. refuges within compartments of the development site
- A likely minimum of 10 - 15 visits (dependent on numbers/capture rates) to check the refuges under suitable weather conditions to remove any reptiles;
- Management (i.e. strimming/cutting) of grassland vegetation between refuges during translocation;

8.301 Prior to construction, a phased clearance would follow the translocation exercise with all suitable reptile habitat within the Site boundary cleared (strimmed) in a progressive manner from the north-western boundary (site access) south and eastwards. This would render the areas unsuitable for reptiles and allow any remaining reptiles sufficient time to move out prior to the commencement of ground works. A buffer strip of unsuitable habitat will also be installed as a temporary exclusion zone along the Site boundary, this will be formed through habitat management works to render this unsuitable (strimming and maintenance of a short sward <50mm) to prevent movement of reptiles into the works area.

8.302 In addition, to the above mitigation a number of reptile refugia (log-pile habitats and hibernacula) will be created within the retained areas along the northern extent of the Site to enhance this habitat for reptiles. These habitat piles will be constructed from brash and material arising from site clearance works and will be installed during site clearance works.

- 8.303 The retained habitat on the Site (northern extent) and off-site compensation area (Solar Farm site) are not adequate to receive the population of reptile from the site footprint, especially as these habitats already have a similar composition of reptile species and the carrying capacity is unknown. Further discussions with NRW are ongoing to in order to secure the Corrwg Bank parcel of land, which is within their ownership, to act as a receptor site to receive further translocated reptile species.
- 8.304 The operational phase of the development is likely to represent further disturbance to reptiles present in retained areas (e.g. Pen-Y-Castell/Northern extent of site) and in adjoining habitats at the southern boundaries of the Site (North Caerau SINC).
- 8.305 The mitigation and compensation detailed above will in part reduce the impact of the Proposed Development on the reptile population on the Site supports, however the risk of a significant adverse impact remains given the significant loss of habitat on the Site and uncertainties regarding carrying capacity of the mitigation areas (i.e. retained northern habitats and Solar Farm site). The likelihood of this risk being realised is currently assessed as Likely although as a minimum, a proportion of the existing population could be accommodated within the secured mitigation areas. On this basis, a moderate negative impact on the reptile population within the site is considered likely. The securing of the NRW off-site land (Corrwg Bank), as a receptor site, is likely to reduce the risk of a significant adverse impact on the species.

Invertebrates

- 8.306 Habitat features at the site are considered to have invertebrate interest on a county scale and as large areas of these features will be lost as part of the development proposal, this net loss in available habitat is considered likely to result in a significant adverse impact on the invertebrate assemblage present in the absence of mitigation.
- 8.307 Proposed soft landscape planting will result in a net increase in standing water and tree habitat on-site. Further details of the soft landscape planting scheme is currently unknown at this stage and as such their benefit to invertebrate species is unknown. However, these soft landscaping measures are unlikely to represent a significant beneficial impact, given the net loss in habitat associated with site clearance/construction works.
- 8.308 As described in paragraphs 8.248 to 8.253, provision of off-site compensation either through management/enhancement at the Solar Farm site or at the Corrwg Bank site (NRW owned

and yet to be confirmed) , could mitigate in part of the loss of habitats during construction & operation of the scheme. However, in the absence of a secured off-site provision, a significant adverse impact on the invertebrate assemblage is likely to persist on the basis of the mitigation measures within retained/newly planted habitats.

Residual Impacts

- 8.309 Following consideration of the potential impacts of the Proposed Development on valued ecological features during construction and operation, and the implementation of mitigation measures described in the previous section, the residual impact of the scheme is summarised in Table 8.15.
- 8.310 The table indicates that major negative impacts would be associated with the Proposed Development during construction as a result of the loss of the wet heath and *Agrostis-Pteridium* mosaic habitat and re-engineering of the water course until the new planting within the scheme becomes established and matures. A minor adverse impact is expected on the upland heathland from the loss of isolated stands of habitat.
- 8.311 A major adverse impact associated with the Proposed Development during construction will be experienced by the ground & tree/scrub nesting birds (including Nightjar) and invertebrate populations on the Site. In the absence of securing the additional off-site NRW compensation/receptor site a moderate adverse impact will be experienced by the reptile species. A minor adverse impact will be experienced by the foraging bats in the short term until the planting matures.
- 8.312 A moderate positive impact is expected in the long term (operation) on the PAWS and foraging bat population, whilst a minor positive impact is expected on the tree/scrub nesting birds as the planting matures.
- 8.313 The highest valuation of a habitat or vegetation community was 'County' given to the SINCs on and adjacent to the Site, whilst the highest valuation given to a habitat was 'County' assigned to the Upland Heathland, Wet Heath & Mire. The highest valuation for a protected species was the Nightjar population identified on the Site and was considered to be of 'National' ecological importance. Other features were considered of importance at a 'Local'/'Negligible' scale.

Table 8.15: Residual Impact Summary

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
Construction				
Designations				
On-site Watercourse SINC Direct: Re-profiling/re-directing and potentially culverting.	Permanent effect on feature of County Importance.	Major adverse impact	Sympathetic engineering design.	Major adverse impact in the short/medium reducing to moderate in the long term as the engineered stream is colonised and with mitigation measures in place.
Indirect: Creation of silt/other contaminants potentially entering running water.	Temporary effect on feature of County importance.	Minor adverse impact	Production of CEMP. Creation of SuDS.	

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
The Afan Mineral Railway SINC No direct impacts. Indirect: Surface water runoff/hydrology contaminants potentially affecting SINC.	Temporary effect on feature of County importance.	Minor adverse impact	Production of CEMP. Creation of SuDS.	Neutral in long term with mitigation measures.
Caerau North SINC No direct impact. Indirect impact from potential changes in hydrology. Creation of silt/other contaminants potentially entering hydrology and habitats on the Site.	Potentially permanent effect on feature of County Importance from altered hydrology.	Minor adverse impact.	Sympathetic soft landscaping design and earth works.	Neutral after mitigation measures.
	Potential temporary affect from contaminants.	Minor adverse impact.	Production of CEMP. Sympathetic soft landscaping design and earth works. Creation of SuDS.	

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
Plantation on Ancient Woodland A small net loss will occur from the creation of the access road.	Permanent small effect on feature of County importance.	Minor adverse impact	Sympathetic engineering design and soft landscaping.	Neutral in medium-long term as woodland planting and colonising matures.
Habitats				
Upland Heathland Direct: Small loss of eastern habitats.	Permanent effect on feature of County importance.	Minor adverse impact	No details are currently available regarding soft landscaping scheme and offset habitat loss through off-site compensation.	Minor Adverse in long term in absence of mitigation planting.
Wet Heath Direct loss of majority of habitat.	Permanent effect on feature of County importance.	Major Adverse effect	No details are currently available regarding soft landscaping scheme and offset habitat loss through off-site compensation.	Major Adverse effect from the majority of habitat loss.

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
Mire(M6c & M25a) Direct net loss of habitat.	Permanent effect on feature of County importance.	Moderate adverse impact	No details are currently available regarding exact habitat loss; soft landscaping scheme and offset habitat loss through off-site compensation.	Moderate adverse in the short term through habitat loss.
Mire (M6c & M25a) Indirect impact from potential changes in hydrology. Creation of silt/other contaminants potentially entering hydrology and habitats.	Temporary effect on feature of local importance.	Minor adverse impact	Production of CEMP. Creation of SuDS.	
Agrostis-Pteridium mosaic (M23) Loss of the majority of habitat to create access road.	Permanent effect on feature of local importance.	Major adverse impact	No details are currently available regarding soft landscaping scheme and offset habitat loss through off-site compensation.	Major adverse impact in long term.

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
Neutral Grassland It is unclear whether there will be direct impact due to its marginal location. Indirect: Surface water runoff/hydrology contaminants potentially affecting habitat.	Temporary effect on feature of local importance.	Minor adverse impact	Production of CEMP. Creation of SuDS.	Neutral in long term with mitigation measures.
Swamp (S9 & S19) Indirect impact from potential changes in hydrology. Creation of silt/other contaminants potentially entering hydrology and habitats.	Temporary effect on feature of local importance.	Minor adverse impact	Production of CEMP. Creation of SuDS.	Neutral in long term with mitigation measures.

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
Acid Grassland Construction activities and storage materials could not be precluded.	Temporary effect on feature of County importance.	Minor adverse impact	Production of CEMP.	Neutral in long term with mitigation measures.
Standing Water Indirect impact from potential changes in hydrology. Creation of silt/other contaminants potentially entering hydrology and habitats.	Temporary effect on feature of local importance.	Moderate adverse impact	Production of CEMP. Creation of SuDS.	Neutral in long term with mitigation measures.
Fauna				
Bats – foraging/ commuting: Net loss of suitable foraging habitat, and disturbance by increased human presence;	Permanent on feature of local importance.	Minor adverse impact in localised areas of site due to loss of foraging habitat,	Retention of northern slope habitats and some conifer plantation maintaining green corridors. Additional woodland planting;	Minor adverse impact in the short-term, reducing in the medium term as new planting establishes and

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
traffic and artificial light caused by construction.	Temporary effect on feature of local importance.	Minor adverse impact increased lighting and noise in short term	Sympathetic site lighting plan. Retention of dark corridors along retained woodland corridors.	matures, with sensitive lighting.
Ground Nesting Birds Significant loss of the majority of ground nesting habitat on-site. Indirect: Potential increased disturbance of retained/adjacent ground nesting habitats.	Permanent effect on feature of local importance.	Major Adverse impact.	Soil strip outside bird nesting season and/or proceeded by a visual inspection.	Major Adverse impact.
	Temporary effect on feature of local importance.	Minor adverse impact increased disturbance in short term on retained and adjacent habitats.		
Tree Nesting Birds Direct loss of nesting habitat on-site. Indirect: Potential increased disturbance of retained tree/scrub nesting habitats.	Permanent effect on feature of local importance.	Major Adverse impact.	Retention of woodland areas and green corridors. Additional woodland planting;	Major Adverse in short term reducing in the medium-long term as new planting establishes and matures.
	Temporary effect on feature of local importance.	Minor adverse impact increased from increased disturbance.	Vegetation clearance outside bird nesting season and/or preceded by a visual inspection.	

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
Nightjar Significant loss of the majority of ground nesting habitat on-site.	Permanent effect on feature of National importance.	Major Adverse impact.	Soil strip outside bird nesting season and/or proceeded by a visual inspection. Deterrents employed to stop nesting on-site. Solar Farm off-site compensation to have implementation of a management strategy to increase carrying capacity of Nightjar.	Major Adverse impact potentially reducing with strategic management of off-site compensation sites increasing carrying capacity.
Indirect: Potential increased disturbance of retained/adjacent ground nesting habitats.	Temporary effect on feature of National importance.	Minor adverse impact increased disturbance in short term		

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
Reptile Significant loss of the majority of reptile habitat on-site. Indirect: Potential increased disturbance of retained/adjacent reptile habitats.	Permanent effect on features of local ecological importance.	Major Adverse impact.	Phased reptile clearance/translocation exercise agreed with LPA. Works undertake at appropriate time of year. Retention of the Northern Boundary reptile habitats; Provision of soft landscape planting across site creating suitable reptile mosaic of habitat in some areas of site (yet to be confirmed); Management of retained and any off-site compensation area (Solar Farm site) to enhance biodiversity including reptile interest. Enhancement of retained areas through provision a number of habitat piles in the retained grassland areas increasing carrying capacity.	Moderate Adverse impact.

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
Invertebrates Significant loss of the majority of invertebrate habitat on-site.	Permanent effect on features of county ecological importance.	Major Adverse impact.	Retention of the Northern Boundary invertebrate habitats; Provision of soft landscape planting across site creating a suitable diverse mosaic of invertebrate habitat in some areas of site (yet to be confirmed); Management of retained and any off-site compensation area (Solar Farm site) to enhance biodiversity including invertebrate interest. Enhancement of retained areas through provision a number of habitat piles in the retained grassland.	Major Adverse impact.
Operation				
Designations				
On-site Watercourse SINC Indirect: Creation of contaminants potentially entering running water.	Temporary effect on feature of County importance.	Minor adverse impact	Integration of appropriate pollution prevention and control measures into the Proposed Development.	Neutral impact in long term.

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
The Afan Mineral Railway SINC Indirect: Surface water runoff/hydrology contaminants potentially affecting SINC.	Temporary effect on feature of County importance.	Minor adverse impact	Integration of appropriate pollution prevention and control measures into the Proposed Development.	Neutral impact in long term.
Caerau North SINC Indirect impact from potential changes in hydrology from maturing buffer planting. Creation of contaminants potentially entering hydrology and habitats on-site. Increase disturbance from visitor footfall.	Potentially permanent effect on feature of County Importance from altered hydrology.	Minor adverse impact.	Sympathetic soft landscaping design.	Neutral impact after mitigation measures and effective management.
	Temporary effect on feature of County importance from contamination events and increased visitor disturbance.	Minor adverse impact	Integration of appropriate pollution prevention and control measures into the Proposed Development. Management plan controlling visitor footfall on-site.	

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
Plantation on Ancient Woodland Increase in net woodland cover from planting.	Permanent effect on feature of County importance due to increase in woodland habitat.	Moderate positive impact	Proposed woodland planting maturing and natural re-colonising of felled areas.	Moderate positive impact in long term.
Indirect: Surface water runoff/hydrology contaminants potentially affecting designation. Increase disturbance from visitor footfall.	Temporary effect on feature of County importance from contamination events and increased visitor disturbance.	Minor adverse impact	Integration of appropriate pollution prevention and control measures into the Proposed Development. Management plan controlling visitor footfall on-site.	

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
Habitats				
Upland Heathland Indirect: Surface water runoff/hydrology contaminants potentially affecting designation. Increase disturbance from visitor footfall.	Temporary effect on feature of County importance from contamination events increased visitor disturbance.	Minor adverse impact	Integration of appropriate pollution prevention and control measures into the Proposed Development. Management plan controlling visitor disturbance on-site.	Neutral in long term with mitigation measures.
Mire(M6c & M25a) Indirect impact from potential changes in hydrology from maturing buffer planting. Creation of contaminants potentially entering hydrology and habitats on-site.	Potentially permanent effect on feature of County Importance from altered hydrology. Temporary effect on feature of County importance.	Minor adverse impact from indirect effects.	Sympathetic soft landscaping design. Integration of appropriate pollution prevention and control measures into the Proposed Development.	Moderate adverse impact in short term reducing in long term with mitigation measures.

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
Neutral Grassland It is unclear whether there will be retention of this habitat. Indirect: Surface water runoff/hydrology contaminants potentially affecting habitat. Increase disturbance from visitor footfall.	Temporary effect on feature of local importance.	Minor adverse impact	Integration of appropriate pollution prevention and control measures into the Proposed Development. Management plan controlling visitor footfall on-site.	Neutral in long term with mitigation measures.
Swamp (S9 & S19) Indirect impact from potential changes in hydrology from maturing buffer planting. Creation of contaminants potentially entering hydrology and habitats on-site.	Potentially permanent effect on feature of County Importance from altered hydrology. Temporary effect on feature of local importance.	Minor adverse impact	Sympathetic soft landscaping design. Integration of appropriate pollution prevention and control measures into the Proposed Development.	Neutral in long term with mitigation measures.

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
Acid Grassland Indirect: Surface water runoff/hydrology contaminants potentially affecting habitat. Increase disturbance from visitor footfall.	Temporary effect on feature of local importance.	Minor adverse impact	Integration of appropriate pollution prevention and control measures into the Proposed Development. Management plan controlling visitor footfall on-site.	Neutral in long term with mitigation measures.
Standing Water Indirect impact from potential changes in hydrology from maturing buffer planting. Creation of contaminants potentially entering hydrology and habitats on-site.	Potentially permanent effect on feature of local Importance from altered hydrology. Temporary effect on feature of local importance.	Minor adverse impact Minor adverse impact	Sympathetic soft landscaping design. Integration of appropriate pollution prevention and control measures into the Proposed Development.	Neutral impact in long term with mitigation measures.

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
Fauna				
Bats – foraging/ commuting: Net increase in suitable foraging habitat (trees), Indirect disturbance by increased human presence; traffic and artificial light caused by construction.	Permanent effect on feature of local importance from increase in woodland and ponds.	Moderate positive impact	Maturing of planted woodland and standing water ponds;	Minor adverse impact in the short-term changing to moderate positive in the medium/long term as new planting establishes and matures, with sensitive lighting.
	Temporary effect on feature of local importance from disturbance.	Minor adverse impact	Retention of dark corridors along retained woodland corridors.	
Ground Nesting Birds Indirect: Potential increased disturbance of retained/adjacent ground nesting habitats.	Temporary effect on feature of local importance from disturbance.	Minor Adverse impact on ground nesting birds in retained habitats.	Management plan controlling visitor footfall on-site in these areas (northern boundary and North Caerau SINC).	Overall the Ground Nesting birds will have a major adverse effect on them from habitat loss.
Tree Nesting Birds	Permanent effect on feature of local importance.	Minor positive impact.	Soft landscaping woodland planting matures.	A major adverse impact is certain in the short term

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
A net gain in broadleaf and woodland across site is expected from soft landscaping. Indirect: Potential increased disturbance of retained tree/scrub nesting habitats.	Temporary effect on feature of local importance.	Minor adverse impact increased from increased disturbance.	Management plan controlling visitor footfall on-site in woodland areas.	from habitat loss changing to a minor positive in medium-long term as new planting establishes and matures increasing the net resource available to these species.
Nightjar Indirect: Potential increased disturbance of retained/adjacent ground nesting habitats.	Temporary effect on feature of National importance.	Minor adverse impact increased disturbance in short term	Management plan controlling visitor footfall on-site in these areas (northern boundary and North Caerau SINCL).	Overall Nightjar will have a major adverse effect on them from habitat loss.

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
Reptile Indirect: Potential increased disturbance of retained/adjacent reptile habitats.	Temporary effect on feature of local importance.	Minor Adverse impact.	Phased reptile clearance/translocation exercise agreed with LPA. Works undertake at appropriate time of year. Retention of the Northern Boundary reptile habitats; Provision of soft landscape planting across site creating suitable reptile mosaic of habitat in some areas of site (yet to be confirmed); Management of retained and any off-site compensation area (Solar Farm site) to enhance biodiversity including reptile interest. Enhancement of retained areas through provision a number of habitat piles in the retained grassland areas increasing carrying capacity.	Overall the reptile population will have a moderate adverse effect on them from habitat loss.

Description of Impact	Nature of Effect on Ecological Feature	Effect without Mitigation	Mitigation Measures	Residual effects (after mitigation)
Invertebrates Indirect: Potential increased disturbance of retained/adjacent reptile habitats.	Temporary effect on feature of county importance.	Minor Adverse impact.	Management of new soft landscape planting across site maintaining functionality for invertebrates. Management of retained and any off-site compensation area (Solar Farm site) to maintain/enhance biodiversity including invertebrate interest.	Overall there will be a major adverse effect on the invertebrate population from habitat loss.

Cumulative Impact

- 8.314 As set out within the Scoping Report (as included in Appendix 1.1 of ES Volume 2), the cumulative impact of the Afan Valley Adventure Resort alongside other proposed or consented/operational developments in the surrounding local area was requested to be considered. A list of cumulative projects is included in Table 8.16, the selection of which has been based on discussion with officers at NPTCBC.
- 8.315 All of the projects included in Table 8.16 are renewable energy schemes (upland wind farms or solar arrays). In general, these schemes had similar habitat composition to the Application Site i.e. marshy grassland, conifer plantation and clear fell with Purple Moor Grass (*Molinia*) dominant re-growth. The wind farm projects generally resulted in minimal loss of habitats, and the schemes had mitigation, management & enhancement in place to offset these losses. As stated in previous sections of this chapter, the consented Solar Farm at Caerau (Planning Ref: P/14/543/Ful) will not be implemented with the site identified as providing mitigation for the Application Site. Further consideration of any cumulative impacts of the Caerau Solar Farm site are therefore no longer appropriate.
- 8.316 The similarity of the habitats identified on the Sites included in Table 8.16 is reflected in the protected species present, which were broadly comparable to the Application Site i.e. predominantly ground nesting birds (including Nightjar) and reptiles. The breeding bird population on the wind farm sites are only impacted by minimal losses to their habitat, and through temporary disturbance with regards to the construction phases.
- 8.317 The Nightjar populations in the Application Site will interact with the Nightjars identified on the Caerau Solar Farm site, and potentially with the populations of identified on Pen-Y-Cymoedd and Llynfi Afan, due to the proximity of the Sites within published foraging ranges of Nightjar from nest sites (0.5 - 2km³⁰). The population of Nightjar in Pen-Y-Cymoedd has remained consistent throughout the construction and operational phases, whilst the last known survey conducted at Llynfi (in 2008) did not identify any breeding pairs. A significant impact is considered unlikely on the larger geographical scale encompassing all the sites, due to the persistence of populations on these sites (Nightjar); alternative breeding habitats, and mitigation & enhancement measures currently in place.

³⁰ Sharps. K. 2013. The conservation ecology of the European nightjar (*Caprimulgus europaeus*) in a complex heathland-plantation landscape. A thesis submitted for the degree of Doctor of Philosophy at the School of Environmental Sciences, University of East Anglia, Norwich, UK.

- 8.318 Similar to the reasons stated above for ground nesting birds, a significant impact on reptiles is considered unlikely on a larger geographical scale due to alternative retained habitats and mitigation & enchantment measures.
- 8.319 In general, it is considered that there will not be a significant adverse impact from cumulative impacts.

Table 8.16 Summary of projects considered for assessment of cumulative impacts

Project Title	Planning Application No.	Development Details	Project Phase	Ecological Affect: Habitat	Ecological Affect: Protected Species	Distance from Afan site boundary
Pen-Y-Cymoedd	P2009/1053	Upto 76 Wind Turbines.	Operational	Permanent loss of Conifer Plantation and clear fell areas dominated by Molinia.	Breeding birds (including Nightjar) Small loss of habitat and disturbance. Reptile: Small loss of habitat and disturbance.	Approximately 1.5km to nearest wind turbine. Approximately 0.6km to site boundary.
Llynfi Afan	P2010/1148	12 Wind turbines (9 in NPT and 3 in Bridgend) and associated infrastructure.	Operational	Permanent loss of Semi-improved, Unimproved & Marshy grassland habitat from infrastructure construction.	Nightjar small loss of habitat and disturbance. 2005 surveys identified 2 males and a single female, whilst 2008 surveys identified no breeding pairs. Small loss of ground nesting bird habitat and disturbance. Reptile: Small loss of habitat and disturbance.	Approximately 1.7km east to nearest wind turbine.

Caerau	P/14/543/Ful	Solar Farm: Freestanding solar PV panels with an overall generating capacity of 18.4 MWp.	Full Planning Granted. Not yet constructed.	Loss of upland habitats of similar composition to site through solar panel infra structure and management.	Loss of ground nesting bird habitat (including Nightjar). Reptile: Loss of habitat and disturbance.	Adjacent to northern site boundary. Breeding birds including Nightjar and ground nesting birds (Skylark).
Foel Trawsnant Wind Farm	P2014/0825	13 wind turbines with a maximum tip height of 120m to generate up to 39 MW, together with ancillary development including substation and control building, on-site underground electrical cables, stone site access tracks, temporary construction compounds, turbine foundations and temporary crane pads.)	Not yet constructed.	Habitat: Permanent loss of Semi-improved & Marshy grassland habitat from infrastructure construction. Minimal loss of Acid/Neutral flush. No significant affects predicted on protected species.	Negligible impact on protected species.	1.2km west of site boundary.
Ffyon Oer Wind Farm	P2002/1322	16 wind turbines and infrastructure.	Operational	Limited information available.		

Summary and Conclusions

- 8.320 The combination of desk and field surveys undertaken has identified that valued ecological features exist within and adjacent to the Proposed Development footprint.
- 8.321 The site is not covered by any statutory nature conservation designations. However, a number of locally designated SINC's - were located either on or adjacent to site including an on-site watercourse SINC and The Afan Mineral Railway SINC and Caerau North SINC. Located immediately north and south of the Site respectively. A PAWS was also located on the northern boundary of the Site. The on-site watercourse SINC will significant residual adverse impact from the development due to re-engineering. However, it is unlikely that the other designations will be subject to a significant residual adverse impact as a result of the development works.
- 8.322 The Proposed Development site currently comprises of a variety of upland habitat types – principally upland heathland, mire, swamp, acid & neutral grassland and purple moor-grass. A number of these vegetative communities met the criteria (as defined by JNCC) for Environment Act Wales Section 7 Priority Habitats of Principal Importance. There was also remnant blocks of conifer and areas of clear fell indicating the historic use of the Site as a commercial plantation. The habitats on-site in turn support several notable species of fauna including nesting birds, a population of common lizard, upland terrestrial invertebrates and foraging and foraging/commuting bat species.
- 8.323 The ecological features (i.e. habitats and species) at, and immediately adjacent to, the site were assigned an ecological importance at a geographical scale ranging from 'National' (Wales) to 'Local'(Afan Valley). The potential impacts of the scheme on these features have been assessed using best practice guidelines.
- 8.324 A combination of habitat retention and mitigation within the Application Site and off-site compensation is proposed to mitigate/compensate for the scale of habitat loss associated with the Proposed Development. The off-site Solar Farm site is within the current control of Applicant and is proposed to be utilised as off-site compensation in conjunction with another off-site site. However, further discussions with NRW are required to identify and secure this off-site compensation site (Corrwg Bank). These works will involve the retention and future management (for biodiversity) of areas of habitat on-site including the northern boundary

habitats (including the PAWS) and Pen-Y-Castell, it will also include the restoration/management of the Solar Farm site located immediately adjacent to the southern site boundary. These mitigation measures coupled with the other measures proposed including - the provision of native species soft landscape planting, nest boxes, the appropriate timing of works, adoption of reasonable avoidance measures during site clearance etc. will in part mitigate for the short and long-term impacts of the scheme. However, given the nature and scale of the scheme; scope of mitigation/compensation proposed, and unsecured suitable off-site compensation; residual significant adverse impacts on some ecological features of interest present on-site (such as Nightjar & Reptiles) are certain to occur as a result of Proposed Development.

8.325 Following mitigation, impacts on ground nesting bird (including Nightjar) and invertebrate species during the construction and operational stages of the Proposed Development were considered certain to result in a major negative impact; with the reptile population impacted to a moderate level. These impacts are due to the nature and scale of the Proposed Development and the change in nature of the habitats present on-site from upland habitat and conifer plantation, and the net habitat loss this will result in for these species groups, as mitigation measures to enhance and restore retained and adjacent areas will not significantly increase the carrying capacity of these areas to mitigate for the impact of the Proposed Development.

8.326 The highest value ecological features present on-site where significant residual impacts were identified were the Nightjar population which were assessed as being of national ecological importance. Proposed Development will have a significant adverse effect on this ecological feature.

8.327 It must also be noted however that proposed soft landscape planting associated with the Proposed Development will provide an ecological resource on-site in the long term. However, there are no details regarding the soft landscaping available at the time of writing this chapter. The planting will potentially provide a variety of habitats likely to offer foraging, shelter and commuting resources for a variety of species groups and will provide a net increase in tree habitat on-site. This habitat resource is considered unlikely to have a significant beneficial impact on any species assemblage on-site although the net increase in trees and structural vegetation will provide suitable nesting for bird species and a resource for foraging and commuting bat species. This increase in tree cover will result in a minor positive impact on

the tree/scrub nesting birds, and a moderate positive impact on the foraging and commuting bat species in the long term.



WildFox Fox Resort, Afan Valley

High Level Ecology Strategy (External Version)

On behalf of **WildFox Resort Group**

Document Control Sheet

Project Name: WildFox Resort, Afan Valley

Project Ref: 332510796

Report Title: High Level Ecology Strategy – DRAFT

Doc Ref: 332510796/Ecol/001

Date: 17/12/2021

	Name	Position	Signature	Date
Prepared by:	Jamie Glossop	Associate Ecologist	JC	15.12.21
Reviewed by:	Helen Evriviades MCIEEM	Senior Associate Ecologist	HE	16.12.21
Approved by:	Elaine Richmond	Environmental Director	ER	17.12.21
For and on behalf of Stantec UK Limited				

Revision	Date	Description	Prepared	Reviewed	Approved
AA	17.12.21	Draft for client review	JG	HE	ER
AB	28.01.22	Final for external submission	JG		

This report has been prepared by Stantec UK Limited ('Stantec') on behalf of its client to whom this report is addressed ('Client') in connection with the project described in this report and takes into account the Client's particular instructions and requirements. This report was prepared in accordance with the professional services appointment under which Stantec was appointed by its Client. This report is not intended for and should not be relied on by any third party (i.e. parties other than the Client). Stantec accepts no duty or responsibility (including in negligence) to any party other than the Client and disclaims all liability of any nature whatsoever to any such party in respect of this report.

Contents

Executive Summary	1
1 Introduction.....	3
1.2 Report Purpose	3
1.3 Consultation.....	3
2 Ecological Baseline Review	5
2.2 Wild Fox Site	5
2.3 Solar Farm Site.....	7
2.4 Dyffryn Tips	8
3 Review of Ecological Planning Conditions.....	10
4 Outline Enhancement Measures.....	12
4.1 Overview.....	12
4.2 WildFox Resort Site.....	12
4.3 Solar Farm Site.....	13
4.4 Dyffryn Tips	14
5 Ground Investigation Works	16
5.2 Pre-clearance works.....	16
5.3 GI Works.....	17
6 Reptile Translocation	18
6.1 Overview.....	18
6.2 Phase 1 development area	18
6.3 Phase 1b-4 Development Areas	20
6.4 Timings.....	20
7 Conclusions and Next steps	23
8 Figures.....	24

Figures

Figure 1 Site Location Plan	24
Figure 2 Construction Phasing Plan.....	24
Figure 3 Solar Farm Enhancement Plan	24
Figure 4 Dyffryn Tips Enhancement Proposals.....	24

Tables

Table 3.1 Construction Programme Risk Review.....	
Table 4.1 Review of Ecological Planning Conditions	10
Table 7.1 Proposed translocation phasing strategy	21
Table 7.2 Phase 1 reptile capture and translocation timetable	21
Table 7.3 Phase 2-4 reptile capture and translocation timetable	22

Appendices

Appendix A	Relevant Legislation and Policy
Appendix B	Draft Decision Notice

This page is intentionally blank

Executive Summary

Stantec was commissioned by the WildFox Resorts Group Ltd to prepare a High-Level Ecological Strategy (HLES) in relation to the proposed WildFox Resort at Afan Valley in the county borough of Neath Port Talbot. The proposed development will result in the loss of the majority of the existing habitats within the WildFox Resort Site and the compensation and mitigation strategy utilises an area of land directly south of the WildFox Resort Site (the 'Site'), known as the Solar Farm Site (SFS) and an area of farmland located approximately 500 m southwest of the WildFox Resort Site known as the Dyffryn Tips Site (DTS).

The purpose of this HLES is to identify the key actions and measures required to deliver the project whilst achieving biodiversity enhancement across the Wildfox Resort Site and adjacent SFS and DTS. The primary focus of the HLES is to provide an overview of the next steps required to facilitate the Reserved Matters Application, Ground Investigations (GI) works and the enabling works of Phase 1a of the construction programme, ensuring the proposed construction start date of September 2022 is achieved.

The following table provides a summary of the key constraints which have been identified within this HLES and how these constraints have been addressed within this HLES.

HLES Consideration	Summary of proposed strategy/deliverable
Key ecological considerations	- Common lizards- present on Site and require translocation to off-site compensation areas and within retained habitats within the Site. - Breeding birds including nightjars present within the Site - Retained on site habitats of ecological value - Invasive non-native species
Construction programme review	Risks to the construction programme have been identified relating to the presence of the following ecological considerations: - protected species - non-native invasive plant species; and However, it is considered that programme risks can, in the most part, be avoided through implementation of the measures described in this HLES.
Ecological input into Reserved Matters Application	The following documents are to be produced to inform the discharge of all relevant ecological planning conditions: - Enabling Works Ecological Strategy - Environmental Compliance Statement - Strategic Environmental Management Plan - Phase Construction Environmental Management Plan - Strategic Ecological and Landscape Management Plan - Phase Ecological and Landscape Management Plan
Enhancement of off-site Compensation Areas- Solar Farm Site	The enhancement of the offsite compensation areas will largely focus on the removal and/ or control of undesirable habitats such as bracken and scrub to allow a more diverse grassland habitat to develop which is of greater value for reptiles and nesting birds. In particular, the SFS has been identified as providing limited habitat for hibernating reptiles and as such substantial hibernacula features are to be created in order to enhance the carrying capacity of the site for reptiles.
Enhancement of off-site Compensation Areas- Dyffryn Tips	The coal tips within the Dyffryn Tip site are to be fenced off by NPTC owing to potential overgrazing of the piles leading to stability concerns. This provides an opportunity to enhance the coal tips and allow a more structurally diverse grassland/ heathland habitat to develop. Other proposals include undertaking bracken control and looking to reduce grazing pressure within other areas of the site. Such measures will allow a more structurally diverse grassland/heathland complex to develop, providing habitat for reptiles and ground nesting birds such as nightjars.
Ground Investigation (GI) Works	Pre-clearance of habitat in advance of GI work to be undertaken in February/ early March 2022 to reduce the risk of breeding birds being present on commencement of GI works in March. Habitat clearance and

HLES Consideration	Summary of proposed strategy/deliverable
	GI works to be undertaken with an Ecological Clerk of Works present as required.
Reptile Translocation	A phased construction programme over four phases allows the translocation of reptiles to be phased as well. Enhancements will be delivered within offsite compensation areas and retained habitats, as required to facilitate the reptile translocation required for each phase. The current phasing strategy is as follows, with Phase 1a to commence in 2022 and remaining phases in the following years: • Phase 1a and 1b - Reptiles translocated to Solar Farm Phase A • Phase 2 -Reptiles translocated to Retained habitat west of Phase 2 • Phase 3 - Reptiles translocated to Solar Farm Phase B and Dyffryn tips area • Phase 4 – Reptiles translocated to retained habitats within the WildFox Site.
Phase 1 enabling works	The ecological enabling works for Phase 1 of the Wildfox Resort Site will include exclusion and translocation of reptiles to part of the SFS (Phase A) following enhancement of this area. Translocation will be undertaken during March to September 2022 in suitable weather conditions. This translocation exercise will confirm the population density of the reptiles within the Wildfox Resort Site; this information will allow greater certainty to the planning for the translocation of reptiles from subsequent Phases of development within the WildFox Site to the receptor site(s).

1 Introduction

- 1.1.1 Stantec was commissioned by WildFox Resorts Group Ltd to prepare a High-Level Ecological Strategy (HLES) in relation to the proposed WildFox Resort at Afan Valley in South Wales (located at Ordnance Survey (OS) grid reference SS854956). The location and extent of the Site is shown on **Figure 1**.
- 1.1.2 The development comprises a proposed adventure resort of 600 lodges/apartments, a 100-bed hotel and associated buildings and adventure activities which is the subject of an outline planning consent (Planning reference P2018/0493). Initial enabling works, including ground investigations works are scheduled to commence in early 2022 with construction commencing in the autumn of 2022.
- 1.1.3 The current parameters plan for the proposed development will result in the loss of the majority of the existing habitats within the WildFox Resort Site. The strategy to mitigate and compensate for this loss was agreed at the outline planning stage and utilises an area of land directly south of the WildFox Resort Site, known as the Solar Farm Site (SFS) and an area of farmland located approximately 500 m southwest of the WildFox Resort Site known as the Dyffryn Tips Site (DTS). The location and extents of these two sites, in relation to Wildfox Resort Site are provided as **Figure 1**.

1.2 Report Purpose

- 1.2.1 The purpose of this HLES is to identify the key actions and measures required to deliver the project whilst achieving biodiversity enhancement across the Wildfox Resort Site and adjacent SFS and DTS. The primary focus of the HLES is to provide an overview of the next steps required to facilitate the Reserved Matters Application, Ground Investigations (GI) works and the enabling works of Phase 1a of the construction programme, ensuring the proposed construction start date of September 2022 is achieved. The HLES therefore includes the following:
- Summary of the Ecological Baseline
 - Review of ecological conditions and documents which are required to be produced as part of the Reserved Matters Application
 - Development of high-level enhancement measures to be delivered within compensation areas
 - Works required to support ground investigation works
 - Development of high-level reptile translocation strategy

1.3 Consultation

- 1.3.1 The HLES has been developed in close partnership with Neath Port Talbot Council (NPTC) and their ecologists, with Stantec attending a site meeting on the 10th November 2021 with Laura Palmer from NPTC during which potential mitigation options were discussed. Subsequently, a meeting on the 30th November 2021 took place, where elements of the proposed high-level reptile translocation for Phase 1 of the construction period, along with options for delivering mitigation within offsite compensation areas were agreed in principle.
- 1.3.2 Is intended that once the outline measures within this HLES are fully agreed with Neath Port Talbot Council they will be incorporated into the Enabling Works Ecology Strategy, Strategic

Construction Environmental Management Plan (CEMP) and relevant Phase CEMP, required as part of the Reserved Matters Application.

2 Ecological Baseline Review

- 2.1.1 This section provides a brief summary of the existing ecological baseline which has been determined to be present within the WildFox Resort Site itself and the proposed offsite mitigation compensation areas (Solar Farm and Dyffryn Tips). The ecological baseline has been determined through a suite of ecological surveys undertaken at the WildFox Resort and SFS to inform outline planning application, completed by Soltys Brewster during 2016-2018¹.
- 2.1.2 The DTS has not been surveyed in detail, however NPTC have previously undertaken discussions with the Tenant Farmer and developed a management proposal² for enhancement measures of the habitats present across the DTS.
- 2.1.3 In addition to the baseline work undertaken by Soltys Brewster and NPTC, an update walkover of each site was completed in August 2021 by Stantec with subsequent walkovers and update mapping of habitats within each site undertaken by Stantec on the 10th and 24th November 2021.

2.2 Wild Fox Site

Key Ecological Receptors and baseline conditions

- 2.2.1 Following a meeting with NPTC Ecologist on the 18th of October 2021 it was agreed that it should be assumed that the ecological baseline within the WildFox Resort Site remains as previously recorded, and that update species specific survey work is not required to inform the proposed Reserved Matters application. On this basis the key ecological features relevant to the Site are summarised below:
- Bats- low numbers of common and widespread species recorded. No roosting bats recorded within the Site
 - Exceptional population of reptiles considered to be of Local conservation value (Common lizard but also records of adder within the local area)
 - Breeding birds (including nightjar population considered to be of National Importance)
 - Invertebrate assemblage considered to be of County conservation value (includes dragonfly species associated with the onsite water course)
 - Invasive non-native plant species (Japanese Knotweed and Himalayan Balsam)
 - On-site Water course designated as Site of Importance for Nature Conservation (SINC)
 - Planted Ancient Woodland (PAWS) within the Site
 - Habitats of Principal Importance
 - Offsite SINC's
- 2.2.2 These ecological features are the subject of various legal and policy protection measures which are summarised within **Appendix A**, with bats, breeding birds and reptiles receiving legal protection.
- 2.2.3 Although bats have been recorded foraging within the Site no roosts or features with potential to support roosts bats are present within the WildFox Resort Site and as such, they do not pose

¹ Nineteen47 (2018) Afan Valley Resort Environmental Statement

² NPTC (2021) Dyffryn Tips Management Proposal Draft 3

a significant constraint to the delivery of the development. Therefore, the primary constraints to the delivery of the project are the presence of breeding birds, reptiles and non-native invasive plant species in terms of ensuring legal compliance.

- 2.2.4 Breeding birds, particularly ground nesting species such as nightjar and meadow pipits are likely to pose a constraint during the breeding bird season only (March to August inclusive) with the majority of the WildFox Resort Site providing suitable breeding habitat for these species.
- 2.2.5 The conclusion of an 'exceptional' population of reptiles being present within the WildFox Resort Site is based on a sample survey of four keys areas and a peak count of 22 common lizards during that survey work. Common lizard population densities can range from 40-1200 per ha with wetland heath supporting the highest densities³. The Site itself comprises a mosaic of habitats (see **Plate 1**) with varying suitability for common lizards, with areas of dense bracken and remaining conifer plantation which provide sub-optimal habitat, to areas of marshy grassland which potentially provides optimal habitat, although lacks a diverse structure and features which could be used as hibernacula. Large parts of the WildFox Resort Site were clear felled in c. 2013 such that, although some areas appear to provide suitable reptile habitat currently, they may have only recently been colonised by common lizards and the population may not have yet reached its carrying capacity. There is also evidence of recent burning within the site which may have had a localised negative impact on any reptile population. As such it is hard to estimate the current population density within the site and so a precautionary approach has been taken whereby areas of sub-optimal habitat should be assumed to support reptiles at a density of 40-100 per ha and optimal areas a density of 500 per ha.



Plate 1 View of northern boundary showing mosaic of habitat (areas of dense bracken, plantation and open grassland)

- 2.2.6 Invasive non-native plant species (INNS) are present throughout the site but have not been subject to any detailed surveys since the submission of the outline planning application in 2018. As such, the current location and extent of these species is relatively unknown but is not considered to be a significant constraint to the delivery of the project as INNS will be monitored and treated appropriately, as each phase of the Wildfox Resort Site is progressed.

³ [Microsoft Word - Advice note 10 - Peatland Reptile Survey and Mitigation Guidance 20180419 - final \(froglife.org\)](#)

- 2.2.7 The area of PAWS is to be replanted with deciduous trees and areas of acid grassland associated with the White Castle archaeological feature are to be enhanced through bracken control measures. The Strategic Landscape Design for the site includes substantial planting of deciduous and coniferous trees around the site perimeter and on the slopes of the western portion of the site, within which there is scope to provide woodland rides and glades.
- 2.2.8 The remaining ecological features recorded within the site do not receive any legal protection although they are covered under various national and local planning policies as habitats/species of conservation concern.

2.3 Solar Farm Site

Key Ecological Receptors and baseline conditions

- 2.3.1 The Solar Farm Site is an area of land to the south of the WildFox Resort Site, it was previously subject to a planning application for a solar farm which was withdrawn. It is located on the southern slope of a hill and comprises areas of marshy grassland dominated by purple moor grass with areas of dense bracken (See **Plate 2**) and scrub encroachment. The ground conditions are particularly wet and the habitats at the south of the site comprised areas of waterlogged soils. During Stantec's walkover survey of the 24th November 2021 extensive areas of historic burning were evident (see **Plate 3**, with charred remains of gorse present). Several informal footpaths cross the site appear to be frequently used by dog walkers.



Plate 2 Area of dense and scattered scrub within SFS.



Plate 3 View of SFS showing area of burnt gorse

- 2.3.2 The SFS is likely to support common lizards and breeding birds, including nightjars, based on the range of habitats present and contiguous nature of these habitats with those on the Wildfox Resort Site. The limiting factor for common lizards within the SFS appears to be the lack of suitable hibernation features. The site is particularly wet, supporting large areas of marshy grassland, with the site draining southwards to an area of significantly wet marsh and blanket bog, with the risk that any common lizards hibernating below ground are susceptible to drowning and freezing. Periodic burning, likely through arson, is also likely to have had a detrimental impact on the site's suitability to support reptiles and this burning, in combination with the presence of dog walkers, also reduces its current value for breeding birds.

2.4 Dyffryn Tips

Key Ecological Receptors and baseline conditions

- 2.4.1 The DTS comprises the coal tip themselves and areas of grazing pasture. The coal tips support very short and patchy grassland (see **Plate 4**) owing to the thin soils present and is unlikely to support a population of reptiles or be of any particular value to breeding birds. An invertebrate survey⁴ commissioned by NPTC of the tips identified that it did not support any particularly rare invertebrate species or a diverse assemblage of invertebrates, as a result of the coal tips being over grazed by sheep.

⁴ Colliery Spoil Biodiversity Initiative (2018) Invertebrate survey of Duffryn Rhondda spoil tips, neath port talbot



Plate 4. View of coal tips

- 2.4.2 The southern portion of the site supports a large expanse of marshy grassland dominated by purple moor grass, which potentially provides good habitat for common lizards and breeding birds. However, NPTC had advised that this area lacks any significant structural diversity which limits its suitability to support these species in high numbers.
- 2.4.3 The remainder of the site supports areas of improved grassland and areas dominated by bracken and gorse. These areas are unlikely to support a significant population of common lizards but may be utilised by breeding birds.

3 Review of Ecological Planning Conditions

3.1.1 The following section provides a review of the ecological planning conditions as issued on 30th November 2021 which are attached to the outline planning consent. The documents which will need to be produced, to enable the discharge of these conditions are also summarised within the table. The full wording of each planning condition is provided within **Appendix B**. The purpose of this table is to confirm that a number of conditions relevant to the implementation of the scheme; specifically the ecological mitigation and compensation works, will be addressed within a single document and to confirm that some documents (Construction Environmental Management Plan and Ecological and Landscape Management Plan) will require both a strategic version of that document (covering principles for all phases) and a phase-specific version, which will confirm the details relevant to each phase, prior to commencement.

Table 4.1 Review of Ecological Planning Conditions

Condition Number	Summary Condition wording and Comments	Document to be produced/ inputted into by Stantec to discharge condition
Condition 8	Condition 8 requires the developer to notify NPTC of details of the nature and timing of temporary works (Ground Investigations, ecological and habitat management, and other temporary works) which shall be accompanied by associated details of surface water impacts/mitigation and a report from an Ecological Clerk of Works identifying any ecological impacts arising from such temporary works and how such impacts will be mitigated. Stantec will produce an Enabling Works Ecological Strategy document to inform the discharge of Condition 8.	Enabling Works Ecological Strategy (EWES)
Condition 24	Condition 24 requires an Ecological Statement which confirms that the submission complies with the objectives of the Strategic Ecological Landscape Management Plan (Strategic ELMP) (see below) and incorporates a detailed Phase Construction Environmental Management Plan (Phase CEMP). There is potentially overlap of deliverables required under this condition with others. For clarity, Stantec propose to produce an Environmental Compliance Statement which accompanies the submission of the Strategic ELMP and each Phase CEMP.	Environmental Compliance Statement
Condition 18 Condition 19 Condition 20 Condition 49 Condition 57	Condition 18 requires the submission of the Strategic CEMP which is to include measures to establish the ecological baseline and the measures to be implemented during construction works to ensure compliance with all legal and policy requirement in relation to protected habitats and species. Condition 19 requires the submission of a detailed Phase Construction Environmental Management Plan (Phase CEMP) for each development phase. Condition 20 requires the identification of an Ecological Clerk of Works or onsite ecologist	Strategic Construction Environmental Management Plan (Strategic CEMP)

Condition Number	Summary Condition wording and Comments	Document to be produced/ inputted into by Stantec to discharger condition
	Condition 49 relates to roosting bats and measures to be implemented should features with potential to support roosting bats require removal Condition 57 requires the incorporation of buffer zones from all water courses prior to construction commencing. It is considered that all these conditions can be covered within the Strategic CEMP and additionally Conditions 20, 49 and 57 within each Phase CEMP. Stantec will produce the Phase CEMP and Strategic CEMP with input from the appointed contractor	Phase Construction Environmental Management Plan (Phase CEMP) to be appended to the Strategic CEMP.
Condition 21 Condition 22 Condition 23 Condition 27 Condition 28 Condition 40 Condition 58	Condition 21 requires the submission of a Strategic ELMP and is to cover all areas of retained/created habitat onsite and within off-site compensation site. Condition 22 requires the submission of a Phase ELMP for each development phase Condition 23 requires the submission of a detailed landscape plan for each phase Condition 27 requires the submission of the design of the site drainage, watercourse diversion and attenuation ponds to reinstate, create and enhance, where possible, the biodiversity interest of such features. Condition 28 requires the provision of bat and bird boxes within all on-site buildings. Condition 40 requires ecology input into the detailed lighting scheme for construction and operation phases to include the creation of Dark Corridor as discussed in Appendix A8.14 of the ES Condition 58 requires all mature native trees to be retained (not withstanding those trees permitted to be felled). It is considered that all these conditions can be covered either in full or in part within the Strategic ELMP and additionally within a detailed Phase Ecological and Landscape Management Plan (ELMP) including a detailed landscape plan to be produced and appended to the Strategic ELMP	Strategic Ecological and Landscape Management Plan (Strategic ELMP) Phase Ecological and Landscape Management Plan (Phase ELMP) to be appended to the Strategic ELMP

4 Outline Enhancement Measures

4.1 Overview

- 4.1.1 This section provides an overview of the ecological enhancement measures which are to be implemented within the WildFox Resort Site and off-site compensation areas (SFS and DTS). This section primarily focuses on the measures to provide and enhance habitat for reptiles specifically. More detail in relation to enhancement of these areas for other species and ecological receptors will be provided at the detailed design stage. The general principles have already been established within the biodiversity chapter of the ES which accompanied the planning application. This will specifically focus on enhancements for breeding birds, in particular nightjar, as well as other wildlife, including invertebrates, bats and retained habitats.

4.2 WildFox Resort Site

- 4.2.1 The strategic landscape design for the WildFox Resort Site includes a significant amount of coniferous and deciduous woodland planting primarily to screen the development. This requirement and the density of any proposed woodland planting and whether other habitats can be created within this 'landscape buffer' will be considered during future iterations of the masterplan. Initial discussions with Stantec's Landscape Architects, has identified the potential to create woodland rides and open glades within the large areas of woodland planting, along with delivering a programme of bracken control where this is encroaching into favourable habitats such as acid grassland. This integrated approach would provide the visual screening required (recognising the commitment for structural tree planting as part of the overall scheme design), whilst delivering ecological habitat enhancement.
- 4.2.2 The proposed woodland planting will alter the nature of the habitats present, to those which currently support ground nesting upland bird species and reptiles to areas which favour woodland bird species and other species associated with woodland. The proposed woodland planting, if not designed appropriately, has the potential to provide limited suitable habitat for reptiles once it reaches maturity. However, it would provide some hibernation habitat and woodland edge habitat along forest paths, rides etc. Furthermore, it is considered that the woodland planting would reach maturity in c. 20 years from planting, during that time the area would still provide suitable reptile habitat with the suitability of the area for reptiles slowly declining as the woodland matures. This is typical of natural succession, with grassland areas reverting to scrub and then to woodland or in typical forestry locations subject to clear fell and replanting on a 40 + year rotation. In addition, the inclusion of woodland rides and open glades would ensure that areas suitable for reptiles still persist once the woodland reaches maturity.
- 4.2.3 The western part of the WildFox Site is also directly connected to the northern boundary of the SFS and the eastern extent of the DTS (see **Figure 1**). Improving the habitat connectivity between the two sites will allow reptiles to naturally disperse from the WildFox Site to improved and enhanced areas of habitat within both the SFS and Dyffryn Tip Site.
- 4.2.4 Other areas of the Wildfox Resort Site, including the area to the northwest and around the White Castle area, currently support acid grassland which is being encroached by bracken. These areas will remain outwith the development footprint, and will be subject to positive management to control bracken, allowing the acid grassland to recover in these areas. This will provide a further area of grassland with an enhanced habitat structure for reptiles (see Plate 5, below).



Plate 5: View from White Castle looking west over the WildFox Resort Site, showing areas of bracken encroachment

4.3 Solar Farm Site

- 4.3.1 **Figure 4** shows an overview of the proposed enhancement measures for the SFS, focusing on providing enhanced habitat for reptiles. Further measures to enhance this area will be developed at the detailed design stage. The site is to be divided into two phases: Phase A encompassing the western half of the Site and Phase B the eastern half. Enhancement of each area will be undertaken separately so that Phase A can be used for the translocation of reptiles from Phase 1a and Phase 1b of the WildFox site and Phase B can be used for the translocation of reptiles from Phase 3. Enhancing both Phase A and B at the same time could result in the possible risk that the existing and/ or translocated population within Phase A colonise Phase B before the translocation exercise from Phase 3 of the Wildfox Site begins.
- 4.3.2 Enhancement will focus on the creation of hibernacula and habitat management to increase the heterogeneity and structural diversity of the habitats on site with the aim of creating additional habitat for nightjars and invertebrates as well as increasing the foraging opportunities for other bird species and species such as bats. Measures to reduce anti-social behaviour such as restricting access points into the site so that they cannot be accessed by off road bikes, restricting the informal footpath network and fencing off key areas of habitat are also to be implemented.

Hibernacula creation

- 4.3.3 As discussed previously (Section 2.3.2) the limiting factor for common lizards within the SFS appears to be access to hibernation features. Therefore, prior to trapping works commencing (January/ February 2022) within Phase 1a, hibernacula/ refugia features are to be created within the Solar Farm Phase A area as shown on **Figure 3**.
- 4.3.4 The hibernacula/refugia are to be constructed from dead wood/ brash and inert material such as building rubble. Each hibernacula/ refugia is to be 2-3 m wide and 1 m high, of variable length

and are to be orientated approximately east to west to provide a south facing bank and are to be sited away from areas of high footfall, or alternatively fenced off, to prevent vandalism. The majority of the hibernacula will be above ground and sited within areas of dense bracken or scrub growth to minimise the loss of more suitable reptile habitat. The topsoil within the proposed footprint of the hibernacula will be scraped off to a depth of no more than 150 mm. Brash and inert building rubble will be placed on the areas of scraped ground to a height of 1 m and the topsoil previously excavated placed on top of the hibernacula.

- 4.3.5 Two such features are to be created as compensatory habitat with Solar Farm Phase A as shown on **Figure 3**.
- 4.3.6 Prior to the commencement of translocation works in Phase 3 of the Wildfox Resort Site a further two hibernacula as per the above specification will be created within Phase B of the SFS.

Bracken Control

- 4.3.7 Areas of dense bracken within the SFS are to be reduced to provide more suitable habitat for reptiles (see **Figure 3**). It is recognised that areas of scattered bracken do have some value for reptiles, so the target will be to reduce the bracken rather than remove it. As such, bracken areas will be reduced by 75% only, with the aim of allowing a more diverse marsh grassland and/ or wet heath habitat to develop.
- 4.3.8 Bracken control methods include herbicide application, rolling, or cutting with these methods only effective in the summer months when reptiles are active. With rolling and cutting there is a risk of killing and injuring reptiles. Therefore, for this site, it is considered that the use of a herbicide would be more appropriate. The selective herbicide Asulox is typically used for bracken control and is best applied in July, with secondary spraying of any re-emergent fronds in the following season; a specialist contractor should be appointed in relation to herbicide application.

Scrub control

- 4.3.9 Areas of scrub (and young trees) are present within the site. The scrub provides some biodiversity value in its own right and also provides habitat for some species of breeding bird. However, there is a risk of scrub dominating the site, to the detriment of other habitat types and overall species diversity, if left unchecked. As such, all areas of scrub will be thinned by 50% to create open areas suitable for reptiles. The interface between open areas and areas of scrub will also provide habitat suitable for breeding nightjars. Some tall stumps will be left during the scrub/young tree clearance as standing dead wood, to provide singing perches suitable for nightjars.

Long-term management and monitoring

- 4.3.10 Management will be undertaken on an annual basis for a minimum period of 25 years and informed by a programme of monitoring. Monitoring will focus on the habitats present, recording changes in extent and species diversity, colonisation by non-native plant species or other undesirable species and any impacts of anti-social behaviour. Such monitoring targets will be detailed within the Strategic LEMP. Management measures will also be detailed within the SLEMP but are likely to comprise the removal of any fly tipped waste or other such material and treatment; control/management of bracken, scrub and non-native plant species, as required to prevent encroachment to areas of other habitat and checks of habitat creation features (e.g. hibernacula/refugia) and fences/gates/footpaths to check their function.

4.4 Dyffryn Tips

- 4.4.1 A number of enhancement measures for the DTS are proposed and are shown on **Figure 4**, with a summary provided below.

- 4.4.2 The coal tips within the Dyffryn Tip site are to be fenced off by NPTC owing to potential overgrazing of the minimal vegetation on the coal tips by sheep, leading to stability concerns. This provides an opportunity to enhance the biodiversity value of coal tips by allowing a more structurally diverse habitat to develop in the absence of grazing. This will be facilitated by placing brash material won from the WildFox Resort Site during vegetation clearance works in Phase 1a and 2 at the base of the coal tips. This will help stabilise the slopes and reduce erosion of the thin soils by wind and rain, ultimately allowing a greater depth of soil to develop and allowing natural colonisation by grass and heathland species. The placement of the brash material should provide refugia opportunities for reptiles and also has the potential to provide singing posts for nightjars, with appropriate placement/design.
- 4.4.3 Other enhancement proposals for Dyffryn Tips include undertaking bracken control in areas at the north of the site where dense bracken is dominant and looking to reduce grazing pressures within other areas of the site. Such measures will allow a more structurally diverse grassland to develop, providing habitat for reptiles and ground nesting birds such as nightjar. In addition, there is direct connectivity between the northern eastern part of the site and the western portion of the WildFox Resort Site. Managing the bracken in the north-eastern part of the DTS will provide improved habitat connectivity between Dyffryn Tips and retained areas of habitat within the Wildfox Resort which will encourage natural exchange of individual reptiles between the two Sites.

5 Ground Investigation Works

- 5.1.1 This section provides an overview of the ecological mitigation measures and timings which are to be implemented prior to and during the Ground Investigation (GI) works to minimise ecological risks associated with the GI works areas. Prior to GI works commencing, Stantec will develop these measures further within the Enabling Works Ecological Strategy (EWES) which is to be submitted to and approved by NPTC to inform the discharge of Condition 8 attached to the outline consent.
- 5.1.2 The GI works are being managed by Ashfield Solutions Group and are due to be undertaken in early spring 2022 by an appointed contractor. The GI works will therefore be undertaken during the period when reptiles are in the process of emerging from hibernation and breeding birds will potentially have begun nesting. Without the necessary ECoW and appropriate mitigation measures in place these works could potentially kill and injure reptiles and destroy and damage active bird nests. Furthermore, with excavation works and vehicles tracking across the Site, this could result in sediment run-off and/or pollution entering the onsite water course which is designated as a SINCE, as well as damaging areas of habitat which are to be retained as part of the proposals. There is also the risk of disturbing and causing the spread of invasive plant species present within the Site.
- 5.1.3 The EWES will detail the measures which are to be implemented prior to and during works to prevent harm to the ecological features on the site. These will include but not be limited to:
- Provision of contact details for the appointed Ecological Clerk of Work (ECoW) and attendance onsite by ECoW for site briefing to contractor and direct monitoring of works, as required.
 - Site specific pollution control measures including buffers to all water features.
 - Details of the working practices to be implemented (as summarised in 6.2 and 6.3 below)
- 5.1.4 This EWES will be delivered via a toolbox talk to all on-site personnel and copy of it kept within the site office.

5.2 Pre-clearance works

- 5.2.1 To avoid impacts on nesting birds Ashfield Solutions Group and their appointed contractor will identify proposed compound sites, access routes and GI locations in consultation with Stantec, such that these areas can be confirmed and identified within the EWES. Areas where non-native invasive species are present will also be identified and if possible avoided (including an appropriate buffer). The areas directly affected by the GI works will be subject to pre-clearance works in February where vegetation will be removed to c. 150-200 mm above ground level. This will limit the suitability of these areas for ground nesting birds in the subsequent months, whilst retaining some cover for reptiles emerging from hibernation.
- 5.2.2 Vegetation is to be removed using a Cut and Collect Softrak or similar vehicle. These vehicles have rubber tracks and exert a minimal level of ground pressure and are frequently used for vegetation management within Sites of Special Scientific Interest (SSSI)⁵. The use of such a vehicle will minimise disturbance during vegetation clearance to hibernating reptiles.

⁵ Further details on SofTrak specification are provided here <http://loglogic.co.uk/index.php/product-range/cut-and-collect-system#:~:text=The%20Loglogic%20Softrak%20%E2%80%98Cut%20and%20Collect%20System%E2%80%99%20is,restoration%20and%20harvesting%20of%20all%20types%20of%20vegetation.>

- 5.2.3 Cut material will be removed offsite and where appropriate used as part of habitat creation works (hibernacula) within the SFS, Phase A. Where there is a risk of spreading non-native invasive plant species, all cut material will remain within the WildFox Resort Site (in same location where it was cut). Prior to leaving the site, all vehicles and footwear will be cleaned to prevent the spread of non-native invasive plant species offsite.
- 5.2.4 Where it is necessary to remove other debris/ brash etc to gain access to trial pit locations this will be undertaken using an excavator, with material carefully removed and checked for reptiles prior to and during removal.
- 5.2.5 All works will be overseen by the appointed Ecological Clerk of Works (ECoW). During the pre-clearance works the ECoW will note and map any potential hibernacula/ refuge areas such as piles of brash/ rocks.

5.3 GI Works

- 5.3.1 Immediately prior to commencement of the GI Works (1 week prior and 2 days prior), an inspection will be undertaken by the ECoW. During the bird breeding season, surveys will be undertaken at appropriate intervals, to ensure the continued absence of ground nesting birds from areas to be affected by the trial pits/ bore holes. As a minimum, this will likely include a survey on the first day of each working week during the GI works to identify any habitat growth and/ or birds which may have begun nesting over the weekend period.
- 5.3.2 All required silt and other buffer/ protective fencing around retained ecological features/ water courses will be installed prior to works commencing.
- 5.3.3 Hibernacula and refugia previously recorded by the ECoW within the works area will be dismantled by hand and any reptiles moved to safety ahead of works commencing in this area.
- 5.3.4 All excavations will either be infilled or covered over at the end of each working day.
- 5.3.5 Prior to leaving the site all vehicles and footwear will be cleaned to prevent the spread of non-native invasive plant species offsite.

6 Reptile Translocation

6.1 Overview

- 6.1.1 The following sets out the proposed strategy for the translocation of reptiles from the WildFox Resort Site with the location where reptiles within each phase are to be translocated shown on **Figure 2**. Details of the translocation methodology will be provided within the Strategic and Phase CEMP's.
- 6.1.2 It has been assumed that a secure compound and welfare units will be provided as part of the works for the onsite ecologists and will be in place prior to the undertaking of the translocation exercise. The location of the secure compound and welfare units is to be agreed in consultation with the appointed ecologist and mitigation as appropriate will be undertaken prior to the setting up of these facilities.

6.2 Phase 1 development area

Summary of works

- 6.2.1 The Phase 1a development area (Phase 1a) (See **Figure 2**) is to be fenced off with reptile exclusion fencing at the beginning of March 2022 and reptiles translocated to SFS. For the purposes of the translocation the preferred option is that the SFS is to be divided into two areas, Solar Farm Phases A and B. Enhancements will be delivered within the Solar Farm Phase A prior to works commencing in Phase 1a. Solar Farm Phase B will not be enhanced at this stage, however there is an option to bring Phase B forward if a larger than expected population of reptiles is captured within Phase 1.
- 6.2.2 Once cleared of reptiles, construction within the Phase 1a area will commence, with the reptile fencing remaining insitu throughout the duration of construction works.
- 6.2.3 Further details of the required measures are provided below, and a timetable of works is provided in Table 2.

Appointment of Habitat Management Contractor and ecology team

- 6.2.4 A Habitat Management Contractor will be appointed on behalf of WildFox Group Ltd prior to commencement of the works described below. They will be managed by Stantec who will work closely to develop a scheme of works which is deliverable and achievable within the required time frames. The Habitat Management Contractor will be responsible for the vegetation removal and installation of the reptile exclusion fencing.
- 6.2.5 In addition to the Habitat Management Contractor a team of ecologists will be appointed on behalf of WildFox Group Ltd and prior to works commencing. This team will be directly managed by Stantec and they will undertake all required capture and translocation of reptiles during the Phase 1a translocation works.

Capture methodology

- 6.2.6 Reptile exclusion fencing is to be installed around the perimeter of Phase 1a. Prior to installation of the fence the fence line is to be pegged out by the site engineer and then walked by ECoW and appointed Habitat Management Contractor. The fencing will then be micro-sited to avoid dissecting hibernation and refugia features or other large obstacles such as rocks.
- 6.2.7 Surveys for ground nesting birds are to be undertaken prior to commencement of works. Where active nests are recorded, they will be fenced off with marker tape at an appropriate buffer as

determined by the ECoW and works not permitted within the buffer until the nest is no longer active.

- 6.2.8 Prior to installation of the reptile exclusion fencing vegetation along the proposed fence line is to be removed using a Cut and Collect Softrak or similar vehicle and/ or by handheld strimmer's. Fencing will then be installed by hand and/ or vehicle.
- 6.2.9 Habitat manipulation within the fenced off area is to be undertaken prior to commencement of any capture works. Habitat manipulation is to be undertaken by a Cut and Collect Softrak or similar vehicle and/ or by handheld strimmers. The extent of the initial habitat manipulation is to be determined once fencing works are completed and the topography and vegetation type present can be assessed on the ground. The aim of the habitat manipulation is to reduce the areas of suitable reptile habitat to maximise trapping efficiency. During the trapping period further habitat manipulation may be undertaken at the discretion of the appointed ecologist/ ECoW.
- 6.2.10 In addition, a buffer strip of vegetation will be 'cleared' between the main site and the SLF to prevent recolonisation of the main site from any reptiles moved to the SFS Phase 1. This will be carried out under the guidance of the appointed ecologist/ ECoW.
- 6.2.11 Artificial refugia (roofing felt approx. 0.5 m²) are to be placed at a density of 500-1000/ha within areas of suitable habitat for reptiles two weeks prior to commencement of trapping exercise.
- 6.2.12 After two weeks from when the refugia were laid, checks of the refugia and capture of any reptiles will commence for a minimum of 30 days. Trapping will be undertaken by surveyors trained in the capture and handling of reptiles (including adders). Trapping will be undertaken in the early morning, midday and late afternoon during periods of suitable weather conditions. All captured reptiles will be moved to the SFS Phase A. However, if more reptiles are captured than is originally anticipated then there is an option to bring forward enhancements within Phase B so that reptiles can be translocated to this part of the SFS. This will be reviewed as the trapping operation progresses.
- 6.2.13 Trapping will cease after period of 10 consecutive days after no reptiles have been captured and/ or it is considered that a suitable trapping effort has been undertaken in discussion with NPTC based on review of trapping data and weather conditions during the trapping period.
- 6.2.14 Throughout the capture period detailed records of weather conditions, the number and sex of reptiles captured will be recorded on a daily basis with results submitted to the NPTC Ecologist at the end of each week.

Destructive search

- 6.2.15 Following the end of trapping any remaining vegetation will be removed, and any potential refuge features dismantled by hand. Any reptiles seen will be captured and removed to the SFS Phase A.

Completion

- 6.2.16 Following the completion of the destructive search the area will be deemed free of reptiles and construction will commence. The reptile fencing will be checked each week during the construction period for signs of damage and repaired immediately.
- 6.2.17 It is anticipated that the reptile translocation will be completed more quickly in some areas than others. This will allow a 'phased release' of areas deemed to be 'reptile free', following the approach outlined above.

6.3 Phase 1b-4 Development Areas

- 6.3.1 The translocation of reptiles from Phases 1b, 2, 4 and 4 will utilise a combination of the DTS, the SFS Phase B and retained areas within the Wildfox Resort Site as receptor locations. The need for and use of each receptor will largely be informed by the population density recorded during the translocation of the reptiles from Phase 1a which will then be subsequently correlated to the other phases, depending upon habitat type and suitability.
- 6.3.2 The scope and nature of the enhancement measures which can be delivered at the DTS and within the retained areas within the Wildfox Resort Site is yet to be fully determined. The enhancements at DTS is currently being secured through NPTC and the tenant farmer. The on-site habitats to be retained and with the opportunity for enhancement will be developed alongside the details of the Resort Zones and activities, and in consultation with the landscape architect as part of any future iterations of the masterplan. Within the SFS additional hibernacula are to be created as previously specified for the Phase 1a translocation works with Phase B of the SFS as shown on **Figure 3**.
- 6.3.3 Capture and translocation of reptiles will use a combination of habitat manipulations to displace reptiles into retained areas within the Wildfox Resort Site and the use of fencing, capture and translocation.
- 6.3.4 The approach outlined in **Section 7.2** will be followed for the translocation of reptiles during subsequent phases of the development.

6.4 Timings

- 6.4.1 The areas in which reptiles from each Phase of the development are to be translocated to, is illustrated on **Figure 3** and summarised in **Table 7.1**, which outlines the phasing of the proposed translocation strategy. Indicative timings for the various translocation activities in Phase 1 are indicated in **Table 7.2**. In addition, **Table 7.3** provides the Phase 2-4 reptile capture and translocation timetable.

Table 7.1 Proposed translocation phasing strategy

Construction Phase	Areas for translocation	Required Enhancement within Translocation	Proposed exclusion methods
Phase 1	Reptiles translocated to Solar Farm Phase A	Hibernacula creation within Solar Farm Phase A, completed in the winter preceding Phase 1 commencement	Exclusion fencing and translocation
Phase 2	Reptiles translocated to Retained habitat west of Phase 2	Removal of scrub, creation of refugia/ hibernacula from felled material in the winter preceding Phase 2 commencement	Habitat manipulation and exclusion fencing and translocation
Phase 3	Reptiles translocated to Solar Farm Phase B and Dyffryn tips area	Creation of hibernacula in Phase B and control of bracken. Enhancement measures within Dyffryn tip site to be agreed.	Exclusion fencing and translocation
Phase 4	Retained habitats within the WildFox Site.	Enhancement of retained habitats	Habitat manipulation and exclusion fencing and translocation

Table 7.2 Phase 1 reptile capture and translocation timetable

Phase 1 Reptile Capture and translocation 2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Appoint ECOW and Habitat Management Contractor									
Appoint Ecology team to undertake trapping works									
Establish site compound unit									
Hibernacula/ refugia creation within SFS									
Fence Installation and laying out of refugia									
Reptile trapping exercise (30 day minimum)									
Destructive search following 10 days of no reptile captures									
Construction works commence									

Table 7.3 Phase 2-4 reptile capture and translocation timetable

Phase 2-4 Reptile Capture and translocation 2022-2023	July 2022- Feb 2023	Mar	Apr	May	Jun	Jul	Aug	Sep
Hibernacula/ refugia creation within SFS								
Delivery of enhancement measures at Dyffryn Tips								
Delivery of enhancement measures within on-site retained areas								
Fence Installation and laying out of refugia								
Reptile trapping exercise (30 day minimum)								
Destructive search following 10 days of no reptile captures								
Construction works commence								

7 Conclusions and Next steps

- 7.1.1 This HLES has identified that there are ecological challenges to the delivery of the scheme and provides a framework to address these constraints to deliver the project and secure a positive outcome for biodiversity. This HLES and the associated recommendations will be kept under review in response to any changes to the masterplan and project programme.
- 7.1.2 The following steps are to be taken over the next three months, to agree the HLES and lay a path to enable the commencement of GI works in March 2022 and Phase 1a of the Wildfox Resort Development in September 2022.
- Agree the principles of the strategy set out within this HLES with the WildFox Resort Group and present the HLES to NPTC for their agreement in principle.
 - Produce Enabling Works Ecological Strategy for submission to NPTC
 - Appointment of Habitat Management Contractor, Ecological Clerk of works and Ecology Survey Team - Stantec to provide recommendations to WildFox Resort Ltd and WildFox Resort Ltd to appoint these directly prior to commencement of ecological management works.
 - Begin hibernacula creation and scrub removal in Phase A of SFS in February/ early March 2022.
 - Agree Dyffryn Tips management proposals with NPTC and Tenant Farmer.
 - Review GI specification and provide comments and recommendations for any required amendments prior to planned GI commencement in March 2022.

8 Figures

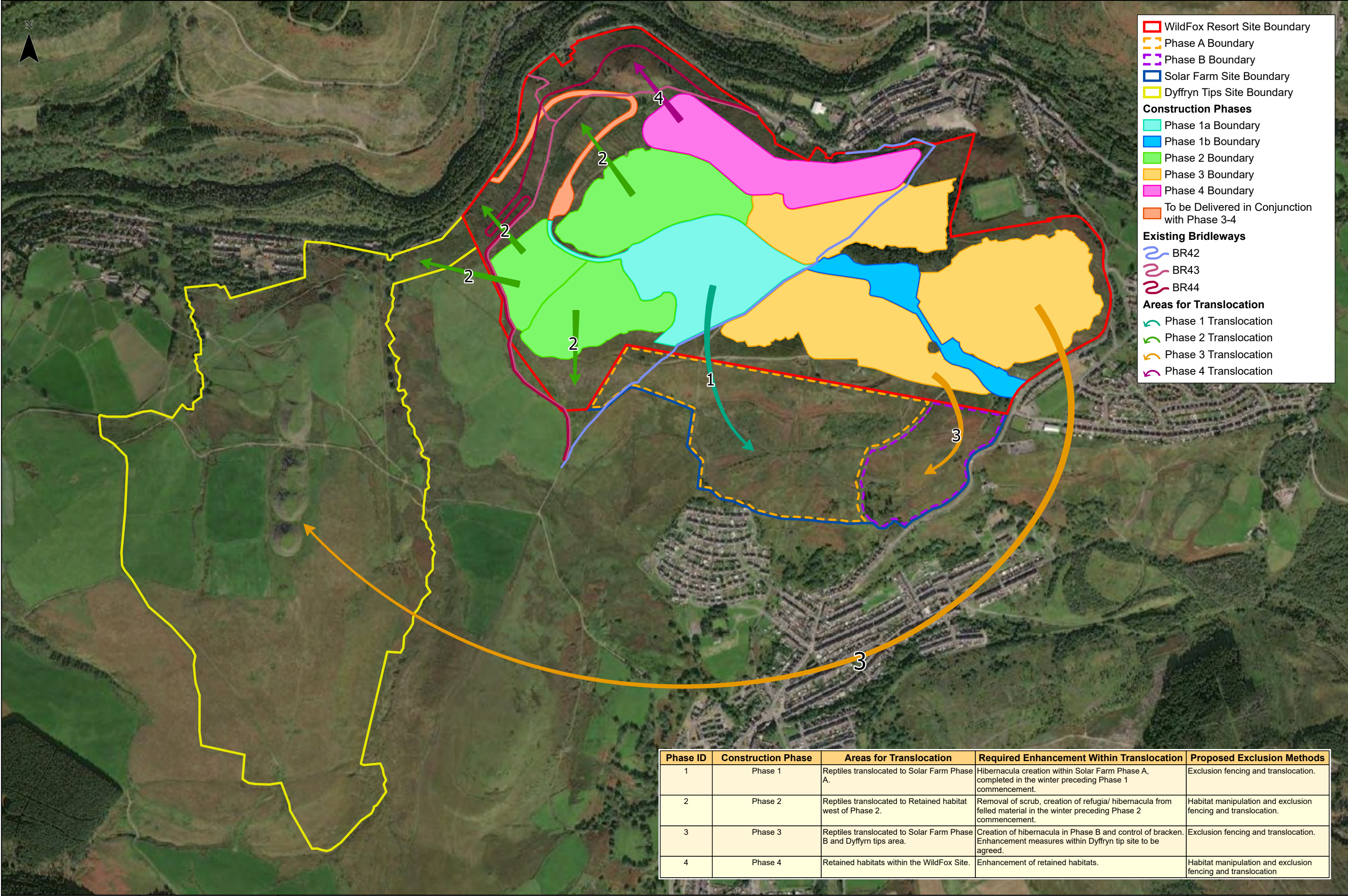
Figure 1 Site Location Plan

Figure 2 Construction Phasing Plan

Figure 3 Solar Farm Enhancement Plan

Figure 4 Dyffryn Tips Enhancement Proposals





Phase ID	Construction Phase	Areas for Translocation	Required Enhancement Within Translocation	Proposed Exclusion Methods
1	Phase 1	Reptiles translocated to Solar Farm Phase A.	Hibernacula creation within Solar Farm Phase A, completed in the winter preceding Phase 1 commencement.	Exclusion fencing and translocation.
2	Phase 2	Reptiles translocated to Retained habitat west of Phase 2.	Removal of scrub, creation of refugia/ hibernacula from felled material in the winter preceding Phase 2 commencement.	Habitat manipulation and exclusion fencing and translocation.
3	Phase 3	Reptiles translocated to Solar Farm Phase B and Dyffryn tips area.	Creation of hibernacula in Phase B and control of bracken. Enhancement measures within Dyffryn tip site to be agreed.	Exclusion fencing and translocation.
4	Phase 4	Retained habitats within the WildFox Site.	Enhancement of retained habitats.	Habitat manipulation and exclusion fencing and translocation