

## **Appendix 7A**

Extended Phase 1 Habitat

Survey Report

Welsh Government

**Global Centre for Rail Excellence  
(GCRE)**

**Extended Phase 1 Habitat Survey  
Report**

Issue | 27 August 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.




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# 1 Introduction

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## 1.1 Background

Ove Arup & Partners Ltd (Arup) was commissioned by the Welsh Government (WG) to undertake a range of consultancy services in relation to the Global Centre for Rail Excellence (GCRE), hereafter referred to as ‘the Project’.

As part of that commission, a range of ecological surveys have been undertaken to identify the baseline ecological conditions of the Project area, to inform the assessment of impacts as part of the Environmental Impact Assessment (EIA) process.

This document reports on the Extended Phase 1 Habitat Survey undertaken for the Project.

## 1.2 Objectives

The aim of the Extended Phase 1 Habitat Survey is to:

- Establish the presence of habitats and species on site and in the surrounding area through a desk study and a field survey; and
- Assess the potential of the site for supporting protected and/or notable species.

## 2 Project Description and Context

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The WG are proposing to develop a rail testing, maintenance, research, development and storage facility (also referred to as the Global Rail Centre for Excellence) at the site of the Onllwyn washery and Nant Helen open cast mine site. The site for development is approximately 475 ha.

The proposed site is currently being mined by Celtic Energy, who will cease extraction operations in 2021, at which point Celtic Energy will be required to restore the land in accordance with regulatory requirements and agreements with Powys County Council (PCC) and Neath Port Talbot County Borough Council (NPTCBC). This includes Section 106 planning obligations and planning conditions that need to be discharged.

Celtic Energy has submitted two recent planning applications for the site, including: the revised restoration strategy for approval (Planning reference number: 19/1899/REM) which would change the existing approved restoration scheme (for planning application ref 18/1070/REM). And, the Nant Helen complementary earthworks application for approval (Planning reference number: 20/0738/FUL) The purpose of these applications is to allow for a 'flexible and adaptable landform for a variety of future uses on restoration, including the use of the site as a rail testing and storage facility, proposed by the WG.



### 3 Site Description

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The study area is shown on Figure 1 and is hereafter referred to as the 'site'.

The site is within the Dulais Valley located within Powys and Neath Port Talbot, with the Brecon Beacons National Park Authority boundary immediately to the north. Nearby settlements include Onllwyn, Seven Sisters, Ystradgynlais, Caehopkin, Abercrave or Coelbren.

The site is predominantly brownfield land that has been heavily worked by open cast mining. Much of the site has been revegetated.

## 4 Study Area

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The study area encompasses the majority of land within the Nant Helen open cast operational site, which at the time of commencing the ecological surveys was considered to be the likely boundary of the project site.

## 5 Legislation

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A framework of international (European), national and local legislation and planning policy guidance exists to protect and conserve wildlife and habitats. The following legislation exists to protect habitats and species of nature conservation importance:

- i. The Conservation of Habitats and Species Regulations 2017 (the Habitat Regulations) (as amended) which transposes Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) into UK law;
- ii. The Birds Directive (Council Directive 2009/147/EC on the conservation of wild birds) (the Wild Birds Directive);
- iii. Wildlife and Countryside Act 1981 (as amended) (WCA);
- iv. The Invasive Alien Species (Enforcement and Permitting) Order 2019;
- v. Environment (Wales) Act 2016;
- vi. The Countryside and Rights of Way Act 2000;
- vii. The Hedgerow Regulations 1997; and
- viii. Protection of Badgers Act 1992.

These pieces of legislation include a number of offences relating to protected species and requirements for licences to allow construction works to proceed. In addition, the Habitats Regulations set out the requirement for the consideration of the potential effects of a project on European designated sites.

Actions which are prohibited by legislation can be made lawful on the approval and granting of a licence from Natural Resources Wales (NRW), subject to conditions.

Full details of the legislation are provided in Appendix A.

## 6 Methodology

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### 6.1 Existing Data Review

The desk study element involved two methodologies: a review of existing ecological reports and an ecological data search.

Existing ecological data that informed the 2011 Environmental Statement<sup>1</sup>, including previous desk study results and further surveys, were reviewed.

### 6.2 Desk Study

An ecological data search was carried out to identify statutory designated sites within 5 km of the Site centre point. Online searches were carried out using the Multi Agency Geographic Information for the Countryside (MAGIC)<sup>2</sup>, Natural Resources Wales website<sup>3</sup> and the Joint Nature Conservation Committee (JNCC) website<sup>4</sup>.

In addition to this, protected and notable<sup>5</sup> species and invasive non-native species<sup>6</sup> within 5 km of the Site centre point were obtained from the Biodiversity Information Service for Powys & Brecon Beacons National Park (BIS)<sup>7</sup> on 21<sup>st</sup> November 2018, in addition to non-statutory site data and protected / notable habitats within 1 km.

### 6.3 Field Survey

#### 6.3.1 Habitats

An Extended Phase 1 Habitat survey was carried out on the site in accordance with standard JNCC Phase 1 Habitat Survey methodology<sup>8</sup> on the following dates:

- 26<sup>th</sup> November 2018,
- 25<sup>th</sup> April 2019,

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<sup>1</sup> Environmental Statement (2011), Celtic Energy.

<sup>2</sup> <http://magic.defra.gov.uk/> Accessed online 12/11/2019.

<sup>3</sup> <https://naturalresources.wales/conservation-biodiversity-and-wildlife/find-protected-areas-of-land-and-seas/designated-sites-search/?lang=en> Accessed online 21/11/2018.

<sup>4</sup> <http://jncc.defra.gov.uk> Accessed online 12/11/2019.

<sup>5</sup> 'Notable' species and habitats considered in this report include species and habitats of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales, under section 7 of the Environment (Wales) Act 2016, in addition to any species considered to be of significance for nature conservation such species listed in red data books, the Royal Society for the Protection of Birds (RSPB) 'Birds of Conservation Concern' lists and or Local Biodiversity Action Plans (LBAPs).

<sup>6</sup> As listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and/or Part 2 Schedule 2 of The Invasive Alien Species (Enforcement and Permitting) Order 2019

<sup>7</sup> <https://www.bis.org.uk/home> Accessed online 12/11/2019.

<sup>8</sup> Joint Nature Conservation Committee, (2010). *Handbook for Phase 1 habitat survey – a technique for environmental audit*. <http://jncc.defra.gov.uk/page-2468>.

- 26<sup>th</sup> April 2019; and
- 29<sup>th</sup> May 2019.

Surveys were carried out by Arup ecologists. Habitat areas greater than 0.1 ha were mapped and Target Notes (TN) were used to highlight any features/habitats of interest and/or suitable habitat for protected species. For completeness, any Target Notes identified as incidental records during other surveys on site have also been included.

### 6.3.2 Species

In conjunction with the Extended Phase 1 Habitat Survey, the potential for the site to support any legally protected species and/or other notable species were recorded.

Relevant species included all those protected by European or UK law, and notable species including those identified as being of principal importance in Wales, under Section 7 of the Environment (Wales) Act 2016 (Appendix A).

Detailed faunal surveys were not undertaken at this time, rather the potential for the site to support each species/species group was assessed based on the known range of each and the suitability of the habitats within the site. Any field evidence or sightings of such species was recorded as seen. The following species were considered:

#### 6.3.2.1 Badger (*Meles meles*)

Any evidence of badger setts or other badger activity such as paths, latrines or signs of foraging found during the Extended Phase 1 Habitat Survey was target noted and mapped. The survey methodology used was in accordance with best practice survey guidance<sup>9</sup>, including the classification of any setts recorded.

#### 6.3.2.2 Bats

Any buildings, structures and or trees within the study area were appraised (from the ground) for their suitability to support breeding, resting and hibernating bats using survey methods outlined in best practice survey guidance<sup>10</sup>. In addition, habitats were appraised for their suitability to support foraging and commuting bats.

#### 6.3.2.3 Hazel Dormouse (*Muscardinus avellanarius*)

The site was assessed for its suitability to support hazel dormice, based on best practice survey guidance<sup>11</sup>.

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<sup>9</sup> Harris, S., Cresswell, P. and Jefferies, D., (1989). *Surveying Badgers*. Mammal Society.

<sup>10</sup> Collins, J. (ed.) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)*. The Bat Conservation Trust, London.

<sup>11</sup> Bright, P. et al (2006). *The Dormouse conservation handbook – second edition*, English Nature.

### 6.3.2.4 Otter (*Lutra lutra*)

Water bodies, if present on the site were assessed for their suitability to support otter, in accordance with best practice survey guidance<sup>12</sup>.

### 6.3.2.5 Water Vole (*Arvicola amphibius*)

If present, water bodies on site were assessed for the suitability for water vole using best practice survey guidance<sup>13</sup>.

### 6.3.2.6 Birds

The site was surveyed for habitat suitable to support protected bird species and species of conservation significance, including nesting and wintering habitat. Any bird species seen at the site were recorded and any further evidence of species such as old nests or owl pellets was noted.

### 6.3.2.7 Reptiles

The site was appraised for its suitability to support reptiles, in accordance with published guidance<sup>14</sup>.

### 6.3.2.8 Amphibians

The site was appraised for its suitability to support amphibians, both protected species and species of conservation concern.

### 6.3.2.9 Other Species

The site was also appraised for its suitability to support other protected or notable fauna including mammals and invertebrates.

### 6.3.2.10 Invasive Non-Native Plant Species

The site was searched for evidence of invasive plant species as listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and/or Part 2 Schedule 2 of The Invasive Alien Species (Enforcement and Permitting) Order 2019, such as Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*) and giant hogweed (*Heracleum mantegazzianum*).

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<sup>12</sup> Chanin, P., (2003). *Monitoring the Otter, Lutra. Conserving Natura 2000 Rivers Monitoring Series No. 10.*, English Nature, Peterborough.

<sup>13</sup> Strachan R, Moorhouse T and M Gelling (2011) *Water vole conservation handbook, Third edition*, Wild Cru, Oxford University.

<sup>14</sup> Gent, T. and Gibson, S. (2003). *Herpetofauna Workers Manual*. JNCC, Peterborough.

## 6.4 Limitations

A number of the survey's visits were undertaken outside of the optimal period for undertaking botanical surveys (April-October); however, it is considered that sufficient (botanical) species information was obtained in order to classify the habitat types on site.

Whilst not a full protected species or botanical survey, the Extended Phase 1 Habitat Survey methodology enables an experienced ecologist to obtain a sufficient understanding of the ecology of a site in order to either confirm the conservation importance of the site, and assess the potential for impacts on habitats/species likely to represent a material consideration in planning terms, or to ascertain that further surveys will be required before such confirmation can be made.

The findings presented in this study represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys are limited by factors which affect the presence of flora and fauna, factors such as the time of year and natural behaviour of the animals. Nevertheless, these surveys were conducted at the optimal survey periods and using methodologies which are in accordance with published guidelines.

## 7 Results

### 7.1 Existing Data Review

The data in Table 1 below were collated from the surveys that were undertaken to inform an Environmental Statement that was prepared for the site in 2011 for a western extension to the Nant Helen (Extension) Surface Coal Mine, and additional surveys that were conducted on site between 2012 and 2016. The site for the 2011 Environmental Statement encompassed the existing and operational Nant Helen Site and a proposed extension (approximately 25 ha) to the south-west.

Table 1. Summary of existing survey data

Survey	Methodology
Extended Phase 1 Habitat Survey	An Extended Phase 1 Habitat Survey, undertaken on a number of visits between April and August 2010 of the site and surrounding areas, recorded a variety of habitats including plantation woodland, broadleaved woodland, hedgerows, scrub, acid marshy/grassland, mire, ephemeral/short perennial, watercourses and standing water.
Phase 2 Vegetation Survey	Grassland vegetation and areas dominated by purple moor grass ( <i>Molinia caerulea</i> ) within the site were subject to National Vegetation Classification (NVC) surveys, in July 2010. An NVC survey was undertaken on restored grassland areas at Nant Helen in August 2013. Bog pool, mire and various grassland communities were identified on site.
Bryophyte & lichen Survey	A bryophyte and lichen survey was undertaken on an area of translocated bog and surrounding engineered mounds over two days in August 2012. Although the bryophyte and lichen communities on site were relatively diverse, no protected or notable species were identified.
River Corridor Surveys	A survey to describe the physical characteristics of the watercourses on and near the site was undertaken following the methods outlines in the River Habitat Survey <sup>15</sup> . The majority of the watercourses within the site have been previously destroyed and restored to stone-line channels that only discharge water during heavy rain. One of two natural watercourses is a remnant section of the Nant Gyrlais, which above and below this undisturbed section has been lost to previous open casting. The Nant Penrhos is a wooded gorge, disturbed in part by deep mine tips.
Badger Survey	Signs of badger presence, including setts, latrines, paths, prints, hairs and snuffle holes were searched for on and adjacent to the site. No signs of badgers were identified during the survey.
Bat Surveys - roosts	All trees and buildings within and adjacent to the site were assessed for their suitability to support roosting bats in June 2010, in-line with good practice guidelines of the time <sup>16,17</sup> . Trees that were assessed from the ground as being

<sup>15</sup> Environment Agency (2003). *River Habitat Survey in Britain and Ireland*. Field Survey Guidance Manual.

<sup>16</sup> Mitchell-Jones, A. J. (2004). *Bat Mitigation Guidelines*. English Nature.

<sup>17</sup> Bat Conservation Trust (2007). *Bat Surveys – Good Practice Guidelines*. Bat Conservation Trust, London.



Survey	Methodology
	<p>suitable for bats were subject to aerial inspections. Only one tree was identified from aerial surveys as being suitable for roosting bats and a single pipistrelle was found in a small cavity.</p> <p>Twenty bat boxes were installed on site in 2014 and 2015 as mitigation for previous expansion of the Nant Helen mine. These were inspected for signs of use by bats in 2015 and 2016, using a torch. In 2015, two boxes were found to be occupied by a pipistrelle bat. In 2016, 3 boxes were found to be occupied by a pipistrelle bat.</p>
Bat Surveys – transect and static monitoring	<p>Activity surveys in the form of walked transects and the deployment of static detectors were also undertaken.</p> <p>Seven bat species (common pipistrelle (<i>Pipistrellus pipistrellus</i>), soprano pipistrelle <i>P. pygmaeus</i>), Nathusius pipistrelle (<i>P. nathusii</i>), brown long-eared (<i>Plecotus auratus</i>), noctule (<i>Nyctalus noctula</i>), serotine (<i>Eptesicus serotinus</i>) and Leisler's (<i>N. leislerii</i>) were recorded commuting/foraging within and adjacent to the site during the static and transect surveys, with most records comprising pipistrelles.</p>
Dormouse Survey	<p>One hundred dormouse nest tubes were deployed in July 2010 in four representative areas of suitable habitat on site. The tubes were then checked for presence/signs of dormice once per month in August, September, October and November 2010. Additionally, an inspection of hazel nuts was undertaken, to determine whether they had been opened by dormice.</p> <p>No dormice or signs of dormice were identified during the nest tube checks and no hazel nuts were found to have been opened by dormice.</p>
Otter Survey	<p>Three watercourses (Nant Penrhos, Nant Gyrlais and an unnamed watercourse) were surveyed in July and September 2010 for their suitability to support otters and for any signs of otter presence, including spraints, feeding remains and holts.</p> <p>No signs of otter were identified in proximity to any of watercourses or waterbodies that were surveyed.</p>
Water Vole Survey	<p>Watercourses and waterbodies were surveyed for signs of water voles.</p> <p>The watercourses were found to be generally unsuitable due to being dry for extended periods. No signs of water vole were identified in proximity to any of watercourses or waterbodies that were surveyed.</p>
Breeding & Wintering Bird Surveys	<p>Breeding bird surveys were undertaken on five visits between April and July 2010 using an abbreviated form of the Common Bird Census methodology.<sup>18</sup> An additional survey was undertaken in March 2010 to record any early breeding species. Surveys at dusk were undertaken on three occasions in June and July 2010 to record crepuscular species. A wintering bird survey was undertaken on four visits between November 2009 and February 2010.</p> <p>Twenty-one species were recorded as breeding/possibly breeding within and adjacent to site. Six of these species were listed on Section 42 of the Natural Environment and Rural Communities Act (NERC)<sup>19</sup> and five species were red listed on the Birds of Conservation Concern 3 (BoCC).<sup>20</sup> No crepuscular species were recorded.</p> <p>Crossbills (<i>Loxia curvirostra</i>) were recorded, which are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), but no evidence of</p>

<sup>18</sup> Bibby *et al.* (2000). *Bird Census Techniques Second Edition*.

<sup>19</sup> Section 42 of the NERC act as been replaced by Section 8 of the Environment (Wales) Act 2016.

<sup>20</sup> BoCC 3 has now been replaced by BoCC 4. There is also a BoCC applicable to Wales.

Survey	Methodology
	breeding was recorded. Five species listed on Section 42 were recorded, four of which were also red listed on BoCC 3.
Specialist Bird Surveys	Specific honey buzzard ( <i>Pernis apivorus</i> ) surveys were undertaken on five visits between July and August 2010. Observations were also made for other raptor species and a search for old nests was conducted. No nesting honey buzzards were recorded on or adjacent to the site. Neither goshawk ( <i>Accipiter gentilis</i> ) nor peregrine ( <i>Falco peregrinus</i> ) were recorded but three old buzzard ( <i>Buteo buteo</i> ) nests were found. No barn owl ( <i>Tyto alba</i> ) were identified during bat survey work but tawny owl ( <i>Strix aluco</i> ) were heard.
Reptile Survey	One hundred and ninety artificial refugia (roofing felt) were deployed along 22 transects between May and July 2010. The artificial refugia, along with any natural refugia (e.g. log piles) were checked a minimum of six times between June and October 2010 in suitable weather conditions. Common lizard ( <i>Zootoca vivipara</i> ) and slow worm ( <i>Anguis fragilis</i> ) were both recorded in low numbers across the site.
Great Crested Newt Survey	Bottle trapping, torching and egg searching were undertaken on all waterbodies on site in 2009 and 2010. All surveys in 2009 and 2010 were negative for great crested newts. Good populations of palmate newt ( <i>Lissotriton helveticus</i> ) were identified on site. Common toad ( <i>Bufo bufo</i> ) and common frog ( <i>Rana temporaria</i> ) were also present.
Invertebrate Surveys	Sweep netting and a direct searching survey was undertaken in August 2009. Moth trapping was conducted on five evenings between May and September 2010 in representative habitat types across the site. Seven routes on site were walked to record butterflies on six visits in 2010 between May and July. Surveys for marsh Fritillary ( <i>Euphydryas aurinia</i> ) adults carried out during May-June 2010 and larval webs were searched for in August and September 2010. Eighty-six invertebrate species were recorded including one Red Data Book and one Nationally Scarce species. Ninety-two moth species and nineteen other invertebrates were recorded during the moth trap surveys, including one nationally scarce moth and 11 UK Biodiversity Action Plan (UKBAP) species. Thirteen butterfly species were recorded, two of which were listed on Section 42 and on the UKBAP <sup>21</sup> . No adult or larval marsh fritillary were identified on site.

## 7.2 Desk Study

BIS provided records of non-statutory designated sites and protected/notable species on 21<sup>st</sup> November 2018, within a 5 km search radius from the Site and only records from within the last 10 years were requested. Statutory designated sites within 5 km were identified using MAGIC.

### 7.2.1 Statutory Designated Sites

Fourteen statutory designated sites were identified within 5 km of the Site. They comprised one Special Area of Conservation (SAC), 12 Sites of Special Scientific Interest (SSSI) (one of which is also designated as a National Nature Reserve

<sup>21</sup> The UKBAP was succeeded by the 'UK Post-2010 Biodiversity Framework' in July 2012. The UK list of priority species, however, remains an important reference source and has been used to help draw up statutory lists of priority species.

(NNR)) and one National Park. They are detailed in Table 2 below and shown in Figures 2 and 3.

Table 2. Statutory designated sites within 5 km of the Site

Site Name	Designation	Features	Approximate Distance and Orientation from Site
Coedydd Nedd a Mellt	SAC	Annex I habitats that are a primary reason for selection of this site include Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles.  Coedydd Nedd a Mellt is a very large and diverse example of old sessile oak wood in south Wales. The woods extend along a series of deeply incised valleys and ravines and contain complex mosaics of sessile oak <i>Quercus petraea</i> woodland, ash <i>Fraxinus excelsior</i> woodland (some of which is referable to Annex I type 9180 <i>Tilio-Acerion</i> forests of slopes, screes and ravines), and transitions to lowland woodland types. The whole site is biologically rich, with many woodland plant communities represented and rich bryophyte and lichen assemblages. Notable higher plant species include wood fescue <i>Festuca altissima</i> and the ferns <i>Dryopteris aemula</i> , <i>Hymenophyllum tumbrigenae</i> and <i>Asplenium viride</i> .	2.9 km south-east
Nant Llech	SSSI	The Nant Llech, flowing off the Millstone Grit rocks and on to Coal Measure shales has carved a steep-sided valley of special interest on account of its rich variety of woodland and cliff plant communities. A range of woodland types has formed in response to variations in soil moisture content and soil chemistry.  Bird life is rich and the uncommon soldier beetle ( <i>Podabrus alpinus</i> ) has been recorded from the wood.	100 m north-east
Gors Llwyn, Onllwyn	SSSI	This site contains a range of peat-depositing vegetation communities. Peat deposition has been sufficiently great in part of the site to form a dome shaped mass of peat above the general water table, known as a raised mire. There are very few other examples of this formation known in mid and south Wales.  North-east of the complex of mires is an area of acidic pasture. Drier ridges divide up a series of wet flushes which support a range of wetland species e.g. whorled caraway	40 m east

Site Name	Designation	Features	Approximate Distance and Orientation from Site
Caeau Ton-y-Fildre	SSSI	<p>(<i>Carum verticillatum</i>), meadow thistle (<i>Cirsium dissectum</i>) and sharp-flowered rush (<i>Juncus acutiflorus</i>). These plants form a clearly defined community of extremely limited distribution in Europe, occurring only along the southern Atlantic seaboard.</p> <p>The site comprises two unimproved herb-rich pastures on the north bank of Nant y Bryn. The western field supports a wide range of species characteristic of damp, flushed peaty pasture, including globeflower (<i>Trollius europaeus</i>), meadow thistle, whorled caraway and marsh arrowgrass (<i>Triglochin palustris</i>).</p> <p>Notable species in the eastern field include greater butterfly-orchid (<i>Platanthera chlorantha</i>), saw-wort (<i>Serratula tinctorial</i>), dyer's greenweed (<i>Genista tinctora</i>) and petty whin (<i>G. anglica</i>). Over 100 species of flowering plants and ferns having been recorded. The area also supports invertebrates, especially butterflies.</p>	260 m east
Waun Ton-y-Spyddaden	SSSI	<p>A series of small, unimproved, herb-rich hay meadows lying on a very gentle slope. The site demonstrates well the effects of traditional management on the moorland vegetation to be found on the better soils in this part of Wales.</p> <p>A vivid gradation in plant communities can be seen as the slope descends from north to south. At the top end is a typical moorland community of mat-grass (<i>Nardus stricta</i>), heath rush (<i>Juncus squarrosus</i>), deergrass (<i>Scirpus cespitosus</i>) and sheep's-fescue (<i>Festuca ovina</i>). This changes into grass heath communities of brown bent (<i>Agrostis canina</i>), red fescue (<i>Festuca rubra</i>), lousewort (<i>Pedicularis sylvatica</i>) and heath spotted-orchid (<i>Dactylorhiza maculata</i> spp. <i>ericetorum</i>), which in turn grade into purple moor-grass/sedge associations.</p>	2.2 km north-east
Rhos Hen-Glyn-Isaf	SSSI	<p>This site comprises an extensive and varied area of damp/wet heathy pasture above the valley of the River Griedd, near Ystradgynlais. It is noted for its wide variety of plant species, including several that are uncommon in Brecknock.</p> <p>A large part of the site supports a sward dominated by purple moor-grass, sedges and common cottongrass (<i>Eriophorum angustifolium</i>). Other species include bog pimpernel (<i>Anagallis tenella</i>), round-leaved sundew (<i>Drosera rotundifolia</i>), few-flowered spike-</p>	2.7 km north-west

Site Name	Designation	Features	Approximate Distance and Orientation from Site
Mynydd Du	SSSI	<p>rush (<i>Eleocharis quinqueflora</i>), common butter-wort (<i>Pinguicula vulgaris</i>) and devil's-bit scabious (<i>Succisa pratensis</i>).</p> <p>Additional interest is provided by stands of alder (<i>Alnus glutinosa</i>) and by ditches which support species such as hemp-agrimony (<i>Eupatorium cannabinum</i>), bogbean (<i>Menyanthes trifoliata</i>), bog pondweed (<i>Potamogeton polygonifolius</i>) and the locally uncommon fern (<i>Osmunda regalis</i>).</p>	3 km north
Ogof Ffynnon Ddu	SSSI	<p>This is an important upland site of special interest for its vegetation, open water and birdlife. In addition to the Old Red Sandstone there are significant outcrops of Carboniferous Limestone and Millstone Grit.</p> <p>The summit ridges are notable for their extensive grassland, dominated in the main by matgrass. Small areas still support heather <i>Calluna vulgaris</i> and bilberry <i>Vaccinium myrtillus</i>.</p> <p>The north and east facing cliffs of Bannau Sir Gaer and Bannau Brycheiniog support an interesting arctic-alpine flora, with such species as northern bedstraw (<i>Galium boreale</i>), dwarf willow (<i>Salix herbacea</i>), lesser meadow-rue (<i>Thalictrum minus</i>) and roseroot (<i>Sedum rosea</i>), together with a rich moss and liverwort flora.</p>	3.3 km north-east
Ogof Ffynnon Ddu - Pant Mawr	SSSI, NNR	<p>The site contains part of an extensive cave system which has at least 40 kilometres of passages, the largest length in any Welsh cave, situated within a vertical range of 300 metres, which is the greatest in any cave in Britain. A number of rare crustacean species restricted to subterranean habitats are of particular note.</p> <p>The undulating upland plateau above the cave system supports the finest limestone pavement in mid and south Wales. It is rich in plant species, including such rarities as lily-of-the valley (<i>Convallaria majalis</i>), soft-leaved sedge (<i>C. montana</i>), mountain melick (<i>Melica nutans</i>), lesser meadow-rue (<i>Thalictrum minus</i>) and the nationally rare hairy greenweed (<i>Genista pilosa</i>).</p> <p>These areas of sheltered, deep heather provide suitable habitat for nightjar (<i>Caprimulgus europaeus</i>), offering probably one of the last breeding localities in Brecknock for this</p>	3.3 km north-east

Site Name	Designation	Features	Approximate Distance and Orientation from Site
Nant y Rhos	SSSI	<p>summer-visiting bird. Also present within the site are a number of peat-bottomed pools with a well-developed upland dragonfly and damselfly population.</p> <p>The site consists of a single, gently sloping enclosure on the west side of the Nant y Rhos, 2.5 km south-east of Ystalyfera, at an altitude of 140 m above sea level. The geology of this area comprises Middle Coal Measure shales, overlain for the most part by boulder clay. The site is of special interest for its species-rich fen meadow vegetation, which includes large populations of meadow thistle and whorled caraway.</p> <p>Most of the site supports vegetation that is dominated by purple moor-grass, accompanied by a range of characteristic associates including meadow thistle, flea sedge (<i>Carex pulicaris</i>), carnation sedge (<i>C. panicea</i>) and tawny sedge (<i>C. hostiana</i>).</p>	3.5 km south-west
Craig y Rhiwarth	SSSI	<p>The west-facing limestone escarpment of Craig y Rhiwarth on the east bank of the Afon Tawe, above Craig-y-nos, supports some of the finest limestone plant communities in Brecknock. The limestone is covered in places by acidic boulder clay, where communities of plants demanding more acidic conditions are confined and contrast with the calcicolous communities elsewhere.</p> <p>Areas of acidic glacial drift support contrasting oak and birch woodland and contribute to the great species diversity of the site, with over 170 species of higher plants and a similar number of lower plants known to grow here.</p>	3.6 km north-east
Dyffynnoedd Nedd a Mellte a Moel Penderyn	SSSI	<p>Dyffynnoedd Nedd a Mellte, a Moel Penderyn is of special interest for its extensive and diverse semi-natural woodland, important populations of several flowering plants and supporting outstanding assemblages of mosses, liverworts and lichens. The site includes a range of geological features, well-exposed in the cliffs and rocky river beds. These include exposures at Moel Penderyn, Craig y Ddinas and Bwa Maen and geomorphological features within parts of the valleys of the Hepste and Mellte are also of special interest.</p> <p>This site includes the wooded valleys of the rivers Nedd and Mellte, and their tributaries above Pontneddfechan, as they pass through a Millstone Grit and limestone plateau, and</p>	2.9 km south-east

Site Name	Designation	Features	Approximate Distance and Orientation from Site
Caeau Nant y Llechau	SSSI	<p>Moel Penderyn, which lies to the east. The plateau lies at about 300 m, the rivers having eroded deep, narrow valleys with gorges, river cliffs, block scree and waterfalls.</p> <p>This is the largest area of traditional unimproved hay meadow known in Brecknock. The collection of gently sloping, south-east facing fields on the upper valley side of the Nedd support a wealth of plant species. Developed on boulder clay overlying millstone grit, flushed in part by springs and drained by a number of well wooded streams, the varying topography is reflected in the diverse flora, with over 110 species of higher plants recorded from the grassland areas.</p>	4.5 km east



### 7.2.2 Non-Statutory Designated Sites

Non-statutory designated sites within 1 km of the site were returned in the desk study records from BIS. Eight sites were identified, all of which are adopted Sites of Importance for Nature Conservation (SINC). They are listed in Table 3 below.

Table 3. Non-statutory designated sites within 5 km of the site

Site Name	Designation	Approximate Distance and Orientation from Site
Gorsllwyn Meadows	SINC	Partially within the site boundary; occurs in the northern part of the Washery.
Onllwyn Coal Washery	SINC	Partially within the site boundary; occurs in the north eastern part of the Washery
Dyffryn Cellwen	SINC	Within the site; occurs in the south eastern part of the Washery.
Intervalley Road, Banwen	SINC	Immediately adjacent; south of the Washery.
Banwen Pond	SINC	500 m south of the Site.
Adjacent to Gorsllwyn	SINC	Immediately adjacent, north of the Washery.
Aberhenwaun Uchaf	SINC	600 m south.
Land behind Marigold Place	SINC	800 m south.

### 7.2.3 Other Notable Habitats

Other notable habitats within 1 km were returned in the desk study records from BIS.

A Wildlife Trust Reserve is present approximately 1 km west of the site. Marsh fritillary butterflies are present within the reserve.

There were 57 areas of ancient woodland, the closest of which is within the site. Areas of ancient woodland within 1 km of the site are shown on Figure 4.

Habitats listed as Habitats of Principal Importance (HPI) in response to the requirements of Section 7 of the Environment (Wales) Act 2016 were also identified. These included: blanket bog and limestone pavement.

### 7.2.4 Protected and Notable Species

Records of protected and/or notable species identified within 5 km of the site are summarised in Table 4 below. The distance given is that to the closest point on the site boundary.

Table 4. Protected and notable species within 5 km of the site

Species / Group	Scientific Name	Status <sup>22</sup>	Number of Records	Approximate distance of closest record (m)
<b>Bats</b>				
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	EPS, WCA	10	300
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	EPS, WCA	27	400
Unidentified bat	<i>Chiroptera</i>	EPS, WCA	10	400
Daubenton's bat	<i>Myotis daubentonii</i>	EPS, WCA	7	400
Noctule bat	<i>Nyctalus noctula</i>	EPS, WCA	11	400
Pipistrelle species	<i>Pipistrellus spp.</i>	EPS, WCA	14	600
Brown long-eared bat	<i>Plecotus auritus</i>	EPS, WCA	7	1000
Myotis bat	<i>Myotis spp.</i>	EPS, WCA	2	1700
Nathusius' pipistrelle	<i>Pipistrellus nathusii</i>	EPS, WCA	2	2000
Natterer's bat	<i>Myotis nattereri</i>	EPS, WCA	2	2000
Lesser horseshoe bat	<i>Rhinolophus hipposideros</i>	EPS, WCA	1	2000
<b>Other mammals</b>				
Hare	<i>Lepus europaeus</i>	S7	3	Within the site
Otter	<i>Lutra lutra</i>	EPS, WCA, S7	27	400
Badger <sup>23</sup>	<i>Meles meles</i>	BA	3	700
Hedgehog	<i>Erinaceus europaeus</i>	S7	32	800
Polecat	<i>Mustela putorius</i>	HDir, S7	4	1500
Harvest mouse	<i>Micromys minutus</i>	S7	1	2000
<b>Birds</b>				
Cuckoo	<i>Cuculus canorus</i>	S7	23	Within the site
House sparrow	<i>Passer domesticus</i>	S7	81	Within the site

<sup>22</sup> EPS = European Protected Species as listed under Schedule 2 of the Conservation of Habitats and Species Regulations (2017).

HDir = Animals and plants that receive protection under the Council Directive 92/43/EEC (The Habitats Directive).

BDir = Birds that receive protection under the Directive 2009/147/ED (The Birds Directive).

WCA = Species protected under Schedule 1 (birds), Schedule 5 (animals) or Schedule 8 (plants) of the Wildlife and Countryside Act (1981) as amended.

S7 = Species listed on Section 7 of the Environment (Wales) Act 2016.

<sup>23</sup> BA = Protection of Badgers Act (1992).

Kestrel	<i>Falco tinnunculus</i>	S7	27	Within the site
Lesser black-backed gull	<i>Larus fuscus</i>	BDir	6	Within the site
Red kite	<i>Milvus milvus</i>	WCA, BDir	44	Within the site
Starling	<i>Sturnus vulgaris</i>	BDir, S7	68	Within the site
Hawfinch	<i>Coccothraustes coccothraustes</i>	S7	1	100
Dunnoek	<i>Prunella modularis</i>	S7	51	300
Merlin	<i>Falco columbarius</i>	BDir, WCA	1	300
Mistle thrush	<i>Turdus viscivorus</i>	BDir	31	300
Bullfinch	<i>Pyrrhula pyrrhula</i>	S7	24	400
Common crossbill	<i>Loxia curvirostra</i>	WCA	24	400
Skylark	<i>Alauda arvensis</i>	BDir, S7	26	400
Woodcock	<i>Scolopax rusticola</i>	BDir	12	400
Grasshopper warbler	<i>Locustella naevia</i>	S7	12	600
Pied flycatcher	<i>Ficedula hypoleuca</i>	S7	11	600
Wood warbler	<i>Phylloscopus sibilatrix</i>	S7	13	600
Barn owl	<i>Tyto alba</i>	WCA	5	700
Curlew	<i>Numenius arquata</i>	BDir, S7	4	800
Linnet	<i>Linaria cannabina</i>	S7	9	800
Mallard	<i>Anas platyrhynchos</i>	BDir	33	800
Snipe	<i>Gallinago gallinago</i>	BDir	17	800
Song thrush	<i>Turdus philomelos</i>	BDir, S7	57	800
Brambling	<i>Fringilla montifringilla</i>	WCA	1	900
Fieldfare	<i>Turdus pilaris</i>	BDir, WCA	13	900
Lapwing	<i>Vanellus vanellus</i>	BDir, S7	7	900
Redwing	<i>Turdus iliacus</i>	WCA, BDir	17	900
Reed bunting	<i>Emberiza schoeniclus</i>	S7	27	900
Peregrine	<i>Falco peregrinus</i>	BDir, WCA	18	1000
Lesser redpoll	<i>Acanthis cabaret</i>	S7	32	1200
Hen harrier	<i>Circus cyaneus</i>	BDir, S7	2	1300
Jack snipe	<i>Lymnocyptes minimus</i>	BDir	3	1400
Water rail	<i>Rallus aquaticus</i>	BDir	2	1500
Hobby	<i>Falco subbuteo</i>	WCA	4	1600

Honey buzzard	<i>Pernis apivorus</i>	BDir WCA	2	1600
Goshawk	<i>Accipiter gentilis</i>	WCA	7	1700
Herring gull	<i>Larus argentatus</i>	S7	7	1700
Tree pipit	<i>Anthus trivialis</i>	S7	15	1700
Nightjar	<i>Caprimulgus europaeus</i>	BDir, S7	8	1800
Osprey	<i>Pandion haliaetus</i>	BDir, WCA	1	1900
Short-eared owl	<i>Asio flammeus</i>	BDir	3	2000
Spotted flycatcher	<i>Muscicapa striata</i>	S7	2	2500
Goosander	<i>Mergus merganser</i>	BDir	9	2900
Kingfisher	<i>Alcedo atthis</i>	BDir, WCA	2	2900
Willow tit	<i>Poecile montana</i>	S7	1	3400
Yellowhammer	<i>Emberiza citrinella</i>	S7	2	3400
Golden plover	<i>Pluvialis apricaria</i>	BDir, BDir, S7	1	3600
Wigeon	<i>Anas penelope</i>	BDir	2	3600
Mute swan	<i>Cygnus olor</i>	BDir	9	3700
Ring ouzel	<i>Turdus torquatus</i>	S7	1	4000
<b>Reptiles and Amphibians</b>				
Common toad	<i>Bufo bufo</i>	WCA	12	200
Common lizard	<i>Zootoca vivipara</i>	WCA	14	700
Common frog	<i>Rana temporaria</i>	WCA	32	700
Grass snake	<i>Natrix helvetica</i>	WCA	7	1000
Palmate newt	<i>Lissotriton helveticus</i>	WCA	5	1700
Slow worm	<i>Anguis fragilis</i>	WCA	10	2000
<b>Fish</b>				
Atlantic salmon	<i>Salmo salar</i>	HDir, S7	2	600
Bullhead	<i>Cottus gobio</i>	HDir	2	2000
<b>Invertebrates</b>				
Broom moth	<i>Ceramica pisi</i>	S7	7	800
Marsh fritillary	<i>Euphydryas aurinia</i>	EPS, WCA, S7	49	900
Dark-barred Twin-spot Carpet	<i>Xanthorhoe ferrugata</i>	S7	9	900
Small phoenix	<i>Ecliptopera silaceata</i>	S7	9	900
Small heath	<i>Coenonympha pamphilus</i>	S7	16	1000

Knot grass	<i>Acronicta rumicis</i>	S7	7	1200
Dot moth	<i>Melanchra persicariae</i>	S7	2	1300
Rosy minor	<i>Litoligia literosa</i>	S7	2	1300
Rosy rustic	<i>Hydraecia micacea</i>	S7	2	1300
Sallow	<i>Cirrhia icteritia</i>	S7	2	1300
Ear moth	<i>Amphipoea oculea</i>	S7	2	1400
Oak hook-tip	<i>Watsonalla binaria</i>	S7	1	1500
Oblique carpet	<i>Orthonama vittata</i>	S7	4	1500
Autumnal rustic	<i>Eugnorisma glareosa</i>	S7	2	1500
Hedge rustic	<i>Tholera cespitis</i>	S7	1	1600
Grayling	<i>Hipparchia semele</i>	S7	9	1800
Double dart	<i>Graphiphora augur</i>	S7	1	1800
Blood-vein	<i>Timandra comae</i>	S7	1	1900
Buff ermine	<i>Spilosoma lutea</i>	S7	2	1900
Garden tiger	<i>Arctia caja</i>	S7	2	1900
Shoulder-striped wainscot	<i>Leucania comma</i>	S7	1	1900
Small square-spot	<i>Diarsia rubi</i>	S7	5	1900
White ermine	<i>Spilosoma lubricipeda</i>	S7	5	1900
Centre-barred sallow	<i>Atethmia centrago</i>	S7	1	1900
Dusky brocade	<i>Apamea remissa</i>	S7	1	1900
Ghost moth	<i>Hepialus humuli</i>	S7	2	1900
Small Pearl-bordered Fritillary	<i>Boloria selene</i>	S7	4	2200
Small blue	<i>Cupido minimus</i>	WCA, S7	1	2300
Wall	<i>Lasiommata megera</i>	S7	15	2300
Brindled beauty	<i>Lycia hirtaria</i>	S7	1	2400
Cinnabar	<i>Tyria jacobaeae</i>	S7	3	2500
Narrow-bordered bee hawk-moth	<i>Hemaris tityus</i>	S7	1	3700
Dingy skipper	<i>Erynnis tages</i>	S7	2	4000
<b>Vascular plants</b>				

Small-flowered Sticky Eyebright	<i>Euphrasia officinalis subsp. anglica</i>	S7	1	100
Bluebell	<i>Hyacinthoides non-scripta</i>	WCA	47	100
Globeflower	<i>Trollius europaeus</i>	S7	1	600
Eyebright	<i>Euphrasia officinalis subsp. pratensis</i>	S7	1	1700
<b>Bryophytes &amp; lichens</b>				
A lichen	<i>Parmotrema perlatum</i>	S7	6	Within the site
A lichen	<i>Usnea articulata</i>	S7	6	Within the site
Scarce Turf-moss	<i>Rhytidiadelphus subpinnatus</i>	S7	6	500
Witches' Whiskers Lichen	<i>Usnea florida</i>	S7	2	1300
Varnished Hook-moss	<i>Hamatocaulis vernicosus</i>	HDir, WCA	1	1400
A lichen	<i>Pachyphiale carneola</i>	S7	1	1900
A lichen	<i>Pannaria conoplea</i>	S7	1	1900
A lichen	<i>Parmeliella triptophylla</i>	S7	1	1900
A lichen	<i>Phyllopsora rosei</i>	S7	1	1900
A lichen	<i>Sticta canariensis (dufourii)</i>	S7	1	1900
A lichen	<i>Sticta fuliginosa</i>	S7	2	1900
A lichen	<i>Sticta limbata</i>	S7	2	1900

## 7.3 Field Survey

A brief description of each of the habitats found within the site boundary is given in Section 7.3.1 below. An assessment of the site for supporting protected species is given in Section 7.3.2 and target notes recorded during the field survey and other surveys on site during 2019 are given in Section 7.3.3.

### 7.3.1 Habitats

Forty habitat types were identified within the Site. These are described below and shown on Figure 5.

## Broadleaved woodland – semi-natural

There were areas of semi-natural broadleaved woodland on the edges of the Site. Species compositions were broadly similar throughout the site and comprised willow (*Salix* sp.), silver birch (*Betula pendula*), hawthorn (*Crataegus monogyna*), rowan (*Sorbus acuparia*), sessile oak (*Quercus petraea*) and hazel (*Corylus avellana*). Along the access road to the Nant Helen site, there was a small area of large mature oak trees with a bluebell (*Hyacinthoides non-scripta*) understorey (TN51, Figure 5). This area of woodland is on the Ancient Woodland Inventory.

## Broadleaved woodland – plantation

Small areas of semi-mature planted woodland were present throughout the Site and formed some of the previously restored mining areas. Species compositions were similar to those of the semi-natural woodlands on Site.

## Coniferous woodland – plantation

A large conifer plantation was present in the north-west of the Site and extends outside of the site boundary. Larch trees (*Larix* sp.) were the dominant species, with pine (*Pinus* sp.) and spruce (*Picea* sp.) also present. The ground flora was sparse and was dominated by mosses and common wintergreen (*Pyrola minor*), which occurred extensively through the plantation. Bee orchids were identified within the woodland, but they were outside of the site boundary (TN1, Figure 5). In parts of the woodland, the understorey supported establishing broadleaved species such as oak and birch.

It is noted that part of this area is recorded as PAWS (in the Ancient Woodland Inventory<sup>24</sup>), although did not support any indicator species of ancient woodland. Furthermore, a separate technical note (Appendix C) confirms that the plantation is on backfilled material following mining and extending over the area recorded as a PAWS; rather than as implied, the plantation replacing semi-natural woodland on the in situ woodland soils.

## Mixed woodland – plantation

This habitat type was present in restored mining areas on Site. Species present included: larch, spruce, hazel, hawthorn, field maple (*Acer campestre*) and willow species.

## Scrub – dense/continuous

Dense scrub was present around settling lagoons in the south-east of the Site. Bramble, European gorse (*Ulex europeaus*), dogwood (*Cornus sanguinea*), willow and self-seeded birch trees were present.

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<sup>24</sup> <https://naturalresources.wales/evidence-and-data/research-and-reports/ancient-woodland-inventory/?lang=en>

## Scrub – scattered

Scattered willow and gorse scrub was present throughout the Site. Other species present included bramble and birch seedlings.

## Broadleaved parkland/scattered trees

Scattered broadleaved trees were present throughout the site. Species present included English oak (*Quercus robur*), willow, hawthorn and rowan.

## Coniferous parkland/scattered trees

An area of scattered larch, pine and spruce trees was present in the north of the Site.

## Coniferous woodland – recently felled

A recently felled conifer plantation was present in the south-west, just outside the site boundary. It has been colonised by scrub species including bramble and willow. Stacked logs were present throughout the area.

## Neutral grassland – unimproved

Areas were present alongside tracks within the Washery and comprised a moderately diverse flora including grasses: Yorkshire fog (*Holcus lanatus*), sweet vernal grass (*Anthoxanthum odoratum*), false oat-grass (*Arrhenatherum elatius*), crested dogs tail (*Cynosurus cristatus*), creeping bent (*Agrostis stolonifera*), and sedges: glaucous sedge (*Carex flacca*) and black sedge (*C. nigra*). Herbs included common yellow rattle (*Rhinanthus minor*), cowslip (*Primula veris*), hairy tare (*Vicia hirsuta*), cuckoo flower (*Cardamine pratensis*) and marsh thistle (*Cirsium palustre*). In unmanaged areas, ruderal and scrub species were present including rose-bay willowherb (*Chamerion angustifolium*), docks (*Rumex* spp), rushes (*Juncus* spp) and tufted hair grass (*Deschampsia cespitosa*), in addition to willow and hawthorn scrub, and oak saplings.

## Acid grassland – semi-improved

The centre of the Site comprised short acid grassland. Species present included red fescue (*Festuca rubra*), sheep's fescue (*F. ovina*), cat's ear (*Hypochaeris radicata*), heath grass (*Danthonia decumbens*), bent grass (*Agrostis* sp.), tormentil (*Potentilla erecta*), pearly everlasting (*Anaphalis margaritacea*) and wild strawberry (*Fragaria vesca*).

## Improved grassland

Grazed fields were present to the east of the Site. They were dominated by perennial rye-grass (*Lolium perenne*). Other species present included Yorkshire fog, white clover (*Trifolium repens*) and rush species.



## Marsh/marshy grassland

Large areas of the site comprised grasslands dominated by rushes. Species present included hard rush (*Juncus inflexus*), soft rush (*Juncus effusus*), yarrow (*Achillea millefolium*), meadowsweet (*Filipendula ulmaria*), cock's foot (*Dactyla glomeratus*), valerian (*Valeriana* sp.), common sorrel (*Rumex acetosa*), ribwort plantain (*Plantago lanceolata*), vetch species (*Vicia* spp.), Yorkshire fog and teasel (*Dipsacus fullonum*). Some areas of this habitat were dominated by purple moor grass. These grasslands were often heavily grazed by sheep, cattle and horses.

## Poor semi-improved grassland

A species-poor semi-improved grassland was present south of the improved fields. Species here included: Yorkshire-fog, soft rush, creeping thistle (*Cirsium arvense*), creeping buttercup (*Ranunculus repens*) and stitchwort (*Stellaria* sp.)

## Bracken – scattered

Stands of bracken (*Pteridium aquilinum*) were present within grasslands outside the site boundary to the west.

## Dry dwarf shrub heath – acid

This habitat, which occurred in the north east corner of the site and in a smaller area which was restored from previous mining activities; was dominated by common heather (*Calluna vulgaris*). Other species present included purple moor grass (*Molinia caerulea*), bilberry (*Vaccinium myrtillus*), soft rush, marsh willowherb (*Epibolium palustre*), hawthorn, Yorkshire fog, willow, bracken, foxglove, red fescue, silver birch, rowan, and *Cladonia* lichens (*Cladonia* spp.).

## Wet dwarf shrub heath

The area that was restored from previous mining activities in the centre of the site comprised an area of wet heath. Common heather and cross-leaved heather (*Erica tetralix*) were present, along with purple moor grass and sphagnum mosses (*Sphagnum* spp.).

## Dry heath/acid grassland

An area of heath/acid grassland mosaic was present south of the overburden mound. Species present included: common heather and European gorse, mouse-ear-hawkweed (*Pilosella officinarum*), cowslip (*Primula veris*) and great wood-rush (*Luzula sylvatica*), with locally abundant willowherb (*Epibolium* sp.).

## Acid/neutral flush

A flush was present within the field in the restored mining area and was dominated by rush species. Water was present at the time of the survey.

## Fen – basin mire

A fen was present within the restored mining area, likely to be fed by the flush within the same field. Common cotton-grass (*Eriophorum angustifolium*) and common club-rush were present (*Schoenoplectus lacustris*).

## Swamp

A reedbed was present on site close to settling lagoons. The vegetation here was dominated by common reed (*Phragmites australis*).

## Standing water

Numerous lagoons and settling ponds were present across the site. The lagoons were generally bordered by scattered scrub or ruderal vegetation with reedmace (*Typha* spp.) often present. Four ponds were present in the centre of the site in a previously restored mining area. These were bordered by rushes, reedmace and sphagnum mosses.

## Running water

Various drains and streams were present throughout the Site. These were typically up to 1 m wide with beds formed of rocks. The River Dulais flows east to west, from the Washery, in the south eastern corner of the site.

## Acid/neutral natural inland cliff

A sharp rock face was present in the acid grassland towards the south of the site.

## Quarry

The opencast mine site comprises a large quarry to the north-west of the Site. A pool of standing water is present at the bottom of the quarry.

## Spoil

Multiple spoil heaps were present on Site, comprised of coal.

## Amenity grassland

A small area of amenity grassland formed an island along Onllwyn Road in Onllwyn village.

## Ephemeral/short perennial

Various areas of the mine site had been colonised by ephemeral/short perennial vegetation. Colt's foot (*Tussilago farfara*) was abundant. Foxglove (*Digitalis purpurea*), mouse-ear hawkweed, and mosses were also present.