The Abergelli Power Gas Fired Generating Station Order

6.2 Environmental Statement Appendices - Volume F Ecology Part I

Planning Act 2008
The Infrastructure Planning
(Applications: Prescribed Forms and Procedure) Regulations 2009

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Appendix 8.1a

Preliminary Ecological Appraisal Report – Non-Confidential

Abergelli Power Project Preliminary Ecological Appraisal – NON-CONFIDENTIAL

Abergelli Power Limited
May 2018

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1. Executive Summary

1.1.1 AECOM was instructed by Abergelli Power Limited to carry out a Preliminary Ecological Appraisal (PEA) of the Abergelli site, hereafter referred to as 'the Project Site'. The central grid reference for the Project Site is SN 6528 0143 and the boundary of the Project Site is shown on Figure 1.

1.1.2 The Project Site supports woodland, rows of trees, standalone trees, dense and scattered scrub, improved, semi-improved and marshy grassland, tall ruderal vegetation, running water, fences and bare ground (hard standing).

1.1.3 The Project will require the partial removal of hedgerows, semi-natural broadleaved woodland, rows of trees, scrub, running water, ponds, hardstanding, marshy semi-improved and improved grassland and trees with potential for roosting bats.

1.1.4 The Project Site has potential to support the following protected species; marshy fritillary butterfly, great crested newt, reptiles, breeding birds, bats, hazel dormouse, badger, polecat, otter and water vole. The site may support important hedgerows.

1.1.5 In order to inform the production of an Ecological Impact Assessment as part of a wider Environmental Impact Assessment the following surveys are recommended:

Feature/Species	Details	Survey Timing
Important Hedgerows	Hedgerows proposed to be removed as part of the development should be assessed by a suitably qualified ecologist to determine if they are classified as an important hedgerow under the hedgerow regulations, 1997 (Ref. 1).	April to early-June
Tree Preservation Orders (TPO)	A survey to identify TPO trees outside of the Project Site boundary which will be affected by the works should be undertaken.	Anytime
Invertebrates (including marsh fritillary butterfly)	Consultation with NRW and the local planning authority required to determine the need for further surveys.	To be confirmed.
Great Crested Newt	Surveys for great crested newts to be undertaken on suitable ponds within the Project Site boundary, and within 500 m of the Project Site boundary to determine if they are present in the area.	Manual surveys: Between mid-March and mid-June; two of which should be between mid-April and mid-May. eDNA sampling surveys: Water samples must be taken between the 15th

Feature/Species	Details	Survey Timing
		April and 30th June.
Reptiles	Presence absence surveys in suitable areas of habitat using artificial refugia	Seven surveys to be undertaken between April and September, avoiding the summer months of July and August if possible.
Breeding Birds	Breeding bird surveys to be undertaken within suitable areas of habitat within the site to assess presence, population and activity of birds. Particular focus will be paid to protected/priority species breeding in woodland, hedgerows and scrub and ground nesting birds in particular lapwing in areas of marshy and semi-improved grassland.	Breeding birds - four visits between March and July.
Bats – Tree Assessments	If trees or broadleaved semi-natural woodland within the Project Site are to be removed or illuminated by external lighting a preliminary ground level roost assessment should be undertaken on all trees.	Anytime, ideally in winter
Bats – Building and Structure Assessments	Buildings and/or structures within the vicinity of the Project Site should be assessed for their potential to support summer roosting and winter hibernating bats.	Anytime
Bats – Tree Roost Survey	Any trees to be removed which have been assessed as having low potential to support roosting bats will not be subject to further surveys, but precautionary measures may be appropriate during felling or pruning activities. Any trees to be removed which have been assessed as having moderate or high potential to support roosting bats may require a further Potential Roost Feature (PRF) climbed inspection survey and/or will require presence/absence surveys to be undertaken	May - September
Bats – Buildings and Structures Survey	Any buildings or structures assessed as having potential to support roosting bats may require an internal inspection,	Summer Roosts: May - September. Up to

Feature/Species	Details	Survey Timing
	winter hibernations survey, and/or will require presence/absence surveys to be undertaken. To establish roost presence or likely absence up to three manual surveys (dusk/dawn) are to be completed following the Bat Survey Guidelines (Ref. 2).	three visits. Winter Roosts: October - April
Bats – Activity Survey	*Transect Surveys:* Two site visits a month, for each month between April and October inclusive for walked transects. Two people must be present on each transect. Transects will incorporate all areas of suitable habitat. Particular focus will be on commuting bats using the hedgerows and tree lines. The transect route will depend on suitable and safe access. *Automated/Static Activity Surveys:* Three locations per transect with data to be collected on five consecutive nights per month, for each month between April and October inclusive for remote detector surveys. The devices will placed out and retrieved after each session. Recordings are then analysed in the office.	April - October. Two site visits per month.
Hazel Dormouse	A consultation with NRW and the local planning authority will be required to determine if further surveys for hazel dormouse are required.	If surveys are required. Dormouse tubes must be deployed within suitable areas of habitat and surveys must be undertaken once per month between April and November.
Badger	[redacted]	October - April

Feature/Species	Details	Survey Timing
Otter	An otter survey should be undertaken along watercourses and ditches and at least 100 m from the Project Site to ascertain presence and distribution. Otters have previously been identified within the local area (see Table 4-1)	Anytime
Water Vole	A water vole survey should be undertaken.	Two surveys required: one mid-April – June, and another July – September, at least 2 months apart.
Invasive Non-Native Plants	An INNS survey is required within areas that could not be accessed during the PEA.	May - September

1.1.6 The Executive Summary is not a substitute for the full report. Refer to the full text for further detail.

2. Introduction

2.1 Introduction

2.1.1 AECOM was instructed by Abergelli Power Limited (APL) to carry out a Preliminary Ecological Appraisal (PEA) of the Abergelli site, hereafter referred to as 'the Project Site'. The central grid reference for the Project Site is SN 6528 0143 and the boundary of the Project Site is shown on Figure 1.

2.1.2 This PEA was commissioned to identify whether there are known or potential ecological receptors (nature conservation designations, and protected and notable habitats and species) that may constrain or influence the design and implementation of the Project. The approach applied when undertaking this PEA pays due regard to the *Guidelines for Preliminary Ecological Appraisal* published by the Chartered Institute of Ecology and Environmental Management (Ref. 3). The PEA addresses relevant wildlife legislation and planning policy as summarised in Section 2 of this report.

2.1.3 In order to deliver the PEA, a desk study and an extended Phase 1 Habitat Survey were undertaken by an appropriately experienced ecologist, to identify ecological features within the Project Site and the wider potential zone of influence of the Project. The potential zone of influence was defined with reference to the project description provided by APL as shown as the habitats surveyed on Figure 1. Additional details are provided in Section 3: Methodology.

2.2 Proposed Development

2.2.1 The Project Site is located near to the village of Felindre, Swansea, as shown in Figure 1.1 of the ES, and the central grid reference for the Project Site is SN65280143. The Project Site is approximately 30.66 ha. A full description of the development is provided in Chapter 3: Project and Site Description) of the ES.

2.2.2 The development will require the removal of hedgerows, semi-natural broadleaved woodland, rows of trees, scrub, running water, ponds, hardstanding, marshy grassland, semi-improved grassland, improved grassland, and trees with potential for roosting bats.

2.2.3 It is understood that construction is programmed to commence no sooner than 2020/2021.

2.3 Objectives

2.3.1 The objectives of the PEA were:

- Identify designated nature conservation sites on or within proximity to the Project Site;
- Identify known records of protected or notable species within proximity to the Project Site;

- Identify and categorise the main habitats and features of ecological interest present within the Project Site ;
- Appraise the potential for protected or notable species of fauna and flora;
- Provide advice on potential ecological constraints and opportunities on or within proximity to the Project Site;
- Identify the requirement for further habitat and species surveys;
- Make recommendations for requirements to avoid and mitigate ecological impacts as well as opportunities for biodiversity enhancements; and,
- Provide a map showing the Phase 1 habitats on the Project Site and features of ecological interest.

2.3.2 The purpose of this report is to support the submission of a Development Consent Order (DCO) application. The report identifies the scope of further work (where necessary) that would be required to support a DCO application. High level recommendations are made on potential options for the avoidance, mitigation or compensation of the potential impacts of the Project (where known) on the identified ecological receptors, and of potential enhancements to the biodiversity and ecosystem services. A full assessment of potential effects and mitigation will be made during the Ecological Impact Assessment (EcIA).

2.4 Wildlife Legislation and Planning Policy

Wildlife Legislation

2.4.1 There are several different acts of legislation and regulations which refer to the protection of wildlife. These are summarised in Appendix A. In particular, the legislation relating to possible protected species on the Project Site is outlined. This is a brief summary of the legislation and is not to be regarded as a definitive legal opinion. When dealing with individual cases, the client is advised to consult the full texts of the relevant legislation and obtain further legal advice.

2.4.2 The following wildlife legislation is potentially relevant to the Project:

- The Wildlife and Countryside Act (WCA) 1981 (as amended);
- The Countryside and Rights of Way (CRoW) Act 2000;
- The Conservation of Habitats & Species Regulations 2010 (as amended);
- Environment (Wales) Act 2016;
- The Hedgerow Regulations 1997; and,
- The Protection of Badgers Act 1992.

2.4.3 The above legislation has been considered when planning and undertaking this PEA using the methods described in Section 3, when identifying potential constraints to the Project, and when making recommendations for further survey, design options and mitigation, as discussed in Section 5. Compliance with legislation may require the attainment of relevant protected species licences prior to the implementation of the Project.

National Planning Policy

Planning Policy Wales (8th Ed. January 2016)

2.4.4 Planning Policy Wales (PPW) sets out the land use planning policies of Welsh Government. It provides the policy framework for the preparation of Local Development Plans. Chapter 5, Conserving and Improving the Natural Heritage and Coast, outlines Welsh Government's objectives for the conservation and improvement of natural heritage.

Technical Advice Note 5 (TAN5) Nature Conservation and Planning (2009)

2.4.5 The Planning Policy Wales (PPW) is supplemented by a series of Technical Advice Notes. TAN 5 provides guidance on how the land use planning system should contribute to protecting and enhancing biodiversity and geological conservation. It provides advice on areas including the key principles of positive planning for nature conservation, nature conservation in Local Development Plans and development management procedures. It also provides advice on development affecting designated sites and habitats, in addition to protected or priority habitats and species.

2.4.6 Key Principles include that the town and country planning system in Wales should integrate nature conservation into all planning decisions; that the town and country planning system should look for development to provide a net benefit for biodiversity conservation with no significant loss of habitats or populations of species, locally or nationally and that they should ensure that the UK's international and national obligations for site, species and habitat protection are fully met in all planning decisions.

Local Planning Policy

2.4.7 Local Development Plans (LDPs) must be produced by every Local Planning Authority in Wales. Any development proposal will be tested against the policies within the LDP. The LDPs follow the planning guidance provide in PPW, including biodiversity and natural heritage policies. These include protecting designated sites and other areas of importance for biodiversity conservation; safeguarding protected species and priority species, including those listed in local biodiversity action plans and retaining, creating and enhancing features of importance for biodiversity conservation where appropriate.

2.4.8 Relevant local planning policies for City and County of Swansea (CCS) are detailed in the adopted City and County of Swansea Unitary Development Plan.

2.4.9 CCS has also submitted the Swansea Local Development Plan 2010 – 2025 to the Secretary of State for Examination in public. This is an emerging development plan, and is not part of the statutory development plan. However, its policies are a material consideration. :

2.4.10 Appendix A provides a summary of relevant local planning policies. For the precise wording of each specific policy please refer back to the source document. This planning policy has been considered when assessing potential ecological constraints and opportunities identified by the desk study and field surveys; and, when assessing requirements for further survey, design options and ecological mitigation, as described in Section 6.

2.5 Quality Assurance

2.5.1 This survey and subsequent report was undertaken in line with AECOM's Integrated Management System (IMS). Our IMS places great emphasis on professionalism, technical excellence, quality, environmental and Health and Safety management. All staff members are committed to establishing and maintaining our certification to the international standards BS EN ISO 9001:2008 and 14001:2004 and BS OHSAS 18001:2007. In addition our IMS requires careful selection and monitoring of the performance of all sub consultants and contractors.

2.5.2 All AECOM Ecologists who worked on this project are members of (at the appropriate level) the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow their code of professional conduct (Ref. 4) when undertaking ecological work.

3. Methodology

3.1 Desk Study

3.1.1 The objectives of the desk study are to review the existing information available in the public domain concerning species and habitats to identify the following:

- Internationally, nationally and locally designated sites, up to 2 km from the Project Site using the Multi Agency Geographic Information for the Countryside (MAGIC) website (www.magic.gov.uk);
- Protected and Priority species records and records of locally designated sites up to 2 km from the Project Site, using the South East Wales Biodiversity Records Centre (SEWBReC);
- Special Areas of Conservation (SACs) and Sites of Special Scientific Interest (SSSIs) designated for bats within a 10 km radius of the Site in accordance with Bat Conservation Trust (Collins, 2016) recommendations;
- Section 7 list of Species and Habitats of Principal Importance for Conservation of Biological Diversity in Wales;
- Ancient Semi-Natural Woodland (ASNW), Plantation on Ancient Woodland Site (PAWS), Restored Ancient Woodland Site (RAWS) or Ancient Woodland Site of Unknown category (AWSU) within or adjacent to the Project Site boundary using LLE dataset (http://lle.gov.wales/home);
- Tree Protection Orders (TPO's) from Swansea Council; and,
- Aerial photographs and Ordnance Survey (OS) maps were reviewed to identify features of ecological interest surrounding the Project Site including ponds within 500 m, nearby areas of ecological interest and features connecting these habitats (hedgerows, watercourses, railway lines).

3.1.2 The reports of previous surveys undertaken by BSG Ecology and WSP/Parsons Brinckerhoff (WSP/PB) were provided by the client and were reviewed (Ref. 5).

3.2 Extended Phase 1 Habitat Survey

3.2.1 A Phase 1 Habitat Survey (Ref. 6) of the Project Site was undertaken by two suitably experienced ecologists of AECOM on the 18th and 19th May 2017.

3.2.2 The survey involved a site walkover and preliminary assessment of key habitats, land use and ecological features. The main habitats present were recorded using standard Phase 1 Habitat Survey methodology as described in the Handbook for Phase 1 Habitat Survey: A technique for Environmental Audit (JNCC, 2010). The plant species defining the habitat types on the Project Site were recorded. Evidence of any invasive plant species subject to legal controls was recorded. The Project Site was assessed for its potential to support protected or notable species in order to identify potential ecological constraints and to guide recommendations for further surveys.

3.3 Assessment of Bat Potential

3.3.1 During the Phase 1 Habitat Survey, where access allowed, trees and buildings throughout the Project Site were classified into categories dependent on the presence of features suitable as bat roost habitat.

3.3.2 Due to the size of the Project Site and the number of trees present within the Project Site boundary, it was not possible to make an assessment of every tree. However a number of trees were assessed during the Phase 1 Habitat Survey and the details of these are provided in Table 3-1 below. Trees within area of woodland present within or close to the Project Site boundary were not individually assessed but the woodlands were given an overall rating, based on species composition and age, of their likelihood to support roosting bats and/or the need for further assessment.

3.3.3 The assessment was conducted via an external appraisal from the ground using binoculars where necessary. Table 3-1 provides descriptions of the categories for buildings and trees.

3.3.4 Habitats on-site were classified into categories dependent on the presence of features suitable for bats to commute and forage. Table 3-2 provides descriptions for commuting and foraging habitats.

Table 3-1: Building and Tree Bat Roost Potential Categories

Roost Potential	Descriptions for Buildings	Descriptions for Trees
Known or Confirmed	Confirmed signs of bat presence/occupation (droppings, oily staining around entry points, insect remains, odour, scratching) and actual bat presence.	Confirmed signs of bat presence/occupation (droppings, oily staining around entry points, insect

Roost Potential	Descriptions for Buildings	Descriptions for Trees
		remains, odour, scratching) and actual bat presence.
High	A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions (e.g. temperature, humidity, height above ground level, light levels or levels of disturbance) and surrounding habitat. Can include structures with points of access to the interior of the building and poorly maintained fabric providing ready access points for bats into structures, but at the same time not draughty. Structures of traditional stone, brick or timber construction. Structures with large (>20 cm) roof timbers with mortice joints, cracks and holes. Structures of pre or early 20th century construction. Structures with large complicated and/or uncluttered roof spaces providing unobstructed flying spaces. Structures with weather boarding and/or hanging tiles with gaps. Structures with accessible south facing roofs. Structures with proximity to good foraging habitat such as woodland, wetland, water and /or good hedgerows.	A tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions (e.g. temperature, humidity, height above ground level, light levels or levels of disturbance) and surrounding habitat.
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions (e.g. temperature, humidity, height above ground level, light levels or levels of disturbance) and surrounding habitat but unlikely to support a roost of high conservation status. Can include structures with some potential to support roosting bats, but fewer features than a high risk building. Features may include areas suitable for crevice dwelling and/or access points into structures. Some proximity to foraging habitat.	A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However these potential roost sites do not provide enough space, shelter protection,	Tree of sufficient size and age to contain potential roost features but with none seen from the ground or features seen have only very limited

Roost Potential	Descriptions for Buildings	Descriptions for Trees
	appropriate conditions and/or suitable habitat to be used on a regular basis or by large numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).	roosting potential.
Negligible	No features suitable for roosting bats. Can include structures constructed from unsuitable materials e.g. prefabricated with steel and sheet material. Structure is draughty, light and cool buildings with no roosting opportunities. High levels of regular disturbance including external and/or internal lighting. Building is isolated from areas of foraging habitat.	Trees with no potential to support bats.

(Source: Category descriptions drawn from Ref. 2 and Ref. 7, to be applied using professional judgement)

Table 3-2: Commuting and Foraging Habitat Potential Categories

Commuting and Foraging Potential	Descriptions
High	Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Project Site is close to and connected to known roosts.
Moderate	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
Low	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small number of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Negligible	Negligible habitat features on site likely to be used by commuting or foraging bats.

(Source: Category descriptions drawn from Ref. 2 and Ref. 7, to be applied using professional judgement)

3.4 Limitations

3.4.1 Biological records can be received from a wide variety of sources and may or may not be comprehensive and accurate. However, if assessed in conjunction with a Phase 1 Habitat survey, they can contribute to a robust ecological assessment of a site.

3.4.2 Due to the size of the Project Site, it was not possible to assess every tree or building for its potential to support bats.

3.4.3 Some areas adjacent to but outside of the Project Site boundary were not accessible at the time of survey and as such these habitats were surveyed from the road at a distance.

3.4.4 Some areas within the Project Site boundary were not accessible due to the presence of horses; these habitats were surveyed at a distance.

3.4.5 There is potential for trees and/or buildings with the potential to support roosting bats to have gone unrecorded due to time and access restrictions. It is possible that some species, including invasive non-native plant species may not have been recorded due to access limitations.

3.4.6 Despite the limitations described, there are deemed to be no significant limitations to this PEA.

4. Baseline Conditions

4.1 Desk Study Results

4.1.1 The designated habitats, sites and features within proximity to the Project Site are listed in Table 4-1 below and shown on Figure 2.

Table 4-1: Desk Study Results

Designation /Feature	Description
Designated Sites within 2 km	**Nant Y Crimp SSSI** **Distance and Direction**: Approximately 1.3 km west **Description**: Nant y Crimp is of special interest for its wet pastures, species-rich neutral grasslands and semi-natural woodland as well as associated scrub, which are host to several uncommon plant species. Notable plant species recorded at the Site include petty whin *Genista anglica*, cranberry *Vaccinium oxycoccos*, narrow buckler fern *Dryopteris carthusiana* and whorled caraway *Carum verticillatum*, the latter an Atlantic species characteristic of unimproved pastures in the South Wales coalfield. In addition, there is also a colony of the marsh fritillary butterfly *Euphydryas aurinia* at the Site. This is a declining species confined in South Wales to wet agriculturally unimproved pastures where its food plant, devil's bit scabious *Succisa pratensis*, grows in profusion.
Locally Designated Sites within 2 km	**Llety-Morfil SNCI** **Distance and Direction:** Within the Project Site boundary **Description:** Supporting the habitats: native wet woodland, ancient woodland, structurally-diverse and species-rich scrub, and purple moor-grass and rush pasture; and the Section 7 listed moth, wall *Lasiommata megera*. **Coed Barcud Wildlife Trust Reserve** **Distance and Direction**: Adjacent to the north east of the Project Site. **Description**: A previously improved grassland field, planted up to become a future woodland. Within the boundary of Rhos Fawr SNCI. **Rhos Fawr SNCI** **Distance and Direction:** Adjacent to the northern Project Site boundary **Description:** Supporting the habitats: woodland containing ancient woodland indicator species, structurally-diverse and species-rich scrub, species-rich neutral grassland, purple moor-grass and rush pasture, and watercourse with exposure/erosion features; and a number of Section 7 listed bird species.

Designation /Feature	Description
	Felindre Grasslands SNCI **Distance and Direction:** Adjacent to the west of the Project Site boundary. **Description:** Native wet woodland, lowland mixed deciduous woodland, structurally-diverse and species-rich gorse scrub, and purple moor-grass and rush pasture; and a number of Section 7 listed invertebrate and bird species, and the Schedule 1 listed birds barn owl *Tyto alba* and Northern goshawk *Accipiter gentilis*. **Middle Llan SNCI** **Distance and Direction:** Adjacent to the southern Project Site boundary **Description:** Supporting the habitats: Continuous semi-natural linear vegetation and watercourse with exposure/erosion features. **Rhyd-Y-Pandy Valley and Grasslands SNCI** **Distance and Direction:** Approximately 70 m east **Description:** Supporting the habitats: native wet woodland, woodland containing ancient woodland indicator species, gorse stands, lowland meadow, species-rich neutral grassland, structurally-diverse and species-rich scrub, purple moor-grass and rush pasture, reedbeds, and watercourse with exposure/erosion features; and a number of Section 7 listed invertebrate and bird species, and the Schedule 1 listed birds barn owl and red kite *Milvus milvus*. **Waun Garn Wen SNCI** **Distance and Direction:** Approximately 130 m west **Description:** Supporting the habitats: native wet woodland, structurally-diverse and species-rich scrub, purple moor-grass and rush pasture, and watercourse with exposure/erosion features; and a number of Section 7 listed invertebrate and bird species. **Pant Lasau SNCI** **Distance and Direction:** Approximately 120 m south **Description:** Supporting the habitats: native wet woodland, lowland mixed deciduous woodland, gorse stands, lowland fen, structurally-diverse and species-rich scrub, purple moor-grass and rush pasture, and watercourse with exposure/erosion features; and a number of Section 7 listed invertebrate and bird species. **Cefn Forest Stream SNCI** **Distance and Direction:** Approximately 230 m south west **Description:** Supporting the habitats: woodland containing ancient woodland indicator species, upland mixed ash woodland, native wet woodland, lowland mixed deciduous woodland, lowland meadow, species-rich neutral grassland, structurally-diverse and species-rich scrub, degraded lowland heath, lowland fen, purple moor-grass and rush pasture, ponds, and watercourse with exposure/erosion features; and a number of Section 7 listed invertebrate and bird species, and

Designation /Feature	Description
	the Schedule 1 listed bird barn owl. **<u>Lower Lliw Resivoir SNCI</u>** **Distance and Direction:** Approximately 460 m north **Description:** Supporting the habitats: woodland containing ancient woodland indicator species, gorse stands, species-rich bracken, structurally-diverse and species-rich scrub, purple moor-grass and rush pasture, and watercourse with exposure/erosion features; and a number of Section 7 listed invertebrate and bird species, and the Schedule 1 listed birds kingfisher *Alcedo atthis*, merlin *Falco columbarius* and red kite. **<u>Middle Lliw SNCI</u>** **Distance and Direction:** Approximately 670 m north west **Description:** Supporting the habitats: ancient semi-natural woodland, woodland containing ancient woodland indicator species, structurally-diverse and species-rich scrub, gorse stands, species-rich neutral grassland, semi-improved lowland dry acid grassland, acid grassland with anthills, purple moor-grass and rush pasture, watercourse with exposure/erosion features, and species-rich bracken; and a number of Section 7 listed invertebrate species. **<u>Cilfaen SNCI</u>** **Distance and Direction:** Approximately 760 m north west **Description:** Supporting the habitats: wet woodland, woodland containing ancient woodland indicator species, and purple moor-grass and rush pasture.
Designated Sites within 10 km designated for bats	There are no sites designated for bats within 10 km of the Project Site.
Protected and Priority Species Records from the last 10 years within 2 km	The following species have been recorded within 2 km of the Project Site in the last 10 years: **Plants**: Cornflower *Centaurea cyanus*, bluebell *Hyacinthoides non-scripta.* **Invertebrates**: Dusky brocade *Apamea remissa*, minor shoulder-knot *Brachylomia viminalis*, broom moth *Ceramica pisi*, small phoenix *Ecliptopera silaceata,* dingy skipper *Erynnis tages*, marsh fritillary *Euphydryas aurinia*, rustic *Hoplodrina blanda*, shoulder-striped wainscot *Leucania comma*, buff ermine *Spilosoma lutea*, blood-vein *Timandra comae*. **Amphibians:** Common toad *Bufo bufo*, palmate newt *Lissotriton helveticus*, common frog *Rana temporaria*. **Reptiles**: Slow-worm *Anguis fragilis*, grass snake *Natrix natrix*, adder *Vipera berus*, common lizard *Zootoca vivipara.* **Birds**: Lesser redpoll *Acanthis cabaret*, goshawk *Accipiter gentilis*, skylark *Alauda arvensis*, kingfisher *Alcedo atthis*, tree pipit *Anthus trivialis*, little ringed plover *Charadrius dubius*, ringed plover *Charadrius hiaticula*, black-headed gull *Chroicocephalus ridibundus*,

Designation /Feature	Description
	cuckoo *Cuculus canorus*, lesser spotted woodpecker *Dendrocopos minor*, yellowhammer *Emberiza citronella*, reed bunting *Emberiza schoeniclus*, merlin *Falco columbarius*, peregrine *Falco peregrinus*, hobby *Falco Subbuteo*, kestrel *Falco tinnunculus*, pied flycatcher *Ficedula hypoleuca*, linnet *Linaria cannabina*, grasshopper warbler *Locustella naevia*, common crossbill *Loxia curvirostra*, common scoter *Melanitta nigra*, red kite *Milvus milvus*, spotted flycatcher *Muscicapa striata*, curlew *Numenius arquata*, osprey *Pandion haliaetus*, house sparrow *Passer domesticus*, wood warbler *Phylloscopus sibilatrix*, willow tit *Poecile montana*, marsh tit *Poecile palustris*, dunnock *Prunella modularis*, bullfinch *Pyrrhula pyrrhula*, starling *Sturnus vulgaris*, redwing *Turdus iliacus*, song thrush *Turdus philomelos*, fieldfare *Turdus pilaris*, barn owl *Tyto alba*, lapwing *Vanellus vanellus*. **Bats**: Bat species *Chiroptera*, unidentified bat *Myotis*, Daubenton's *Myotis daubentonii*, Natterer's *Myotis nattereri*, Noctule *Nyctalus noctule*, pipistrelle species *Pipistrellus,* common pipistrelle *Pipistrellus pipistrelles*, soprano pipistrelle *Pipistrellus pygmaeus*, long-eared species *Plecotus*, brown long-eared *Plecotus auritus*. **Mammals (excluding bats):** West European hedgehog *Erinaceus europaeus*, European otter *Lutra lutra*, Eurasian badger *Meles meles*, polecat *Mustela putorius.*
Priority Habitats and Species – Section 7 List	The full list of Section 7 Habitats and Species of Principle Importance in Wales has been reviewed. Those priority habitats present on site and priority species with potential to be on site are listed in Table 4-2 and Table 4-3 respectively.
Surrounding Land Use	The Project Site is located to the north of Junction 46 of the M4 Motorway close to the village of Felindre, Swansea. The Project Site has agricultural fields to the east, south and north. Areas of woodland are located to the south, east and west of the Project Site. Areas of the Felindre Gas Compressor Station with associated roads and buildings are partially within and adjacent to the Project Site boundary. A waste water treatment works is located in the north west outside of the Project Site boundary.
Ancient Woodland	The following five areas have been identified: • An 8.1ha area of RAWS within and adjacent to the Project Site boundary towards the south west; • A 15.1 ha area of ASWU within and adjacent to the Project Site boundary in the south west. Part of this ASWU area covers the Felindre Gas Compressor Station; • A 0.9 ha area of PAWS adjacent to the Project Site boundary towards to the south west; • An 4.3 ha area of RAWS adjacent to the Project Site boundary; and, • A 1.6 ha ASNW adjacent to the Project Site boundary in the east. This area is also subject to TPOs.

Designation /Feature	Description
Tree Protection Orders (TPOs)	Swansea County Council advised that there is a small area of ASNW woodland covered by TPOs which is adjacent to the Project Site boundary to the east.
Ponds within 500m	OS mapping shows 25 Ponds within 500 m of the Project Site boundary, three of these (Ponds 16,22 and 23) are within the Project Site boundary: • Ponds 1 – 8: Located near to a waste water treatment works approximately 350m west. Connected to the Site via woodland and grassland; • Ponds 9, 10 and 21: Located approximately 350m east and connected to the north-east tip of the road boundary via grassland; • Pond 11: Approximately 210 m west of the Project Site boundary and connected to the Site via grassland and scrub; • Ponds 12 – 14 and 18: Located approximately 450 m east and connected to the Site via woodland and grassland; • Pond 15: Located approximately 130 m north and connected to the Site via woodland and grassland; • Pond 16: Within the Project Site boundary, dry during the Phase 1 Habitat Survey; • Pond 17: Located approximately 200 m west and connected to the Site via woodland, grassland and scrub; • Ponds 19a and 19b: Approximately 400 m north and connected to the Site via grassland; • Pond 20: Approximately 450 m north, connected to the Site via grassland. This pond was identified as dry dry during the Phase 1 Habitat Survey; • Pond 22: Within the Project Site boundary; • Pond 23: Within the Project Site boundary and identified during the Phase 1 Habitat Survey (Appendix B: Target Note 28). This pond was not accessible due to the presence of horses; and, • Pond 24: Approximately 150 m north within the garden of Pen-y-Waun Fach Cottage. The pond is connected to the Site via grassland and woodland.
Previous Surveys	The client provided AECOM with the reports of previous surveys undertaken by BSG Ecology and WSP/PB within the Site (Ref. 5, and Appendices 8.3 and 8.8 of the ES). It was noted that the current red line boundary of the Site is now smaller than the red line boundary used by BSG Ecology and WSP/PB. However, the current red line boundary is within the same area as the previous red line boundary provided to BSG Ecology and WSP/PB and therefore the surveys undertaken would have captured the current Project Site boundary. A summary of the previous protected and priority species surveys are detailed below:

Designation /Feature	Description			
	Species	**Year**	**Summary Results**	**Company**
	Invertebrates (moths, marsh fritillary (adult and larval stages), terrestrial *Coleoptera*, and aquatic macroinvertebrates (in ponds and watercourses)	2014	No protected species identified. A total of 384 species were recorded from the Survey Site. One species is Red Data Book. Two are nationally scarce and fourteen are Section 7species.	BSG Ecology
	Great Crested Newts (GCN) *Triturus cristatus*	2014	No GCN Identified within five ponds surveyed. Palmate newts and smooth newts *Lissotriton vulgaris* were found.	BSG Ecology
	Reptiles	2014	A peak count of 50 common lizard and a peak count of five grass snake were identified within the Site.	BSG Ecology
	Breeding Birds (including barn owl)	2014	Nine Section 42 (now Section 7) bird species considered likely to breed on Site. Two Schedule 1 species, red kite and peregrine falcon recorded. No evidence of schedule 1 species breeding within the Project Site. No evidence of barn owl within the Project Site.	BSG Ecology
	Hazel Dormouse *Muscardinus avellanarius*	2014	No dormice recorded from targeted surveys between June and November 2014.	BSG Ecology
	[redacted]	[redacted]	[redacted]	[redacted]

Designation /Feature	Description			
	Otter	2014	Otter spraint identified within the Project Site.	BSG Ecology
	Water vole *Arvicola amphibius*	2014	Holes that were likely to be mammal burrows were observed. The holes have the right dimensions to allow use by water voles, but did not show signs of current occupation. No latrines, footprints or grazing lawns were observed during the survey.	BSG Ecology
	Bats	2014	At least seven species of bats were recorded during transect surveys; common pipistrelle, soprano pipistrelle, Myotis sp., long-eared bat., noctule, Leisler's bat, and lesser horseshoe bat. All of these species and an additional three were recorded during automated bat detector surveys; Nathusius' pipistrelle, serotine, and greater horseshoe bat. Roost surveys of buildings within the survey Site confirmed that at least three buildings contained bat droppings and were used as bat roosts. Droppings from at least three species of bats (pipistrelle sp., long-eared bat sp. and lesser horseshoe bat) were found. Thirty three trees were located within the survey Site that were considered to have potential to support roosting bats. Emergence and /or re-entry surveys were carried out on eight trees all of which would potentially be directly affected by the Project. No bats were recorded emerging from or entering these potential tree roosts.	BSG Ecology
	Invasive Species	2014	Japanese knotweed *Fallopia japonica*, Himalayan balsam	BSG Ecology

Designation /Feature	Description			
			Impatiens glandulifera, rhododendron *Ericaceae species*, floating pennywort *Hydrocotyle ranunculoide* and montbretia *Crocosmia x crocosmifolia* identified within the Project Site boundary.	
	Invasive Species	2017	Himalayan balsam, Japanese knotweed, montbretia, Japanese rose *Rosa rugosa* and rhododendron. Identified within the Project Site boundary.	WSP/PB

4.2 Extended Phase 1 Habitat Survey

4.2.1 The habitats present within the Project Site boundary and their descriptions are shown in Table 4-2. A plan of the Site showing the location and distribution of these habitats is shown in Figure 1.

Table 4-2: Phase 1 Habitats and Descriptions

Habitat	Description	Section 7 Habitat
Broadleaved Woodland – Semi-Natural	There are areas of semi-natural broadleaved woodland, including areas of RAWS and ASWU, within the Project Site. There is an areas of wet woodland. Species include; oak species *Quercus*, silver birch *Betula pendula*, rowan *Sorbus* sp., honeysuckle *Lonicera periclymenum.*, holly *Ilex aquifolium*, alder *Alnus glutinosa*, hazel *Corylus avellana*, goat willow *Salix caprea,* willow species *Salix* sp. and bramble *Rubus fruticosus* with a ground flora including broad buckler fern *Dryopteris dilatata*, hard fern *Blechnum spicant*, male fern *Dryopteris filix-mas*, pignut Conopodium majus, lesser celandine *Ficaria verna* and native bluebell, herb Robert *Geranium robertianum* and wild strawberry *Fragaria vesca.*	Yes
Broadleaved Woodland – Plantation	There is one small area of broadleaved plantation woodland located within National Grid Compound in the south of the Project Site. Species include; silver birch, alder, willow species, and bramble. Trees with the potential to support roosting bats are described in Table 4-5	Yes
Scrub – Dense/Continuous	There are several areas of dense scrub, predominantly found in the south of the Project Site, but with one area in the north and one in the centre of the Project Site. Species include; bramble, willow species, gorse *Ulex europaeus*	No

Habitat	Description	Section 7 Habitat
	and bracken *Pteridium aquilinum* (Appendix C: Photographs 19 and 23 – 34).	
Scrub – Scattered	Several areas of scattered scrub are found within the south of the Project Site. Species include; gorse, silver birch, willow species, hawthorn *Crataegus monogyna* and bramble.	No
Rows of Trees – Broadleaved	Rows of trees are predominantly located in between grassland fields and along road edges. The majority of these are located on top of earth banks constructed with stone and earth and covered in grass. Species include silver birch, oak species, hawthorn and holly, with a ground flora including native bluebell, dog violet *Viola riviniana*, herb Robert, cleavers *Galium aparine* and sweet vernal grass *Anthoxanthum odoratum* (Appendix C: Photographs 19 and 26)	No
Standalone Trees	There are 13 standalone trees within the Site: • A pedunculate oak Quercus robur, 12 m in height with a diameter at breast height (DBH) of 0.7 m; • An oak species, 13 m in height with a DBH of 0.6 m; • A holly 10 m in height with a DBH of 0.3 m; • A holly 10 m in height with a DBH of 0.3 m; • An oak species 14 m in height with a DBH of 0.7 m; • An oak species 11 m in height with a DBH of 0.4 m; • An ash 8 m in height with a DBH of 0.3 m; • An oak species 12 m in height with a DBH of 0.5 m; • An oak species 9 m in height with a DBH of 0.3 m; • An oak species 11 m in height with a DBH of 0.5 m; • A pedunculate oak 12 m in height with a DBH of 1 m; • A pedunculate oak 12 m in height with a DBH of 1 m; and, • An oak species 9 m in height with a DBH of 0.6 m. Trees with the potential to support roosting bats are described in Table 4-5.	No
Ruderal – Tall Herb and Fern	There are two areas of tall ruderal vegetation. Species include bracken and nettle *Urtica dioica*.	No
Semi-Improved Neutral Grassland	There is semi-improved neutral grassland present on road and track sides both within and adjacent to the Project Site boundary. There are several semi-improved grassland fields within the centre of the Project Site. Semi-improved grassland species include; red fescue *Festuca rubra*, common vetch *Vicia sativa*, ribwort plantain *Plantago lanceolata*, sweet vernal grass, coltsfoot	Yes

Habitat	Description	Section 7 Habitat
	Tussilago farfara, marsh thistle *Cirsium palustre*, hard rush *Juncus inflexus*, compact rush *Juncus conglomeratus*, bird's foot trefoil *Lotus corniculatus*, black medic *Medicago lupulina*, perennial rye grass *Lolium perenne*, red clover *Trifolium pratense*, common mouse-ear *Cerastium fontanum*, Yorkshire fog *Holcus lanatus* and common bent *Agrostis capillaris* (Appendix C: Photographs 19, 21 and 24 – 25).	
Marshy Grassland	There are frequent areas of marshy grassland dominated by soft rush *Juncus effusus* and purple moor grass *Molinia caerulea* both within the Project Site boundary. Marshy grassland areas are predominantly located towards the south of the Project Site.	Yes
Improved Grassland	Areas of improved grassland are dominant throughout the Project Site. The majority of these are sheep and horse grazed. Species include; perennial rye grass, annual meadow grass *Poa annua*, sweet vernal grass and clover species (Appendix C: Photographs 19 – 20 and 26).	No
Running Water	There are several wet ditches (watercourses) across the Project Site (Appendix C: Photograph 26).	No
Standing Water	There are three ponds within the Project Site boundary (Appendix B: Target Notes 28, 40 and 44).	Yes
Hedgerow with Trees – Species – Rich	There is one native species-rich hedgerow alongside the access road to the National Grid site. Species include oak species, ash *Fraxinus excelsior,* hazel, honeysuckle, dog rose *Rosa canina*, field maple *Acer campestre*, holly and goat willow (Appendix C: Photograph 22).	Yes
Hedgerow with Trees – Species – Poor	There is one species-poor hedgerow within the Project Site boundary. Species include oak, ash, rowan, hawthorn, bramble and dog rose with a ground flora which includes native bluebell.	Yes
Intact Hedgerow – Species – Poor	There are two intact species-poor hedgerows. Species include hawthorn, blackthorn *Prunus spinosa*, bramble, hazel, willow species, holly, rose species, oak species, and ash.	Yes
Earth Bank	There are several grass covered raised earth banks within the Project Site. The earth banks comprise earth and stone. Some of these have scattered hawthorn and holly bushes with native bluebells on top of them. The earth banks with rows of trees on top are captured under the row of trees category.	No
Buildings	There are two buildings within the National Grid Compound within the south of the Project Site boundary; these buildings were not assessed for bats due to restricted	No

Habitat	Description	Section 7 Habitat
	access. Four buildings (outside of the Project Site boundary) were identified as having the potential to support roosting bats. Further detail is given in Section 4.5 (Appendix C: Photographs 7 – 17).	
Fences	There is frequent fencing including security and barbed wire fencing throughout the Project Site. The fences have no ecological value.	No
Bare Ground (Hard Standing)	Areas of gravel, asphalt road and pedestrian pavements are located across the Project Site. These have no ecological value.	No

4.3 Protected and Priority Species

4.3.1 Details of protected and priority species recorded on Project Site are shown in Table 4-3. A plan of the Project Site showing the location and distribution of features with potential for protected or priority species is shown in Figure 1. Target notes of protected species evidence or features that have potential to support protected species are shown in Figure 1 and Appendix B.

Table 4-3: Protected and Priority Species Potential

Species/ Species Group	Associated habitat	Description	Section 7 Species
Invertebrates	All natural habitats	All of the natural habitats on Project Site have the potential to support generalist aquatic and terrestrial invertebrates as well as some scarce invertebrates as previously identified in 2014 (see Table 4-1). Records of marsh fritillary were returned from the local records centre. The NVC survey undertaken by BSG Ecology in 2014 identified devil's bit scabious (the marsh fritillary larvae's main food source) within an area which now lies outside of the Project Site boundary and there is no reference to this plant growing anywhere else within the Project Site (Appendix 8.3 of the ES). Subsequent targeted surveys for marsh fritillary butterfly within the area where devils bit scabious was identified were undertaken by BSG Ecology in 2014. BSG Ecology did not find any evidence of marsh fritillary butterfly (Appendix 8.3 of the ES). The WSP/PB updated PEA report did not find any evidence of devil's bit scabious within the Project Site, however it was noted that the PEA was	Yes

Species/ Species Group	Associated habitat	Description	Section 7 Species
		conducted outside of this plants flowering period of July to October and may have gone unrecorded. It stated that there may still be suitable areas within the Project Site in which devil's bit scabious may be found (Ref. 5). Devil's bit scabious typically grows in damp meadows and marshes and along woodland rides and riverbanks. Areas of semi-improved neutral grassland and marshy grassland are present within the Project Site. Therefore there is the potential for devil's bit scabious to be present, however it is considered that even if this plant is now present within the Project Site it is unlikely to be in any great number and therefore it is considered unlikely that marsh fritillary butterfly will be present.	
Amphibians (including GCN)	Running water and ponds, marshy grassland and woodland.	These habitats are suitable for supporting generalist amphibians, including frogs, toads and smooth and palmate newts. Areas of slow running water and ponds have the potential to support breeding GCN. Areas of marshy grassland and woodland have the potential to support GCN using these areas to commute to ponds as well as providing suitable habitat for foraging and hibernation during the terrestrial phase of their life cycle. No GCN have been recorded previously at the Project Site (see Table 4-1) and no records of GCN were identified from the local records centre.	Yes
Reptiles	Semi-improved and marshy grassland, dense and scattered scrub, row of trees, earth banks, wood piles, gabion cage semi-natural broadleaved woodland, running	Semi-improved and marshy grassland, dense and scattered scrub has the potential to support foraging reptiles (Appendix B: Target Notes 7, 12, 14, 18, 20, 31, 32, 36 – 38) Row of trees on earth banks which occur near to woodland or semi-improved grassland may support foraging reptiles and the earth banks with stones have the potential to provide areas for basking as well as shelter and hibernation opportunities (Appendix B: Target Note 39). Wood piles have the potential to provide shelter, hibernation and basking opportunities (Appendix B: Target Notes 8 and 30). The gabion cage has the potential to provide shelter, and hibernation opportunities (Appendix B: Target Note 19). Semi-natural broadleaved woodland, hedgerows	Yes

Species/ Species Group	Associated habitat	Description	Section 7 Species
	water and ponds.	and scrub have the potential to support foraging reptiles as well as providing suitable habitat for shelter and hibernation (Appendix B: Target Notes 12 and 13) Clearings within the semi-natural broadleaved woodland have the potential to support basking reptiles. Running water, ponds and marshy grassland have the potential to provide foraging opportunities for grass snake. The surveys carried out by BSG Ecology in 2014 identified populations of common lizard and grass snake within the Project Site (see Table 4-1).	
Breeding Birds	Semi-natural and plantation woodland, rows of trees, standalone trees, species –rich and species - poor hedgerows, dense and scattered scrub and marshy and semi-improved grassland.	Semi-natural and plantation woodland, rows of trees, standalone trees, species –rich and species-poor hedgerows, dense and scattered scrub and grassland have the potential to support breeding birds. Redpoll, goldcrest *Regulus regulus*, blackcap *Sylvia atricapilla*, robin *Erithacus rubecula,* blue tit *Cyanistes caeruleus*, wren *Troglodytes troglodytes,* blackbird *Turdus merula*, cuckoo and bullfinch were heard during the Phase 1 Habitat Survey (Appendix B: Target Notes 2 and 5). Marshy and semi-improved grassland has the potential to support ground nesting birds, such as lapwing (Appendix B: Target Note 22) and snipe *Gallinago gallinago*. Records of barn owl, goshawk, red kite and peregrine were returned by the local records centre. The breeding bird survey undertaken in 2014 by BSG Ecology did not find any evidence of these species breeding within the Project Site boundary (see Table 4-1). However, it is possible that these species may now be breeding on Project Site.	Yes
Bats	Semi-natural and plantation woodland, rows of trees, standalone trees, species –rich and species	Trees in semi-natural and plantation woodland and rows of trees, and standalone trees have the potential to support roosting, foraging and commuting bats (Appendix B: Target Notes 29, 35 and 36). Species-rich and species-poor hedgerows, dense and scattered scrub, and running water have the potential to support foraging and commuting bats. Marshy and semi-improved grassland and ponds have the potential to support foraging bats. The Project Site was assessed as having High	Yes

Species/ Species Group	Associated habitat	Description	Section 7 Species
	poor hedgerows, dense and scattered scrub and marshy and semi-improved grassland, running water and ponds. Buildings.	commuting and foraging potential (see Table 3-2). Eleven trees were assessed as having the potential to support roosting bats (see Table 4-5). Not all trees close to the Project Site boundary were assessed for their potential to support roosting bats. The majority of trees within the woodlands close to or adjacent to the Project Site boundary were not assessed for their potential to support roosting bats. However, it was noted that the trees within area of woodland are of a suitable age and size to support bat roost potential features. Four buildings (outside of the Project Site boundary) were assessed as having the potential to support roosting bats (see Table 4-5), **Bat surveys undertaken by BSG Ecology in 2014 identified the following (Appendix 8.8 of the ES):** *Internal and External Building Inspection* • Building 4 (not assessed during the AECOM PEA due to landowner access refusal) – Confirmed roost. Long-eared, pipistrelle and lesser horseshoe bat droppings identified in the store room; • Building 8 (AECOM Building 2) – Confirmed bat roost. Long-eared and pipistrelle bat droppings identified in both the first and second storey at the north of the building; • Building 10 (not assessed during the AECOM PEA, outside of the Project Site boundary). Pipistrelle bat droppings identified on the floor; • Buildings 1, 2, 5 and 11 (not assessed during the AECOM PEA, outside of the Project Site boundary) were assessed as having Moderate potential; • Building 7 (AECOM Building 3) was assessed as having Low potential; and, • Building 3, 6 and 9 (not assessed during the AECOM PEA, outside of the Project Site boundary) were assessed as having negligible potential. No further bat surveys were undertaken on buildings as BSG Ecology stated that they would not be affected by the development proposals.	

Species/ Species Group	Associated habitat	Description	Section 7 Species
		Foraging and Commuting Common and soprano pipistrelle, myotis species, noctule, Leisler's and long-eared bat species were identified during the walked transects and static bat detector surveys: One record of lesser horseshoe bat in the south of the Project Site was recorded during the walked transect. In addition to the species listed above Serotine, Nathusius' pipistrelle and greater horseshoe were identified during the static bat detector surveys. The most frequently occurring species across the Project Site were common and soprano pipistrelle. The majority of the bat activity was recorded along hedgerows and treelines within the Project Site. The areas identified during the static detector bat surveys with the highest levels of bat activity were located in the south of the Project Site.	
Brown Hare *Lepus europaeus*	Semi-improved and marshy grassland and woodland	Semi-improved and marshy grassland and woodland habitats have the potential to support breeding, foraging and commuting brown hares. A brown hare was observed within semi-improved grassland by AECOM Ecologists when undertaking GCN surveys (Appendix B: Target Note 43).	Yes
Hazel Dormouse	Semi-natural and plantation woodland, rows of trees, dense and scattered scrub, species-poor and species-rich hedgerows.	Semi-natural and plantation woodland, rows of trees, dense and scattered scrub, species-poor and species-rich hedgerows have the potential to support breeding and foraging dormice (Appendix B: Target Notes 9 and 34 – 35). The dormouse surveys carried out by BSG Ecology in 2014 did not find any evidence of dormice (see Table 4-1).	Yes
European Hedgehog	Semi-natural and plantation woodland, species-rich and species-poor	Semi-natural and plantation woodland, species-rich and species-poor hedgerows dense and scattered scrub has the potential to support hibernating, foraging and commuting hedgehogs. Woodpiles have the potential to support hibernating hedgehogs. Marshy grassland and semi-improved grassland	Yes

Species/ Species Group	Associated habitat	Description	Section 7 Species
	hedgerows, dense and scattered scrub, marshy grassland and semi-improved grassland and woodpiles.	has the potential to support foraging and commuting hedgehogs.	
Badger	Semi-natural and plantation woodland, rows of trees, species-rich and species-poor hedgerows, dense and scattered scrub, marshy grassland and semi-improved and improved grassland.	[redacted]	No
Polecat	Semi-natural and plantation woodland, rows of trees, species-rich and species-poor hedgerows, dense and scattered scrub and semi-	These habitats have the potential to support foraging polecats. Polecat's food sources include rabbits, rats, birds and frogs which are likely to be present within the Project Site boundary. Six records of polecat were returned within 2 km of the Project Site from the local records centre. Piles of wood (Appendix B: Target Notes 8 and 30), woodland and any areas where rabbit burrows are present have the potential to support breeding polecat.	Yes

Species/ Species Group	Associated habitat	Description	Section 7 Species
	improved and improved grassland. Wood Piles.		
Otter	Semi-natural broad-leaved woodland, marshy grassland and running water.	Semi-natural broadleaved woodland which contains or is close to running water has the potential to support breeding as well as foraging and commuting otter. Running water and marshy grassland have the potential to support foraging and commuting otter. Otters are known to be in the area as spraints have been identified outside of the Project Site boundary during protected species surveys carried out by AECOM in 2017. One otter spraint was identified during the BSG Ecology surveys in 2014 (See Table 4-1).	Yes
Water Vole	Running water, marshy grassland and semi-improved grassland.	Running water, marshy grassland and semi-improved grassland provides suitable habitat for water vole. Previous surveys undertaken by BSG Ecology have identified mammal burrows that could be water vole burrows (see Table 4-1).	Yes

4.4 Invasive Species Subject to Legal Controls

4.4.1 Invasive species subject to legal controls were identified on the Project Site at the time of survey and are and are shown in Table 4-4 and on Figure 1. Not all areas of the Site were assessed for invasive species during the Phase 1 Habitat Survey due to access limitations. There is the potential for invasive species to have gone unrecorded in these areas.

Table 4-4: Invasive Species Subject to Legal Controls

Invasive Species Point	Species	Description
1	Rhododendron	5 x 6 m in size.
2	Japanese knotweed	Within hedgerow 5 m long by 1 m wide and 2 m high.
3	Japanese knotweed	On the edge of the road 2x1x2 m in size.
4	Japanese knotweed	Along the edge of a small area of woodland. 10x1x2 m in size (Appendix C: Photograph 18).
5	Rhododendron	Within woodland. 2x2x1 m in size.

Invasive Species Point	Species	Description
6	Rhododendron	1x1x1 m in size.
7	Japanese knotweed	On bank 1x1x2 m in size.
8	Japanese knotweed	Outside of the Project Site boundary. Roots could be inside the Project Site boundary.
9	Japanese knotweed	Occurring throughout the row of trees.
10	Japanese knotweed	Located in the centre of the field which is outside of the Project Site boundary and had no access. Viewed from the road.
11	Japanese knotweed	Within an area of improved grassland. 15x4m in size.
12	Japanese knotweed	4x5 m in size.
13	Himalayan balsam	Large extent of stands along woodland edge and within grassland. There are some scattered stands within the woodland.
14	Himalayan balsam	Young plants throughout scrub/tree line.

4.5 Bat Roost Assessment

4.5.1 Features suitable for supporting roosting bats were assessed during the site visit and are shown in Table 4-5. The locations of potential roosts are shown on Figure 1. Due to time and access constraints during the Phase 1 Habitat Survey, not all trees within the Project Site boundary, not all trees within woodland parcels in close proximity to the Project Site boundary and not all buildings in close proximity to the Project Site boundary were assessed for their potential to support roosting bats.

Table 4-5: Features Assessed as Having Potential to Support Roosting Bats

Feature	Description	Bat Roost Potential Category
Building 1	Approximately 120 m outside of the Project Site boundary to the north east. This was not fully assessed due to time constraints of the PEA survey. This is a modern building with a tiled roof. There were no obvious gaps. House sparrows were observed using spaces in the roof.	Low
Building 2	Approximately 75 m outside of the Project Site boundary to the west. A brick built building with a tower and asbestos pitched roof. There are fly-in access and crevice points (Appendix C: Photographs 7 – 11).	High BSG Ecology confirmed this as a roost in 2014 (Appendix 8.8 of the ES).
Building 3	Approximately 5 m outside of the Project Site boundary to the west. A brick built building with a pitched asbestos roof. There	Moderate

Feature	Description	Bat Roost Potential Category
	are gaps in the mortar and brick work and behind the wooden facia boards (Appendix C: Photographs 12 – 15).	
Building 4	Approximately 10 m outside of the Project Site boundary to the west. A single story brick built building with gaps leading to a cavity wall. Gaps are present on the east and south face of this building (Appendix C: Photographs 16 – 17).	Moderate
Tree 1	Within the Project Site boundary. An oak species, 14 m in height with a DBH of 0.7 m. This tree has south facing split at 6 m (Appendix C: Photograph 1).	Low
Tree 2	Within the Project Site boundary. An oak species, 12 m in height with a DBH of 0.6 m. This tree had dense ivy cover which could be obscuring potential bat features. The ivy itself did not appear to be a suitable feature for use by bats.	Low
Tree 3	Within the Project Site boundary. An oak species, 17 m in height with a DBH of 1.1 m. There is a knothole at 3 m facing north west and a crack in the limb at 5 m facing west.	Moderate
Tree 4	Approximately 55 m outside of the Project Site boundary to the south east. An oak species, 10 m in height with a DBH of 0.7 m. There is a hollow that extends for approximately 30 cm which could be used by a roost for a small number of bats.	Low
Tree 5	Approximately 20 m outside of the Project Site boundary to the south. An oak species, 14 m in height with a DBH of 0.8 m. A hollow at 0.5 m within the base of the tree (Appendix C: Photograph 2).	Low
Tree 6	Within the Project Site boundary. A pedunculate oak, 12 m in height with a DBH of 0.7 m. There is a spilt in the stem facing south towards the road and a woodpecker hole (Appendix C: Photograph 3).	Moderate
Tree 7	Within the Project Site boundary. A pedunculate oak, 8 m in height with a DBH of 1 m. There are splits in the stem facing west (Appendix C: Photograph 4).	Low
Tree 8	Within the Project Site boundary. An oak species, 12 m in height with a DBH of 0.6 m. There is a trunk cavity at 1.5 m, viewed from the road. The tree is located within an area of no access and the other side could not be viewed (Appendix C: Photograph 5).	Moderate
Tree 9	Within the Project Site boundary. An oak species 8 m in height with a DBH of 0.5 m. There are thick stems of ivy on the east face (Appendix C: Photograph 6).	Moderate
Tree 10	Approximately 25 m outside of the Project Site boundary to the east. A rowan 12 m in height with a DBH of 0.4 m. There is cavity approximately 1m from the ground which appears to	Moderate

Feature	Description	Bat Roost Potential Category
	extend upwards. There is currently an active wasp nest in the cavity which may deter bats from using it.	
Tree 11	Within the Project Site boundary. A multi-stem oak species 14 m in height with a DBH of 0.6 m. There is some loose bark and a gap in the base.	Low

5. Ecological Constraints and Indicative Potential Impacts

5.1.1 The constraints and potential impacts listed here do not include consideration of further surveys which have been recommended in Section 6. The results of further surveys may change the likely potential impacts.

5.1.2 The indicative potential impacts of the Project on habitats and protected species are outlined below; potential impacts will be assessed fully during the Ecological Impact Assessment (EcIA).

5.1.3 The development proposals are for proposed 299 MW Open Cycle Gas Turbine power station. The development will require the removal of vegetated habitats including hedgerows, semi-natural broadleaved woodland, rows of trees, scrub, hardstanding, marshy grassland, improved grassland, and trees.

5.2 Indicative Potential Impacts

5.2.1 Without mitigation, during construction and operation the following indicative potential impacts are anticipated:

- Habitat loss, severance and fragmentation;
- Loss and/or disturbance of breeding and resting sites of protected species;
- Disturbance, injury or killing of protected and priority species during site clearance and construction works;
- Disturbance, injury or killing of protected and priority species during operation where protected species are retained within the Project Site;
- Disturbance from noise and vibration (if piling is required);
- Pollution to land and/or water as a result of run off of sediments, chemicals, fuel or oil;
- Degradation of habitats and designated site habitats due to increases in nutrients from operational emissions;
- Spread of invasive species; and,
- External lighting disturbance.

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6. Further Surveys and Recommendations

6.1 Further Surveys

6.1.1 Further surveys for protected species are recommended so that the baseline data can be used to inform the EcIA. Surveys will be programmed and completed with sufficient time ahead of DCO application submission and the results can be used to inform the Project design. Certain species can only be surveyed for at certain times of year and without consideration this has potential to cause project delays.

6.1.2 Recommendations for further surveys are based on the current information available and will be subject to consultation with relevant consultees and local authority officers. Further surveys are recommended for the following species:

a) Hedgerows

6.1.3 Hedgerows proposed to be removed as part of the development should be assessed by a suitably qualified ecologist to determine if they are classified as an Important hedgerow under the Hedgerow Regulations, 1997 (Ref. 1). The optimal times for hedgerow surveys are April – early-June, whilst the woodland ground flora is still present.

b) Tree Preservation Orders

6.1.4 No TPOs are to be removed as part of the Project. However the TPOs may be impacted by the works. TPO trees that may be impacted by the Project should be identified and the appropriate Root Protection Zones should be set up during construction.

c) Invertebrates

6.1.5 As the habitats on the Project Site have not changed significantly since the invertebrate survey conducted in 2014 it is recommended that the consultation is undertaken with Natural Resources Wales (NRW) and the local planning authority to discuss the requirement for additional invertebrate surveys.

6.1.6 Should an update to the 2014 survey data be required by the NRW and the local planning authority it should be undertaken by a suitably qualified ecologist/entomologist to determine if the habitats proposed to be removed as part of the development support any protected and/or priority invertebrate species, including the marsh fritillary butterfly.

d) Great Crested Newts

6.1.7 It is recommended that surveys for great crested newts are undertaken on suitable ponds within the Project Site boundary, and within 500 m of the Project Site boundary to determine if they are present in the area.

e) Reptiles

6.1.8 It is recommended that presence/absence surveys for reptiles should be undertaken in areas of suitable habitat using artificial refugia.

6.1.9 Grass snake and common lizard have previously been identified on Project Site (see Table 4-1).

f) Breeding Birds

6.1.10 It is recommended that breeding bird surveys should be undertaken within suitable areas of habitat within the Site to assess presence, population and activity of birds. Particular focus will be paid to protected and/or priority species breeding in areas of suitable habitat and will include ground nesting birds, in particular lapwing, in areas of marshy and semi-improved grassland.

g) Bats

6.1.11 The Bat Survey Guidelines (Ref. 2) requires surveys to consider potential roosts (trees, buildings and structures) within the Zone of Influence (ZoI) of a project. For the Generating Equipment Site in consideration of construction noise and vibration, and operational lighting to COMAH regulations the ZoI has been set to a 50m radius from the Project Site boundary, and for the rest of the Site set to potential roosts within and adjacent to the Project Site boundary.

Tree Assessments

6.1.12 If broadleaved semi-natural woodland, rows of trees and /or individual trees within the ZoI and Project Site are to be removed or illuminated by external lighting a preliminary ground level roost assessment should be undertaken on all trees within the area which will be affected.

Building and Structure Assessments

6.1.13 Buildings and/or structures within the vicinity of the Project Site should be assessed for their potential to support summer roosting and winter hibernating bats.

Bat Roost Survey

Trees

6.1.14 Any trees to be removed or disturbed (disturbance can include lighting, crown lifting, limb removal, noise and vibration) which have been assessed as having low potential to support roosting bats will not be subject to further surveys, but precautionary measures may be appropriate during felling or pruning activities.

6.1.15 Any trees to be removed or disturbed which have been assessed as having moderate or high potential to support roosting bats may require a further Potential Roost Feature (PRF) climbed inspection survey and/or will require presence/absence surveys to be undertaken.

6.1.16 To establish roost presence or likely absence up to three manual surveys (dusk/dawn) are to be completed following the Bat Survey Guidelines (Collins, 2016). The climbed inspection can count towards one of the three manual surveys.

Buildings and Structures

6.1.17 Any buildings or structures assessed as having potential to support roosting bats may require an internal inspection, winter hibernations survey, and/or will require presence/absence surveys to be undertaken if they are to be disturbed as part of the Project (disturbance can include lighting, renovation works, noise and vibration).

6.1.18 To establish roost presence or likely absence up to three manual surveys (dusk/dawn) are to be completed following the Bat Survey Guidelines (Ref. 2).

6.1.19 At least three surveys are needed to support a European Protected Species License application if a roost is to be destroyed or disturbed.

Activity Survey

6.1.20 To ascertain the presence and/or level of bat activity on the Project Site, activity surveys (including walked transects and automated/static activity surveys) are recommended to be completed following the Bat Survey Guidelines (Ref. 2).

Transect Surveys

6.1.21 This comprises two site visits a month, for each month between April and October inclusive for walked transects. Transects will incorporate all areas of suitable habitat. Particular focus will be on commuting bats using the hedgerows and tree lines. The transect route will depend on suitable and safe access. Due to the size of the Project Site it is anticipated that the Project Site will be covered by two walked transect routes.

Automated/Static Activity Surveys

6.1.22 This comprises three remote detector locations per transect with data to be collected on five consecutive nights per month, for each month between April and October inclusive. The devices will be placed out and retrieved after each session. Recordings are then analysed in the office.

h) Hazel Dormouse

6.1.23 Suitable habitat for supporting dormice was recorded within woodland, hedgerows and dense scrub. No records of dormice were returned from the local records centre. Surveys for dormice were undertaken by BSG Ecology in 2014 (Appendix 8.8 of the ES) and no evidence of dormice was found.

6.1.24 The habitats on-site with the potential to support dormice are not considered to have changed since 2014, Therefore AECOM consider that no further surveys for dormice are necessary. However, a consultation with NRW and the local planning authority will be required to determine if this approach is appropriate. There may be a requirement to undertake further surveys for dormice in areas of suitable habitat on-site.

6.1.25 Should a dormouse survey need to be completed to ascertain presence or likely absence at the Project Site, the survey will follow the guidelines set out in the Dormouse Conservation Handbook Second Edition (Ref. 10).

6.1.26 Nest tubes will be positioned within areas of scrub woodland and along hedgerows suitable to support dormouse. The tubes will be checked monthly using a surveyor possessing a NRW dormouse handling licence for the presence of dormice and also for signs of recently constructed dormouse nests.

6.1.27 Based on survey methodologies provided in Ref. 10, it is recommended that surveys commence in May and are undertaken on a monthly basis until September. As shown in Table 6-1 below, each survey month is given an Index of Probability based on the likelihood of dormouse being present and active in each month. A minimum score of 20 is required to assume absence from the Site.

Table 6-1: Index of probability of finding dormice present in nest tubes in any one month

Month	Index of Probability (based on 50 tubes)
April	1
May	4
June	2
July	2
August	5
September	7
October	2
November	2

6.1.28 If dormice are confirmed present within the woodland on site then an application for a European Protected Species License (EPSL) will need to be made from NRW to allow works to be undertaken that would otherwise be in breach of legislation. The EPSL will contain a Method Statement describing how the works will proceed (likely to include timing of works, working methods and hand searching by a licensed ecologist) and mitigation measures. If an EPSL is required then the survey must include a survey in May to inform a population size class assessment, due to the timing of this PEA this would need to be undertaken in May 2018.

i) Badger

[redacted]

j) Otter and Water Vole

6.1.33 An otter and water vole survey should be undertaken along watercourses and ditches at least 100 m from the Project Site boundary (where access allows) to ascertain presence and distribution.

k) Invasive Non-Native Plant Species

6.1.34 Invasive non-native plant species were identified during the Phase 1 Habitat Survey. A survey for invasive non-native species should be undertaken in areas that could not be accessed during the Phase 1 Habitat Survey.

6.2 Recommendations for Further Work

a) Habitat Regulations Assessment – Screening

6.2.1 A search should be undertaken for any Natura 2000 sites situated within the 10 km study area. A Habitat Regulations Assessment (HRA) screening assessment should be undertaken to ascertain if the development proposals would have a Likely Significant Effects (LSE) on any Natura 2000 sites alone or in-combination with other projects, and therefore identifying whether an Appropriate Assessment (AA) is required. Consultation with NRW is recommended at early stages to discuss the proposals and suitable mitigation measures should these be required.

6.2.2 A HRA screening assessment was undertaken in 2015 by Parsons Brinckerhoff and concluded no LSE. It is recommended that the report is reviewed and, if deemed appropriate, consultation undertaken with NRW to ascertain whether the report can be used to support the DCO application. However, a new in-combination assessment will be required as there is a likelihood that new projects have been planned or built since the 2015 report was written.

6.3 Recommendations for Consultation

6.3.1 Development plans are likely to require the removal of SINC habitats and TPO trees, and may impact upon a number of protected and/or priority species, and designated sites. The following is a list of bodies that should be consulted:

- CCS Ecologist;
- CCS Officer;
- Natural Resources Wales; and,
- Local wildlife groups.

6.4 Recommendations for Mitigation and Enhancement

6.4.1 A detailed list of recommendations has not been completed. Further recommendations will be made as a result of the further surveys and as part of the EcIA.

6.4.2 The mitigation hierarchy should be considered and implemented when designing a new development.

a) Mitigation Hierarchy

1. Enhance positive impacts and opportunities;
2. Avoidance – Alternative site or technology, or timing to eliminate impact;
3. Minimise – Actions during design construction and operation to minimise or eliminate impacts; and
4. Compensation – Used as last resort to offset impacts.

b) Habitat Loss, Severance and Fragmentation

6.4.3 Avoid removal of habitats where possible. The following are of particular importance as they are listed as priority habitats under the Section 7 of the Environment (Wales) Act 2016. The Act places a duty on public authorities to 'seek to maintain and enhance biodiversity' of types of habitat included in on the Section 7 list, and encourage others to take such steps:

- Woodland;
- Semi-improved grassland;
- Marshy grassland;
- Standing water; and,
- Hedgerows.

c) Loss and/or Disturbance of Breeding and Resting sites of Protected Species

6.4.4 Further surveys will confirm the presence of any breeding or resting sites. Disturbance, destruction, or obstruction of breeding or resting sites for European Protected Species (EPS) and certain nationally protected species, such as badger, will require a licence from NRW. Compensatory habitat/sites, mitigation, supervision of works and post construction monitoring would likely be required.

d) Disturbance, Injury and Killing during Construction

- To reduce the risk of killing and injury to individual reptiles when vegetation is cleared it is recommended that a programme of translocation and mitigation based on a high population is undertaken prior to any site clearance.
- Removal or maintenance of habitats that have the potential to support breeding birds should take place outside of the breeding bird season (removal between the 1st September and end of February). There is a potential for a clash between the removal of vegetation to avoid impacts on birds and impacts on reptiles. This will need to be managed and planned once timings are known.

The provision of bird boxes, such as swift boxes, typical garden bird boxes, sparrow terraces and barn owl boxes will provide supplementary nesting sites.

- Any new lighting design should avoid lighting of habitats with the potential to support wildlife (such as vegetated habitats or buildings) and/or adjacent habitats. Suggestions for mitigating external lighting and achieving the lighting recommendations above are outlined in the best practice guidance by the Bat Conservation Trust (Ref. 11 and Ref. 12) and are applicable to several other nocturnal species.
- A vehicle traffic assessment should be completed to understand the likely impacts on habitats and species.
- A noise and vibration assessment as a result of piling should be completed to understand the likely impacts on species.
- Excavations, if left unfilled overnight, should be covered to avoid animals becoming trapped or excavations fitted with a scaffolding board ramp to allow any trapped animals to exit.

e) Pollution to Land and/or Water

- Appropriate measures should be in place to: control pollution and disturbance during construction and adhere to applicable published guidelines. These measures should be detailed and implemented via a Construction Management Plan (CMP) and appropriate Toolbox Talks.

f) Disturbance during Operation including Litter and Predation by Pets

- Areas set aside for wildlife (for example reptile receptor areas, woodland, diverse grassland planting) should be protected for the lifetime of the Project Site and should have management plans in place which are followed to protect and maintain the areas. For example, without active management through successional change grassland will turn to dense scrub which would make an area less suitable for reptiles.
- A Habitat Management Plan should be created for operation of the Project Site.

g) Spread of Invasive Species

- Invasive plants should be treated and removed from the Project Site as part of the Project. The removal of the plants from the Project Site will be of benefit to the biodiversity within the Project Site and the local area.
- Prevent the tracking of vehicles over or otherwise disturbing areas of invasive plant growth or areas of soil contaminated with the remains (roots, seeds, and rhizomes).
- Have an appropriate management plan in place during construction and operation to help prevent/limit any re-growth or re-introduction of invasive species that could be spread by works or invasive grounds maintenance activities, such as flailing and use of tractors or frequent trampling by people.

h) Biodiversity Enhancements

6.4.5 The National Planning Policy Framework (March, 2012) and the Environment (Wales) Act 2016, requires that developments enhance biodiversity, as well as just mitigating impacts.

6.4.6 A detailed list of recommendations has not been completed. Further recommendations can be made as a result of the further surveys and at EcIA stage.

6.4.7 Suggested potential enhancement measures for the Project Site are provided below.

- Implement a sympathetic management regime for the vegetation within the Project Site to increase the conservation value and biodiversity of the Project Site;
- Use locally native species within the planting and landscaping deign, and species that are of a benefit to invertebrates; and,
- Include the provision of bird nesting features within the landscaping design.

7. References

Ref. 1 Defra (2007). Hedgerow Survey Handbook. A standard procedure for local surveys in the UK. Defra. London

Ref. 2 Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London

Ref. 3 CIEEM (2012) Guidelines for Preliminary Ecological Appraisal. Chartered Institute of Ecology and Environmental Management

Ref. 4 CIEEM (2013) Professional Code of Conduct. Chartered Institute of Ecology and Environmental Management (CIEEM) June 2013

Ref. 5 WSP/Parsons Brinckerhoff (2017). Abergelli Power Update Preliminary Ecological Appraisal. Cardiff

Ref. 6 Joint Nature Conservation Committee (2010 Ed.). Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit. JNCC. Peterborough

Ref. 7 Mitchell-Jones A.J. (2004) Bat Workers Manual (3rd edition). JNCC

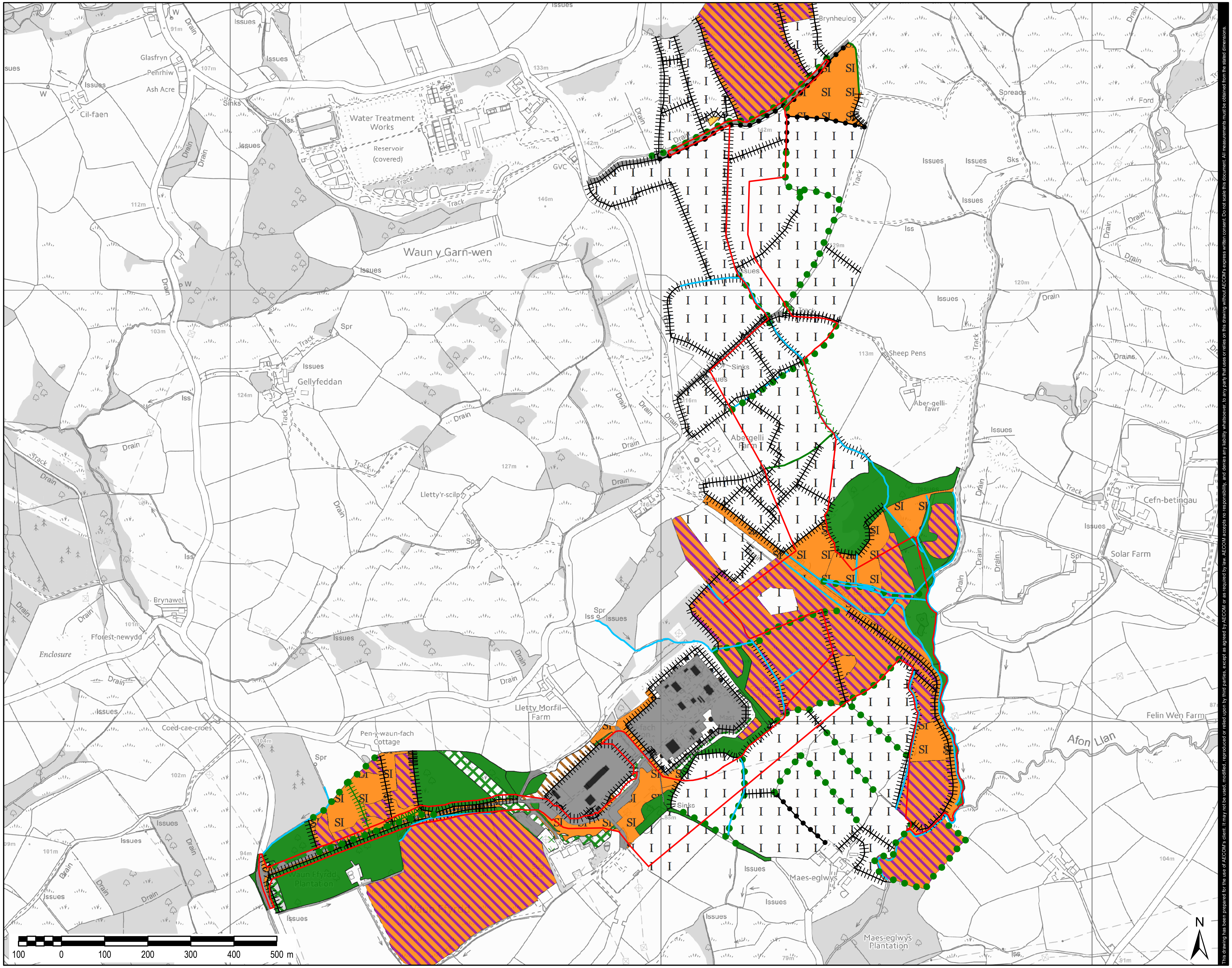
Ref. 8 Bright, P., Morris, P. & Mitchell-Jones, T. (2006). The dormouse conservation handbook. (2nd edition) Peterborough, English Nature

Ref. 9 Bat Conservation Trust (2009). Bats and Lighting in the UK. Bat Conservation Trust, London http://www.bats.org.uk/data/files/bats_and_lighting_in_the_uk__final_version_version_3_may_09.pdf

Ref. 10 Gunnell, K., Murphy, B. and Wiiliams, C. (2013). Designing for Biodiversity: A technical guide for new and existing buildings. London

8. Appendices

Figure 1: Phase 1 Habitat Map



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Project Title:

ABERGELLI POWER PROJECT

Client:

ABERGELLI POWER LTD.

LEGEND

Project Site Boundary

Phase 1 Habitat Linear Features

- Scrub - Scattered
- Row of trees - broadleaved
- Running Water
- Intact Hedge - Species-Poor
- Defunct Hedge - Species-Poor
- Hedge with Trees - Native Species-Rich
- Hedge with Trees - Species-Poor
- Fence
- Earth Bank

Phase 1 Habitat Areas

- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Dense/Continuous scrub
- Scattered scrub
- Semi-improved - neutral grassland
- Improved grassland
- Marsh/marshy grassland
- Tall ruderal - herb and fern
- Dry heath/acid grassland mosaic
- Buildings
- Bare ground
- Hard standing

AECOM Internal Project No:

60542910

Drawing Title:

PHASE 1 HABITAT MAP

Scale at A3: 1:8,000

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FIGURE A8.1.1A			005
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GM	CC	CA	15/05/18

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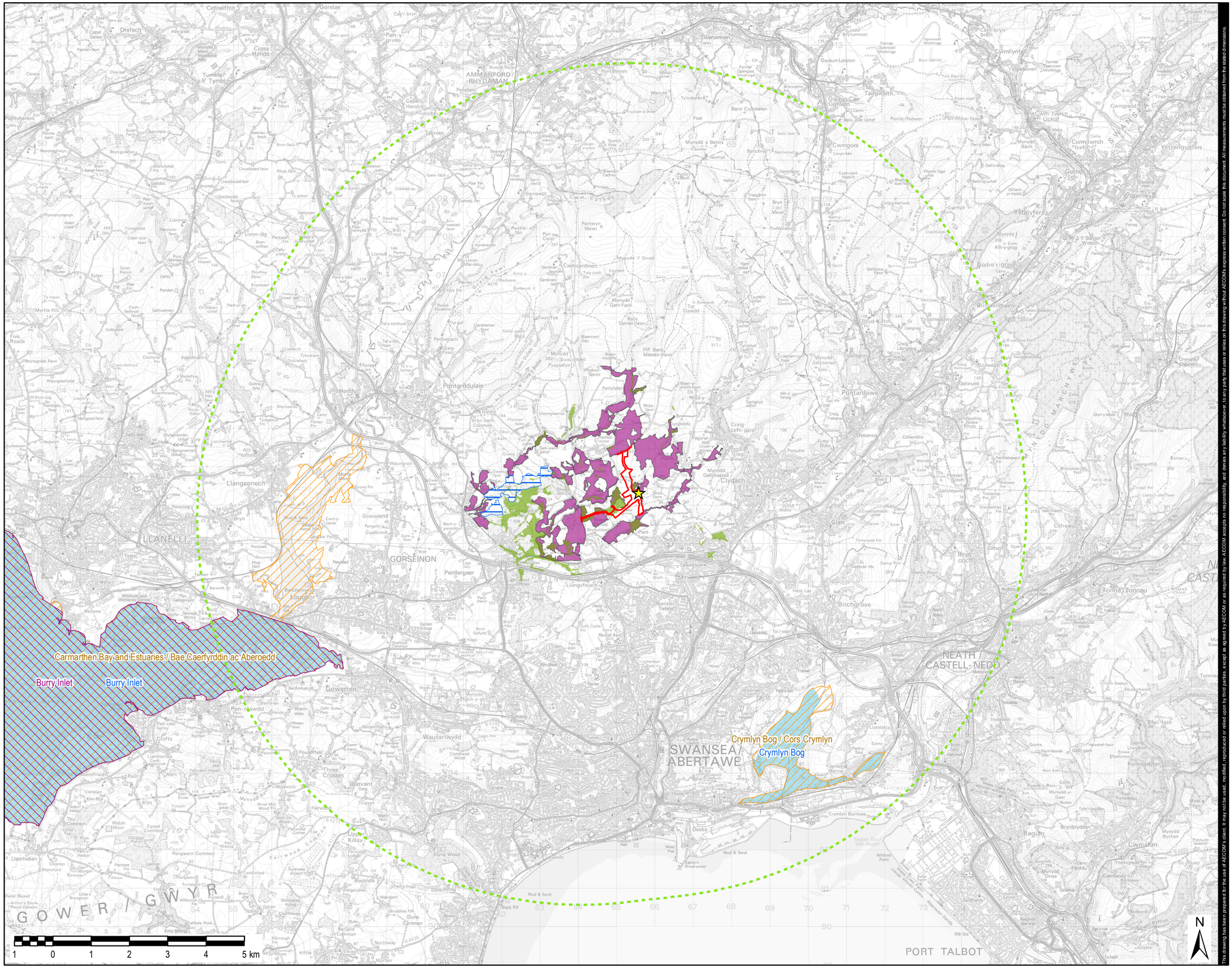
Figure 2: Designated Sites



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Project Title:

ABERGELLI POWER PROJECT

Client:

Abergelli power
A Drax Group company

LEGEND

- Proposed Stack Location
- Project Site Boundary
- 10km Study Area
- Special Protection Area
- Special Area of Conservation
- Site of Special Scientific Interest
- Ancient Woodlands
- Ramsar Site
- SINCs

AECOM Internal Project No:
60542910

Drawing Title:

DESIGNATED SITES 1

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GM	CC	CA	02/05/18

Appendix A Wildlife Legislation and Local Planning Policy

8.2 Legislation – Habitats

8.2.1 A variety of sites are designated in the UK, under Conventions, Directives and Regulations for their nature conservation importance and interest. The general aim of these designations is to conserve and protect ecological resources, as well as raising awareness and understanding. Other non-statutory sites are afforded some protection through local plans. The following outlines the most common statutory and non-statutory designations:

Designation	Brief Description
Special Areas of Conservation (SAC)	SACs are sites selected to conserve the natural habitat types and species of wild flora and fauna listed in the Annexes of the Habitats Directive (further information regarding the Habitats Directive is set out in more detail in Table 8.3 below). They are the best areas to represent the range and variety of habitats and species within the European Union (EU).
Special Protection Area (SPA)	SPAs are strictly protected sites for the most important habitats for rare and migratory birds within the EU classified in accordance with Article 4 of the Birds Directive information regarding the Birds Directive is set out in more detail in Table 8.3 below).
Ramsar Sites	Ramsar Sites are wetlands of international importance. Ramsar Sites are protected, through the planning system, under the Wildlife and Countryside Act 1981 (as amended), and the Countryside and Rights of Way Act 2000 through their notification as SSSIs and through other regulatory systems addressing water, soil and air quality.
National Nature Reserve (NNR)	NNRs are nationally important areas of wildlife habitat and geological formations in Britain. NNRs are designated and protected under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981 (as amended). They receive additional protection under the Countryside and Rights of Way Act 2000. They are managed for the benefit of nature conservation.
Site of Special Scientific Interest (SSSI)	A SSSI is a site of at least national importance for nature conservation designated under the Wildlife and Countryside Act 1981 (as amended) due to its special interest in terms of flora, fauna or geological or physiographical features. Protection afforded to SSSI's was strengthened by the Countryside and Rights of Way Act 2000. It should be noted that under the Countryside and Rights of Way Act 2000 owners of SSSIs must give Natural Resources Wales (NRW) written notice before they begin any of the operations listed in the notification as likely to damage the special interest features, or if they allow others to carry out these activities. None of the listed operations can be carried out without NRW's consent.
County Wildlife Site (Local site)	A County Wildlife Site is a non-statutory site designated by a local authority as being of local nature conservation value.
Ancient Woodland	Ancient Woodland is a term applied to woodlands which have existed from at least Medieval times to the present without ever having been

Designation	Brief Description
Inventory	cleared for uses other than wood or timber production. A convenient date used to separate ancient and secondary woodland is about the year 1600. In special circumstances semi-natural woods of post-1600 but pre-1900 origin are also included.
Wildlife Trust Reserve	These non-statutory sites are managed by the Wildlife Trusts with the purpose of conserving wildlife.

8.3 Legislation – Protected Species

8.3.1 In addition to habitats, a number of species have been afforded protection through international/European and national law. Other species are considered to contribute to our 'quality of life'. Although these species do not benefit from legal protection, they can be material considerations in the planning process. The table below outlines the key forms of protection afforded to species. The Countryside and Rights of Way Act, the Wildlife and Countryside Act 1981 (as amended), The Protection of Badgers Act 1992 and the Conservation of Habitats and Species Regulations 2017 are the main legislative framework for protection of wild animals in the UK. Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) covers birds, Schedule 5 covers other animals and Schedule 8 covers plants.

8.3.2 Species including bats, otters and great crested newts are listed under Schedule 2 of the Conservation of Habitats and Species Regulations 2017. Badgers are protected under their own Act: The Protection of Badgers Act 1992. Activities affecting protected species must usually be conducted under licence obtained from the appropriate body (in Wales, this is Natural Resources Wales).

8.3.1 Developers must be able to show that all reasonable measures have been taken to ensure that protected species are not subject to disturbance. The habitats which regularly support the Conservation of Habitats and Species Regulations 2017Schedule 2 species, the Wildlife and Countryside Act 1981 (as amended) Schedule 1 species and some Wildlife and Countryside Act 1981 (as amended) Schedule 5 species are also protected from disturbance and destruction. Again, all reasonable precautions should be taken to ensure that this does not happen. The Countryside and Rights of Way Act 2000 has strengthened enforcement powers and introduced a new offence of "reckless disturbance" that applies to both protected sites and species. **Error! Reference source not found.** below provides a summary of the relevant legislation with regards to protected and priority species.

8.3.2

Legislation	Brief Description
The Habitats Directive	The Habitats Directive 1992 (Directive 92/43/EEC sets out the legal framework requiring EU member states to protect habitat sites supporting vulnerable and protected species, as listed within the Directive. The need for an assessment of impacts on Natura 2000 sites (the collective name for European designated sites, including SPAs and SACs) is set out within Article 6 of the

Legislation	Brief Description
	Directive. The Directive is transposed into UK law through the Conservation of Habitats and Species Regulations 2017) (the "Habitats Regulations") and the Wildlife & Countryside Act 1981 (as amended).
The Birds Directive	The Directive on the Conservation of Wild Birds (Directive 2009/147/EC (the codified version of Council Directive 79/409/EEC as amended)) provides a framework for the protection, management and control of all species of naturally occurring wild birds in the European territory of Member States, including the UK. The provisions of the Birds Directive are transposed into UK law by the Conservation of Habitats and Species Regulations, 2017 and the Wildlife & Countryside Act 1981 (as amended).
Wildlife and Countryside Act (1981) (as amended)	The Wildlife and Countryside Act 1981 (as amended) is the principal mechanism for the legislative protection of wildlife in Great Britain. This legislation is the means by which the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and (partially) the Birds Directive and the Habitats Directive are implemented in the UK. The Countryside and Rights of Way Act 2000 has strengthened this legal protection (see below). A small number of plant species are listed under Schedule 9 of the Wildlife and Countryside Act 1981, as amended, which includes species such as Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*), montbretia (*Crocosmia x crocosmiiflora*), giant hogweed (*Heracleum mantegazzianum*) and some cotoneaster species (Cotoneaster sp.). It is illegal to plant or to cause these plants to grow in the wild, and legal disposal methods for vegetation and soil subject to disturbance or clearance from a site must be used.
Convention on Biological Diversity and the Countryside and Rights of Way Act 2000	The Countryside and Rights of Way Act 2000 provides a statutory framework for biodiversity conservation. The Act places a duty on Government Departments and the National Assembly for Wales to have regard for the conservation of biodiversity and maintain lists of species and habitats for which conservation steps should be taken or promoted, in accordance with the Convention on Biological Diversity. Schedule 9 of the Act amends SSSI provisions of the Wildlife and Countryside Act 1981, including provisions to change SSSIs and providing increased powers for their protection and management. The provisions extend powers for entering into management agreements; place a duty on public bodies to further the conservation and enhancement of SSSIs; increases penalties on conviction where the provisions are breached; and introduce a new offence whereby third parties can be convicted

Legislation	Brief Description
	for damaging SSSIs. Schedule 12 of the Act amends the species provisions of the Wildlife and Countryside Act 1981, strengthening the legal protection for threatened species. The provisions make certain offences 'arrestable' and create a new offence of reckless disturbance. The UK Biodiversity Action Plan (BAP) was published in 1994, and was the UK Government's response to the Convention on Biological Diversity (CBD), which the UK signed up to in 1992. It provides the framework for fulfilling the UK's responsibilities towards the Convention on Biological Diversity. Conservation of biodiversity (the variety of life on earth) is an essential element of sustainable development.
Environment (Wales) Act 2016	The Environment (Wales) Act puts in place the legislation needed to plan and manage Wales' natural resources in a more proactive, sustainable and joined-up way. Part 1 relates to the sustainable management of natural resources. This ensures that the way in which the use of and the impacts on natural resources do not result in long term decline. The aim is to sustainably manage natural resources in a way and rate that meets the needs of present and current generations without compromising the needs of future generations. The Act also contains at section 7, a duty for the Welsh Ministers prepare and publish a list of the living organisms and types of habitat which in their opinion are of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales. This section replaces the duty in section 42 of the NERC Act 2006.
Protection of Badgers Act 1992	The Protection of Badgers Act 1992 makes it an offence to wilfully take, kill, injure or ill-treat a badger, possess a dead badger or any part of a badger. Sett interference includes damaging or destroying a sett, obstructing access to a sett, and disturbing a badger whilst it is occupying a sett. The Act defines a badger sett as 'any structure or place, which displays signs indicating the current use by a badger' and Natural England takes this definition to include seasonally used setts. Work that may disturb badgers or their setts is illegal without a development licence from the relevant statutory body (in this case Natural Resources Wales).
The Hedgerow Regulations 1997	The Hedgerow Regulations (1997) make provision for the protection of important hedgerows in England and Wales. The regulations affect hedgerows which are 20m or more in length, or connected at both ends to another hedgerow of any length. They relate to hedgerows which are on, or adjoining land used for the following purposes: agriculture or forestry; the breeding or

Legislation	Brief Description
	keeping of horses, ponies or donkeys; common land; village greens; and SSSIs (They do not include hedges that are attached to, or marking the boundaries of a private house. It is an offence to intentionally or recklessly remove or cause or permit another person to remove a hedgerow or intentionally or recklessly remove, or cause or permit another person to remove, a hedgerow which is the subject of a hedgerow retention notice.

8.4 Local Planning Policy

8.4.1 The table below provides a summary of relevant local planning policies found in the Swansea Unitary Development Plan. For the precise wording of each specific policy please refer back to the source document.

Planning Policy	Purpose /Relevant Sections
SP1 Creating a Quality Environment	Sustainable development will be pursued as an integral principle of the planning and development process. Development proposals designed to a high quality and standard, which enhance townscape, landscape, sense of place, and strengthen Swansea Waterfront identity, will be favoured.
SP2 - Creating a Quality Environment	The countryside will be protected and conserved, with green wedges shaping the urban form and safeguarding the distinctive interplay of town and country. Village character will be protected.
SP3 - Creating a Quality Environment	The natural, built, and cultural heritage of the County will be protected and enhanced to safeguard from materially harmful development.
Siting and Location - EV2	The siting of new development should give preference to the use of previously developed land over greenfield sites, and must have regard to the physical character and topography of the site and its surroundings by: i. Avoiding locations that would have a significant adverse impact on prominent buildings, landscapes, open spaces and the general locality, including loss of visual amenity, ii. Effectively integrating with the landscape, seascape or coastline by utilising topography to integrate into the contours of the site and avoiding conspicuous locations on prominent skylines and ridges, iii. Retaining important views into and out of the site, iv. Taking into account and where possible retaining site features including existing buildings, topography, landscape, archaeological and water features, trees and hedgerows, and, where appropriate: v. Undertaking, at the earliest opportunity, an assessment of species and habitats on site and, where planning permission is granted, implementing any necessary mitigation measures, ix. Determining whether the proposal would be at risk from flooding,

Planning Policy	Purpose /Relevant Sections
	increase flood risk off-site, or create additional water run-off, xiii. Having full regard to existing adjacent developments and the possible impact of environmental pollution from those developments, as well as the creation of any environmental pollution to the detriment of neighbouring occupiers (including light, air and noise).
Rural Development - EV21	In the countryside non residential development will only be permitted where it can be demonstrated that: iii. It is an appropriate development associated with farm diversification, sustainable tourism and recreation, or nature conservation and does not adversely affect the viability of an established farm unit.
Rural Development - EV22	The countryside throughout the County will be conserved and enhanced for the sake of its natural heritage, natural resources, historic and cultural environment and agricultural and recreational value through: i. The control of development, and ii. Practical management and improvement measures.
Sites of International Importance - EV25	Development, alone or in combination with other plans or projects, which is likely to adversely affect the integrity of a European protected site (SAC, Marine SAC, SPA and Ramsar Sites) and is not directly connected with or necessary to the management of the site, will not be permitted unless: i. There are imperative reasons of over-riding public interest, including those of a social or economic nature, which are sufficient to override the reasons for designation, and ii. There is no alternative solution. Where such development is permitted, planning conditions and/or obligations will be used to secure all compensatory measures necessary to ensure that the overall coherence of the European Site is protected.
SSSIs and National Nature Reserves - EV27	Development that significantly adversely affects the special interests of sites designated as SSSIs and NNRs will not be permitted unless the need for the development is of such significance that it outweighs the national importance of the designation. Where development is permitted, planning conditions and/or obligations will be used to protect and enhance those interests and where necessary provide effective mitigation and compensatory measures.
Sites of Local Importance - EV28	Within locally designated areas the natural heritage will be preserved and enhanced wherever possible. Development that would significantly adversely affect the special interest of Local Nature Reserves will not be permitted unless the need for the development is of such significance that it outweighs the importance of the designation.

Planning Policy	Purpose /Relevant Sections
	Development that would significantly adversely affect SINCs or RIGs, or which would not provide for appropriate compensatory or mitigation measures will not be permitted, unless it can be demonstrated to meet appropriate social or economic needs where the benefits in such terms would outweigh the harm to the feature concerned. Where development is permitted which would damage the nature conservation value of the site, such damage will be kept to a minimum, and appropriate mitigation or compensatory measures sought.
Trees, Woodland and Hedgerow Protection - EV30	Protection and improved management of woodlands, trees and hedgerows which are important for their visual amenity, historic environment, natural heritage, and/or recreation value will be encouraged, with priority being given to: i. Protecting the remaining areas of ancient semi natural woodland and planted ancient woodland sites, ii. Promoting new planting with species appropriate to the location, where there is no conflict with other land uses or nature conservation interests, and iii. Ensuring that where management involves commercial felling and replanting, protection of amenity interests is achieved.
Environmental Enhancement - EV32	Environmental improvement schemes will be implemented at a number of locations shown on the Proposals Map. These are intended to: i. Improve visual appearance, natural heritage value and recreation potential, ii. Improve the setting of industrial, commercial and residential developments and transport corridors, and iii. Maintain, extend and improve the quality of the urban greenspace network in line with the aims of the 'Greening the City' strategy
Protection of Controlled Waters - EV34	Development proposals that may impact upon the water environment will only be permitted where it can be demonstrated that they would not pose a significant risk to the quality and or quantity of controlled waters. Initiatives that lead to improvements in the quality of surface water will be approved subject to satisfactory ecological and visual safeguards.
Protection of Controlled Waters - EV35	Development that would have an adverse impact on the water environment due to: i. Additional surface water run off leading to a significant risk of flooding on site or an increase in flood risk elsewhere, and/or ii. A reduction in the quality of surface water run-off, will only be permitted where it can be demonstrated that appropriate alleviating measures can be implemented. Sustainable drainage systems (SUDS) will be encouraged wherever

Planning Policy	Purpose /Relevant Sections
	they would be effective and practicable, so as to ensure that development does not increase run off, and potentially damage important landscape features and protected species and habitats. Where SUDS are not provided then any conventional drainage system utilised must improve the status quo.
Air, Noise and Light Pollution EV40	Development proposals will not be permitted that would cause or result in significant harm to health, local amenity, natural heritage, the historic environment or landscape character because of significant levels of air, noise or light pollution.

8.4.2 The table below provides a summary of relevant local planning policies found in the Swansea Local Development Plan 2010 – 2015: Deposit Plan (July 2016). For the precise wording of each specific policy please refer back to the source document.

Planning Policy	Purpose /Relevant Sections
ER 1 Climate Change	To mitigate against the effects of climate change, adapt to its impacts, and to ensure resilience, development proposals should take into account: i. Reducing carbon emissions; ii. Protecting and increasing carbon sinks; iii. Adapting to the implications of climate change at both a strategic and detailed design level; iv. Promoting energy and resource efficiency and increasing the supply of renewable and low carbon energy; v. Avoiding unnecessary flood risk by assessing the implications of development proposals within areas susceptible to flooding and preventing development that unacceptably increases risk, and, vi. Maintaining ecological resilience.
ER 2 Strategic Green Infrastructure Network	Development will be required to maintain or enhance the extent, quality and connectivity of the County's multi-functional green infrastructure network, and where appropriate: i. Create new interconnected areas of green infrastructure between the proposed site and the existing strategic network; ii. Fill gaps in the existing network to improve connectivity; and/or, iii. In instances where loss of green infrastructure is unavoidable, provide mitigation and compensation for the lost assets.
ER 6 Designated Sites of Importance for Nature Conservation	Development will not be permitted that would result in a likely significant adverse effect to sites of international or national nature conservation importance. Development that would affect locally designated sites of nature conservation importance should maintain or enhance the nature conservation interest of the site. Where this cannot be achieved development will only be permitted

	where it can be demonstrated that: i. The need for the development outweighs the need to protect the site for nature conservation purposes; ii. There is no satisfactory alternative location for the development that avoids nature conservation impacts; and, iii. Any unacceptable harm is kept to a minimum by effective avoidance measures and mitigation, or where this is not feasible compensatory measures must be put in place to ensure that there is no overall reduction in the nature conservation value of the area.
ER 8 Habitats and Species	Development proposals that would have a significant adverse effect on the continued viability of habitats and species, including those identified as priorities in the UK or Swansea Local Biodiversity Action Plan, will only be permitted where: i. The need for development outweighs the nature conservation importance of the site; ii. The developer demonstrates that there is no satisfactory alternative location for the development which avoids nature conservation impacts; iii. Effective mitigation measures are provided by the developer; And, iv. Any unavoidable harm is minimised by effective mitigation to ensure that there is no reduction in the overall nature conservation value of the area. Where this is not feasible, compensation measures designed to conserve, enhance, manage and, where appropriate, restore natural habitats and species must be provided.
ER 9 Ecological Networks and Features of Importance for Biodiversity	Development proposals will be expected to maintain, protect and enhance ecological networks and features of importance for biodiversity. Particular importance will be given to maintaining and enhancing the connectivity of ecological networks which enable the dispersal and functioning of protected and priority species. Development proposals that could result in a significant adverse effect on the connectivity of ecological networks and features of importance for biodiversity will only be permitted where: i. The need for the development outweighs the nature conservation value of the site; ii. It can be demonstrated that there is no satisfactory alternative location for the 102 PPW sections 5.5.11 – 5.5.12 and TAN 6 Nature Conservation and Planning (2009) chapter 6 development; iii. A connected element of the natural resource is retained as part of the design of the development; and, iv. Compensatory provision will be made of comparable

	ecological value to that lost as a result of the development.
ER 11 Trees and Development	Development that would adversely affect trees, woodlands and hedgerows of public amenity, natural/cultural heritage value, or that provide important ecosystem services will not normally be permitted. Ancient Woodland, Ancient Woodland Sites, Ancient and Veteran trees merit specific protection and development will not normally be permitted that would result in: i. Fragmentation or loss of Ancient Woodland; ii. The loss of an Ancient or Veteran tree; iii. Ground damage, loss of understorey or ground disturbance to an area of Ancient Woodland or Ancient or Veteran Tree's root protection area; iv. A reduction in the area of other semi natural habitats adjoining Ancient Woodland; v. Significant alteration to the land use adjoining the Ancient Woodland; vi. An increase in the likely exposure of Ancient Woodland, Ancient or Veteran Tree to air, water or light pollution from the surrounding area; vii. Alteration of the hydrology in a way that might impact on Ancient Woodland, Ancient or Veteran Trees; viii. Destruction of important connecting habitats relating to Ancient Woodland; ix. Degradation of important archaeological or historical features within Ancient Woodland or associated with Ancient or Veteran trees; x. Destruction of Plantations on Ancient Woodland Sites (PAWS); and/or, xi. Development within 15m of Ancient Woodland.

Appendix B Target Notes for Phase 1 Habitat Map

Target Note Number	Description
1	The woodlands on either side of the path look like they have received historical infilll planting.
2	Redpoll, goldcrest, blackcap, robin, blue tit, wren, blackcap, blackbird heard in this location.
3	Tree with tag number 01241. Possible TPO.
[redacted]	[redacted]
5	Cuckoo and bullfinch heard in this location.
6	Historical earth bank.
7	Neutral semi-improved grassland on both sides of the track. Species include ribwort plantain, sweet vernal grass, meadow buttercup, silverweed, creeping cinquefoil, black knapweed. This area is, good for reptiles. There is a strip of land used as a horse gallop which is covered in mulch and bark chippings.
8	A large pile of wood within the area of scrub, which provides opportunities for reptiles.
[redacted]	[redacted]
10	Gate.
11	Gate.
12	There is an open area of gravel and semi-improved grassland within woodland area, this has good reptile potential.
13	An area of bracken, some of which has been recently cleared. This area has good reptile potential.
14	There is a gravel path area with semi-improved grass growth. This area has good reptile potential.
15	There is a semi-improved grass bank with some newly planted trees. This area has potential for reptiles.
16	A small area of short perennial vegetation and exposed gravel within the semi-improved grassland.

Target Note Number	Description
17	Some planted hazel and willow within the semi-improved grassland.
18	The area by the pylon is a matric of semi-improved and marsh grassland with planted shrubs. There is good reptile potential here.
19	There is a gabion cage between the scrub and the woodland. This has potential to offer shelter and hibernation opportunities for reptiles.
20	There is scrub on the bank adjacent to a gravel path. This bank has good potential for reptiles.
21	Remnant of stone wall/earth bank hedgerow with native bluebells and oak saplings.
22	Two lapwing seen flying over this field of marshy and improved grassland.
23	Field with solar panels which was not accessed.
24	Raised bank with stone underneath and scattered hawthorn and oak.
25	Public Right of Way (PRoW) stile.
26	PRoW gate.
27	Gate in fence.
28	Pond.
29	Broadleaved woodland trees in this area don't look very suitable for roosting bats. Looks likely to support foraging and commuting bats. A PRoW footpath runs through this woodland.
30	A pile of wood, sheep's wool, manure and straw. This offers some reptile potential.
31	Potential for reptiles on grass verge.
32	Potential for reptiles within grassland on road edge on either side of this road.
33	Potential for dormice within woodland and on edge of road within scrub.
34	Potential for dormice within trees and scrub along road edge.
35	Potential for dormice, foraging and commuting bats and badger.
36	Tall ruderal and scrub vegetation under the pylons on both sides of the road with potential to support reptiles. The area is bordered on either side by trees with potential for commuting and foraging bats.
37	Potential for reptiles.

Target Note Number	Description
38	The scattered scrub and semi-improved grassland on this bank offers low potential for reptiles due to its road barrier.
39	Potential for reptiles on earth bank.
40	Pond.
[redacted]	[redacted]
42	Trees within this woodland need assessment for bat roosts.
43	Brown hare seen in this location on 16/05/17.
44	Location of Pond 16 - dry at time of Phase 1 Habitat Survey.

Appendix C Site Photographs

Photograph 1: Bat Tree 1. Red arrows indicate features of bat interest.

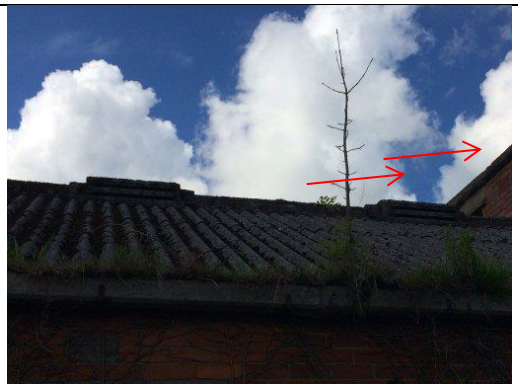
Photograph 2: Bat Tree 5.

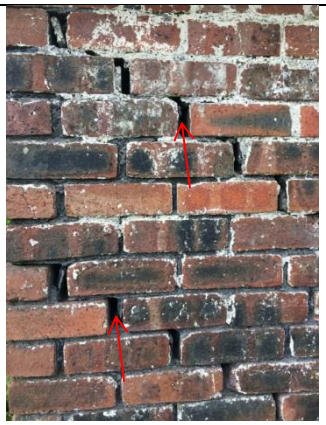
Photograph 3: Bat Tree 6.

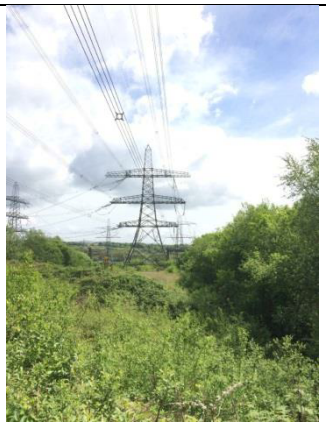
Photograph 4: Bat Tree 7.

Photograph 5: Bat Tree 8.

Photograph 6: Bat Tree 9.

	
Photograph 7: Building 2.	Photograph 8: Building 2.
	
Photograph 9: Building 2.	Photograph 10: Building 2.
	
Photograph 11: Building 2.	Photograph 12: Building 3.
	
Photograph 13: Building 3.	Photograph 14: Building 3.

	
Photograph 15: Building 3	Photograph 16: Building 4.
	
Photograph 17: Building 4, a close up of photograph 16.	Photograph 18: Japanese knotweed, Invasive Species Point 4.
	
Photograph 19: Area of gravel pathway within semi-improved grassland bordered by scrub and a row of trees (Appendix B: Target Note 14).	Photograph 20: An area of wood, sheep's wool and manure within an improved grassland field (Appendix B: Target Note 30).

	
Photograph 21: An area of semi-improved grassland in the south of the Project Site.	Photograph 22: The road leading to National Grid area, bordered by woodland, hedgerows and rows of trees.
	
Photograph 23: An area of dense scrub bordered by woodland.	Photograph 24: An area of semi-improved grassland and scrub adjacent to woodland.
	
Photograph 25: A track with semi-improved grassland either side. A row trees is visible in the background (Appendix B: Target Note 7).	Photograph 26: An improved grassland field with running water (ditch) and a row of trees.

Appendix 8.2

National Vegetation Classification (NVC) Survey Report

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Abergelli

Abergelli Power Project

National Vegetation Classification (NVC)
Survey Report

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Client	Stag Energy
Job	Abergelli
Report title	National Vegetation Classification (NVC) Survey
Draft version/final	FINAL
File reference	7399_R_NVC_APPR (3)_14112014

	Name	**Position**	**Date**
Originated	Anna Gundrey	Senior Ecologist	14 July 2014
Reviewed	James Gillespie	Partner	23 July 2014
Issued to client	Matthew Hobbs	Principal Ecologist	02 October 2014
Final issue to client	Matthew Hobbs	Principal Ecologist	17 November 2014

Contents

1 Summary

1.1 Abergelli Power Limited (APL) is promoting a new Power Generation Plant with its associated Gas and Electricity Connections (the 'Project') on agricultural land within Abergelli Farm, north of Swansea in the City and County of Swansea (approximately at National Grid Reference 265284, 201431).

1.2 As part of the preliminary ecological appraisal[1] for the Survey Site, a request was made to the South East Wales Biodiversity Records Centre (SEWBReC) and Swansea Council for information on designated sites and protected or otherwise notable species on and around the Project Site boundary at the time of the survey (hereafter referred to as the 'Survey Site'). The information collected during the preliminary ecological appraisal and the desk study was used to identify those areas of the Survey Site that required a more detailed botanical survey (National Vegetation Classification (NVC)). The map of Sites of Importance for Nature Conservation (SINCs) provided by Swansea Council revealed that three SINCs, which contain habitats of potentially high botanical value, lie within the Survey Site boundary. APL commissioned BSG Ecology to undertake an NVC survey of woodlands and grasslands within the 150 ha of pastoral farmland within the Survey Site in June and July 2014, to inform and support an application for Development Consent for the Project.

1.3 The land within the Survey Site that is designated as SINC along with some additional fields that were identified as being potentially 'habitats of principal importance for nature conservation' as referred to in Section 42 of the NERC Act 2006 (S42) were selected for inclusion in the NVC survey.

1.4 The surveys were carried out on 11th June 2014 by Anna Gundrey MCIEEM (woodland), 23rd and 25th June 2014 by Vilas Anthwal MCIEEM (woodland) and 30th June and 1st July 2014 by Thomas Flynn (grasslands and mires). The complex of habitats around the gas compressor station was visited again on 12 September 2014 to confirm the boundaries of some habitats; and on 14 November 2014 Niall Lusby rechecked the woodland canopy composition in survey area WL1 (see Figure 2). The surveyors are all suitably qualified botanists and experienced NVC surveyors.

1.5 The surveyors found that the land selected for survey included:

- Four woodland communities / sub-communities –
  - W1 *Salix cinerea – Galium palustre* woodland;
  - W6e *Alnus glutinosa – Urtica dioica* woodland*, Betula pubescens* sub-community;
  - W7 *Alnus glutinosa – Fraxinus excelsior – Lysimachia nemorum* woodland; and
  - W10 *Quercus robur – Pteridium aquilinum – Rubus fruticosus* woodland*.*
- Five mire communities / sub-communities –
  - M15b *Scirpus cespitosus – Erica tetralix* wet heath, typical sub-community;
  - M23a *Juncus effusus/acutiflorus - Galium palustre* rush-pasture, *Juncus acutiflorus* sub-community;
  - M23b *Juncus effusus/acutiflorus - Galium palustre* rush-pasture, *Juncus effusus* sub-community;
  - M25a *Molinia caerulea – Potentilla erecta* mire, *Erica tetralix* sub-community; and
  - M25c *Molinia caerulea – Potentilla erecta* mire*, Angelica sylvestris* sub-community*.*
- Two neutral grassland NVC communities / sub-communities –
  - MG6a *Lolium perenne – Cynosurus cristatus* grassland, typical sub-community; and
  - MG10a *Holcus lanatus – Juncus effusus* rush pasture, typical sub-community.
- As well as mosaics of the above communities.

[1] BSG Ecology (2014). Abergelli Power Project: Preliminary Ecological Appraisal.

2 Introduction

2.1 Abergelli Power Limited commissioned BSG Ecology to undertake a National Vegetation Classification (NVC) survey during 2014 to inform and support an application for Development Consent for the Project described below.

Site Description

2.2 The Survey Site consists of approximately 150 ha of pastoral farmland, primarily grazed by horses. The extent of the Survey Site is shown on Figure 1 and is centred at National Grid Reference 265284, 201431. The nearest settlement is Felindre, which is approximately 2 km to the north of the Survey Site, with Swansea approximately 5 km to the south.

2.3 The Survey Site is largely agriculturally improved pasture with several areas of marshy grassland, particularly in the north, south and north-western extents of the Survey Site. The fields are bounded by fences, running along the line of defunct hedgerows, and often accompanied by ditches. There is a block of broadleaved woodland on the eastern boundary of the Survey Site and areas around the marshy grassland to the west of the Survey Site, and around Felindre Gas Compressor Station and the two National Grid 400 kV electrical substations that lie at the south-west end of the Survey Site. The habitats in the surrounding landscape are similar to those within the Survey Site boundary – a mixture of improved and marshy grassland interspersed with occasional patches of woodland.

Description of Project

2.4 APL is promoting a new Power Generation Plant with associated Gas and Electricity Connections within Abergelli Farm. The Power Generation Plant would operate as a Simple Cycle Gas Turbine (SCGT) peaking plant and would be designed to provide an electrical capacity of up to 299 Megawatts (MW). It would be fuelled by natural gas, supplied by a new underground gas pipeline connecting the Power Generation Plant to the existing National Grid Gas (NGG) National Transmission System (NTS). It would also connect to the National Grid Electrical Transmission System (NETS) via underground cable or overhead lines.

2.5 BSG Ecology has been appointed as the ecological consultant to undertake ecology surveys, including a desk study and Extended Phase 1 Habitat Survey as well as a range of Phase 2 surveys, including a NVC survey. These baseline surveys will be included in an appendix to an ecology chapter of an Environmental Statement, which is intended for submission, as an integral part of the application for Development Consent.

Aims of Study

2.6 The aims of this study are as follows:

- Identify habitats on the Survey Site that are potentially sensitive or important, either because of their ecological designation or the plant community that is present; and
- In order to fully describe such habitats, undertake a National Vegetation Classification (NVC) survey to classify those plant communities present in the identified areas.

3 Methods

Desk Study

3.1 As part of the Preliminary Ecological Appraisal (PEA) for the Survey Site[2], a request was made to the South East Wales Biodiversity Records Centre (SEWBReC) and Swansea Council for information on designated sites and protected or otherwise notable species on and around the Survey Site.

3.2 Of relevance to this report was the data provided by Swansea Council on locally-designated SINCs and the botanical data provided by SEWBReC from within a 2km radius of the Survey Site boundary.

3.3 The information collected during the PEA was used to identify those areas of the Survey Site that required a detailed botanical survey.

3.4 These areas were selected for more detailed botanical survey on the basis that either they were identified as NERC Act Section 42 habitats of principal importance for biodiversity (see Appendix 2), and / or they lie within a SINC boundary for which habitats are a qualifying feature, and/or they are identified on the Ancient Woodland Inventory for Wales.

Field Survey

3.5 Each parcel of land included in the survey was initially walked by the surveyor to map the broad community types with the aid of aerial photographs. Quadrats (measuring 2 m x 2 m for grassland and 50 m x 50 m for woodland canopy (with multiple 4 m x 4 m quadrats for field layer and ground flora as dictated by the complexity of the woodland stands) were then marked out in blocks of vegetation that were considered representative of each community type. In the case of narrow linear habitats (two over-mature hedge banks and a narrow strip of woodland) it was very difficult to identify quadrats so whole lengths were surveyed and species' cover values were recorded accordingly.

3.6 The number of quadrats employed in each type or area of vegetation was related to the level of floristic variability present. For uniform areas of vegetation, one or several quadrats were employed. For vegetation exhibiting more variability, larger numbers of quadrats (up to six in this survey) were employed. The number of quadrats utilized for each vegetation type reflected the surveyors' judgement of the number required to sufficiently capture the floristic variation present. In addition, the identification of plant communities is a two stage process with broad communities identified in the field, and more definitive identifications of community and sub-community occurring later, after data analysis. Therefore the numbers of quadrats associated with the final plant community categories is variable. All plant species present within quadrats were recorded, along with estimates of their cover values. Cover values were recorded using the Domin scale of Rodwell *et al*. (1991) (see Appendix 3). The lists of species generated were evaluated against the keys and community accounts in the relevant British Plant Community Volume[3] to establish the closest fit to a National Vegetation Classification (NVC) community.

Survey Limitations

3.7 Access to parts of sites G2 and G3, as shown on Figure 1, was limited by impenetrable vegetation. This limited the number of quadrats that could be employed in these areas. It is possible that the data obtained in these areas may not be representative, particularly with respect to identifying the presence or absence of rare or notable species. One or more quadrats were placed in the more open parts of areas G2 and G3, but quadrat data was not collected from the dense scrub. The dense scrub was assigned to an NVC category by the surveyor in the field, based on the surveyor's judgement and experience. Because the surveyor was an experienced botanist with

[2] BSG Ecology (2014) Abergelli Power Project: Preliminary Ecological Appraisal.

[3] Rodwell, J. S. (Ed.) (1991). British Plant Communities. Volume 1 Woodlands and Scrub. CUP. Rodwell,J.S. (Ed.) (1991) British Plant Communities. Volume 2 Mires and Heaths. CUP. Rodwell,J.S. (Ed.) (1992) British Plant Communities. Volume 3 Grasslands and Montaine Communities. CUP.

considerable experience of NVC surveys, this approach to the survey of areas G2 and G3 is not considered to have affected the aims and value of the survey. The general character of the vegetation and the typical/abundant species in these areas were determined with a high level of confidence and any limitations are not considered to be significant.

3.8 Because of the very narrow and limited extent of the cover of vegetation at WL9, WL11, and a part of WL13, the survey was conducted using the whole compartment as the quadrat. In places there is a limited canopy but the dominant species were clear and communities have been assigned with a reasonably high level of confidence. The assigned communities are consistent with adjacent patches of woodland.

4 Results

Desk Study

4.1 SEWBReC did not provide any records of notable botanical species on the Survey Site.

4.2 The map of SINCs provided by Swansea Council revealed that three SINCs lie within the Survey Site boundary. These are Rhyd-Y-Pandy Valley Grasslands SINC, Waun Garn Wen SINC and Llety Morfil SINC. Brief descriptions of the habitats present in each SINC are provided below and summarised from citations provided by Swansea Council:

- **Rhyd-Y-Pandy Valley and Grasslands**: Wet woodland and woodland with assemblage of ancient woodland indicator species, scrub, purple moor grass *Molinia caerulea* and rush pasture, lowland meadow, neutral grassland, scrub, reed bed and water course habitats;
- **Waun Garn Wen**: Purple moor grass and rush pasture, wet woodland, scrub and watercourse habitats; and
- **Llety Morfil**: Wet and ancient semi-natural woodland, purple moor grass and rush pasture, and scrub habitats.

4.3 Table 1 below lists the areas that were identified as requiring NVC survey and the reason for their selection. Those labelled 'G' are largely grassland or mire habitats; those labelled 'WL' are largely woodland habitats.

Table 1: NVC Survey Areas.

Survey Area	Reason for inclusion in the NVC Survey
G1	Potential Section 42 NERC Act (S42) habitat and part of Waun Garn Wen SINC
G2	Potential S42 habitat and part of Llety Morfil SINC
G3	Potential S42 habitat and part of Llety Morfil SINC
G4	Potential S42 habitat
G5	Part of Rhyd-y-Pandy SINC
G6	Potential S42 habitat
WL1	Potential S42 habitat and part of Llety Morfil SINC and Ancient Woodland
WL2	Potential S42 habitat and part of Llety Morfil SINC and Ancient Woodland
WL3	Potential S42 habitat and part of Llety Morfil SINC and Ancient Woodland
WL4	Potential S42 habitat and part of Waun Garn Wen SINC and Ancient Woodland
WL5	Potential S42 habitat and part of Llety Morfil SINC and Ancient Woodland
WL6	Potential Section 42 NERC Act (S42) habitat and part of Llety Morfil SINC and Ancient Woodland
WL7	Potential S42 habitat and part of Llety Morfil SINC and Ancient Woodland
WL8	Potential S42 habitat and part of Llety Morfil SINC and Ancient Woodland
WL9	Potential S42 habitat and part of Llety Morfil SINC and Ancient Woodland
WL10	Potential S42 habitat and part of Llety Morfil SINC and Ancient Woodland
WL11	Potential S42 habitat and part of Llety Morfil SINC and Ancient Woodland
WL12	Potential S42 habitat and part of Llety Morfil SINC and Ancient Woodland
WL13	Potential S42 habitat and part of Llety Morfil SINC and Ancient Woodland
WL14	Potential S42 habitat and part of Llety Morfil SINC and Ancient Woodland
WL15	Potential S42 habitat and part of Llety Morfil SINC
WL16	Potential S42 habitat and part of Llety Morfil SINC and Ancient Woodland
WL17	Potential S42 habitat and part of Llety Morfil SINC and Ancient Woodland

Field Survey

4.4 Figures 1 and 2 illustrate the areas that were surveyed and the quadrat sample points.

4.5 The surveys were carried out on 11th June 2014 by Anna Gundrey MCIEEM (woodland), 23rd and 25th June 2014 by Vilas Anthwal MCIEEM (woodland) and 30th June and 1st July 2014 by Thomas Flynn MCIEEM (grasslands and mires). The complex of habitats around the gas compressor station was visited again on 12 September 2014 to confirm the boundaries of some habitats; and on 14 November 2014 Niall Lusby rechecked the woodland canopy composition in survey area WL1 (see Figure 2).

4.6 Table 2 below summarises the NVC communities present in each survey area. This is followed by a more detailed description of each of the communities. The full results, consisting of species lists per quadrat are provided as separate Excel spreadsheets as they are too large for inclusion in the report. The quadrats can be cross-referenced with Figures 1 and 2.

Table 2: NVC Results Summary

Survey Area	NVC	Notes
G1	M15b, M23a, M25a	Purple moor-grass dominated to the north, wet heath to south with patches of rush pasture around margins.
G2	M23b/W1 mosaic	Strip of rush pasture with heavy scrub and tree encroachment forming mosaic. The degree of scrubby cover is variable, increasing to the south / west.
G3	M23b/W1 mosaic	Patch of rush pasture within woodland, with heavy scrub encroachment.
G4	MG6a, MG10a, M23a, M25a,	Patchwork of rush pasture, purple-moor grass mire, wet grassland and more agriculturally improved areas with encroaching willow scrub.
G5	MG6, MG10a, M23a, M23b, M25c	Wet fields ranging from agriculturally semi-improved through rush pasture to purple-moor grass mire at the southern tip of the survey area. The rush pasture at the east of this area was much mown but the unmown parts were relatively species-rich. Based on this, a cautious assessment of the M23 community as M23a has been made.
G6	MG10a	Intensively managed (mown and possibly harrowed) rush pasture.
WL1	W10	Broad-leaved woodland sparse cover of trees and grassy field layer.
WL2	W10	Broad-leaved woodland with dense bramble *Rubus fruticosus agg* understorey.
WL3	W10	Broad-leaved woodland with dense bramble understorey.
WL4	W6e	Wet woodland with Himalayan balsam *Impatiens glandulifera* dominating the ground flora.
WL5	W6e	Open canopy of wet woodland at base of small slope.
WL6	W10	Strip of pedunculate oak *Quercus robur* dominated woodland on the slope. Patchy canopy of tall mature oak.
WL7	W6e	Wet scrubby wood with dense closed canopy occasionally overtopped by oak and alder *Alnus glutinosa* .
WL8	W10	Small mature stand of oak with sparse understorey and thick field layer.
WL9	W10	Mature double hedge bank dominated by oak, with bramble.
WL10	W10	Mature oak with sparse open understorey and some newly planted hawthorn *Crataegus monogyna* and field maple *Acer campestre*.
WL11	W10	Mature hedge bank dominated by oak, with bramble.
WL12	W10	Stand of oak and silver birch *Betula pendula* with a fairly open canopy. Dense field layer.
WL13	W10	Narrow woodland strip. Dominated by oak, with bramble.
WL14	W10	Tall mature stand of oak along boundary. Dense understorey and sparse patchy ground flora.
WL15	W10	Tall stand of scrub wood on a slope with some more recently planted guelder rose

		Viburnum opulus.
WL16	W7/W10 mosaic	Open patchy regrowth of scrub with occasional mature trees. Very open with dominant rush pasture being superseded by willow and gorse scrub.
WL17	W7	Two stands of dense low scrub woodland dominated by birch, alder and willow.

Vegetation Community Descriptions

MG6a *Lolium perenne – Cynosurus cristatus* grassland, typical Sub-Community

4.7 This is the major permanent pasture type on moist free draining neutral soils in lowland Britain. It is generally species-poor and grass-dominated. Typical species include perennial rye-grass *Lolium perenne*, crested dog's-tail *Cynosurus cristatus*, red fescue *Festuca rubra* and common bent *Agrostis capillaris*. Broad-leaved plants are generally sparse and consist of common and widespread species, such as common mouse-ear *Cerastium fontanum*, ribwort plantain *Plantago lanceolata*, white clover *Trifolium repens* and creeping buttercup *Ranunculus repens*.

4.8 A large proportion of the Survey Site is MG6a grassland which, because of its ubiquity, was not included in the NVC survey area. However, some fields that meet this classification are included within the survey area because they lie within a SINC boundary. These are in G4 and G5. The MG6a grassland within G4 is a typical community with perennial rye-grass, crested dog's-tail and Yorkshire fog *Holcus lanatus* being the main grasses; and broad-leaved species including white clover, daisy *Bellis perennis* and ribwort plantain.

4.9 The MG6a grassland at G5 includes more moisture-tolerant species such as marsh thistle *Cirsium palustre*, marsh bedstraw *Galium palustre* and sharp-flowered rush *Juncus acutiflorus*, as well as the more typical perennial rye-grass and white clover. Of particular note was whorled caraway *Carum verticillatum,* a species with very local distribution (confined to the extreme west of Britain), which is more usually found in M23/M25 mire habitats (see below).

MG10a *Holcus lanatus – Juncus effusus* rush pasture, typical sub-community

4.10 This is a neutral grassland community with prominent tussocks of soft rush *Juncus effusus* in and amongst species-poor shorter grassland. Broad-leaved species are generally few in number, but creeping and meadow buttercup *Ranunculus acris* can be abundant along with common species such as white clover, common sorrel *Rumex acetosa*, and cuckoo flower *Cardamine pratensis*.

4.11 This community is found in G4, G5 and G6. The MG10a grassland at G5 is in a close association with MG6a (above). One field has a central wetter area of MG10a grassland within a larger area of MG6a, whilst another is a continuum between the two communities. It has frequent perennial rye-grass and cock's-foot *Dactylis glomerata* indicative of MG6a, but also abundant soft rush and Yorkshire fog. A number of plants of whorled caraway (see paragraph 3.9 above) were also noted.

4.12 The MG10a grassland at G4 also forms a continuum from adjacent slightly drier MG6a habitats. It has abundant soft rush and Yorkshire fog, with smaller proportions of creeping buttercup, fleabane *Pulicaria dysenterica* and selfheal *Prunella vulgaris*.

4.13 The grassland in G6 is heavily disturbed having apparently been mown, harrowed and sprayed to remove the rushes. However, the constant species of MG10a such as soft rush, Yorkshire fog, creeping bent *Agrostis stolonifera* and creeping buttercup are still in evidence.

M15b *Scirpus cespitosus – Erica tetralix* wet heath, typical sub-community

4.14 This is a community of moist acid peats and peaty soils in the western parts of Britain. It is generally characterized by a mixture of varying quantities of purple moor-grass, deer grass *Trichophorum cespitosum (Scirpus cespitosus*), cross-leaved heath *Erica tetralix* and heather *Calluna vulgaris*.

4.15 A large block of the *M15b typical sub-community* is present on G1. Purple moor grass and cross-leaved heath are both abundant here, with frequent deer grass and heather. Other species include common hair grass *Eriophorum angustifolium*, small amounts of hare's-tail cotton grass *Eriophorum vaginatum*, heath milkwort *Polygala serpyllifolia* and marsh lousewort *Pedicularis palustris*.

M23 *Juncus effusus/acutiflorus - Galium palustre* rush-pasture and two sub-communities (M23a *Juncus acutiflorus* sub-community; and M23b *Juncus effusus sub-community*)

4.16 This community is defined by the presence of an abundance of soft rush and/or sharp-flowered rush amongst mesophytic herbs widely occurring in moister agricultural grasslands. It is not a species-rich community, but a diverse range of species can occur amongst the dominant rushes.

4.17 In the habitats present on site, there is mostly a similar proportion of both rushes present, but where soft rush is predominant, and purple moor-grass and whorled caraway are absent, the *Juncus effusus sub-community M23b* has been assigned. This sub-community represents a transition from the drier MG10 rush pasture community described above. Commonly occurring species in this sub-community include Yorkshire-fog, velvet bent *Agrostis canina*, tufted hair grass *Deschampsia cespitosa*, creeping buttercup, marsh bedstraw and marsh thistle. Where sharp-flowered rush is dominant or abundant, or purple moor-grass is abundant, the *Juncus acutiflorus* sub-community M23a has been assigned.

4.18 The M23 community is present on G1 – G5. On G1 there is an area of M23a at the southern tip of the surveyed area. It includes typical M23 species such as velvet bent, soft and sharp flowered rushes, marsh bedstraw and Yorkshire fog, as well species more typical of the M15b wet heath to which it lies adjacent – purple moor grass, tormentil *Potentilla erecta* and heath rush *Juncus squarrosus*. This is a fairly grassy, probably relatively dry example of this community. The local abundance of purple moor-grass suggests affinity with the M23a sub-community, and this vegetation has therefore been mapped as M23a.

4.19 On G2 the M23b sub-community is present within (and in mosaic with) extensive areas of scrub. Much of this area was inaccessible because of the dense scrub cover. The M23b areas surveyed has abundant soft rush cover, with creeping bent, wild angelica *Angelica sylvestris*, greater bird's-foot trefoil *Lotus pedunculatus* and ragged robin *Lychnis flos-cuculi*. Species more typical of scrubby margins were also present in some quantity, including bramble, rosebay willowherb *Chamerion angustifolium*, greater willowherb *Epilobium hirsutum* and hemp agrimony *Eupatorium cannabinum*.

4.20 G3 is similar to G2, consisting of a wetter area surrounded by, and in mosaic with, an extensive area of scrub. The M23b community here is overwhelmingly dominated by soft rush, with occasional wild angelica and bulrush *Typha latifolia*.

4.21 The M23 community on G4 lies along the gallops and is present in association with MG6a, MG10a, and M25 communities. Soft and sharp-flowered rush are both present in some quantity, along with marsh bedstraw, greater bird's-foot trefoil, creeping buttercup, white clover and lesser spearwort *Ranunculus flammula*. Because of the abundance of sharp-flowered rush, the M23 community has been identified as M23a.

4.22 The two fields on the northern and eastern edges of G5 are classified as M23a and M23b. The field to the north has an abundance of soft rush with occasional sharp-flowered rush and so is classified as M23b. It also has abundant creeping bent and frequent marsh bedstraw and greater bird's-foot trefoil and small quantities of wild angelica, Yorkshire fog and tormentil. Purple moor grass is occasionally present. The eastern field has an abundance of both soft and sharp-flowered rush and Yorkshire fog and greater bird's-foot trefoil are both frequent and there are smaller quantities of velvet bent, sweet vernal grass *Anthoxanthum odoratum*, marsh bedstraw and creeping buttercup. While the field could probably be assigned to the wider M23 community, it is worth noting that this area was mown prior to the survey. However, the unmown parts were relatively species-rich and a cautious assessment of the M23 community as M23a has been made.

M25a *Molinea caerulea – Potentilla erecta* mire, *Erica tetralix* sub-community

4.23 This community is characterised by the overwhelming dominance of purple moor grass, which distinguishes it from the M23 community described above. Other species are limited in number and abundance. Soft rush and sharp-flowered rush can be frequent, but tormentil is the only broad-leaved species that occurs regularly.

4.24 A large block of the *Erica tetralix* M25a sub-community is present on G1 and a smaller patch of this community is present on G4. On G1 purple moor grass is dominant, with small amounts of tormentil, cross-leaved heath, soft and sharp-flowered rush, bilberry *Vaccinium myrtillus*, devil's-bit scabious *Succisa pratensis* and deer grass.

4.25 The patch of M25a on G4 is overwhelmingly dominated by purple moor-grass, with no other species recorded.

M25c *Molinea caerulea* – *Potentilla erecta* mire, *Angelica sylvestris* sub-community

4.26 The patch of M25 on G5 lies adjacent to a stream, and has a lower dominance of purple moor-grass, although it is still the most abundant species, and forms distinct tussocks. Other species present include soft rush, marsh bedstraw, greater bird's-foot trefoil and wild angelica. The abundance of wild angelica suggests affinity with the M25c *Angelica sylvestris* sub-community, and this vegetation has therefore been classified as this.

W1 *Salix cinerea – Galium palustre* woodland

4.27 This community has a canopy dominated by grey willow *Salix cinerea*, with scattered silver birch and alder occasionally present. The field layer is variable but often consists of mosaics of more open areas over undulations in wetter and drier ground. Common species are marsh bedstraw, water mint *Mentha aquatica* and soft rush.

4.28 This community is found in mosaic with M23b (see above) on survey areas G2 and G3. The dominant woody species is grey willow, mixed with hazel *Corylus avellana* and bramble. Other species present include soft rush, hemp agrimony and foxglove *Digitalis purpurea*.

W6e *Alnus glutinosa – Urtica dioica* woodland*, Betula pubescens* sub-community

4.29 This classification brings together a variety of canopies dominated by alder*,* willows *Salix* spp., and silver birch. The field layer is generally species-poor, with nettle *Urtica dioica* being the only constant. The *Betula pubescens* sub-community has a greater dominance of downy birch, with an understorey of bramble and honeysuckle *Lonicera periclymenum* and scattered broad-buckler fern *Dryopteris dilatata* and patchily abundant nettle.

4.30 This sub-community is present at WL4, WL5 and WL7. Here the sparse canopy consist largely of downy birch and grey willow, with rowan *Sorbus aucuparia*, sycamore *Acer pseudoplatanus*, and pedunculate oak also present in small numbers. Bramble is frequent in the understorey. The ground flora is dominated by the invasive species Himalayan balsam, which fills a niche usually occupied by nettle. Nettle also remains frequent, and other species occasionally present include cleavers *Galium aparine*, yellow pimpernel *Lysimachia nemorum*, creeping soft grass *Holcus mollis* and ivy *Hedera helix*.

W7 *Alnus glutinosa – Fraxinus excelsior – Lysimachia nemorum* woodland

4.31 This community tends to have an open and irregular canopy of trees with alder being the only woody constant. The most frequent understorey species are hazel, hawthorn and grey willow; and the ground flora includes creeping buttercup, rough meadow grass *Poa trivialis*, Yorkshire fog and yellow pimpernel.

4.32 The W7 community is found on survey areas WL16 (where it forms a mosaic with rush pasture and W10 woodland) and WL17. On these areas, pedunculate oak and grey willow form the canopy, with lower-growing alder, holly *Ilex aquifolium* and grey willow making up the understorey. Bramble scrub is abundant, and the ground flora is sparse. The ground flora includes ivy, soft rush and marsh bedstraw.

W10 *Quercus robur* – *Pteridium aquilinum – Rubus fruticosus* Woodland

4.33 This is essentially oak woodland, with pedunculate oak being the commonest tree. Birch (usually silver birch, but also downy birch) is also frequently present. Holly, rowan and sometimes beech *Fagus sylvatica* occur, and alder may be present on wetter areas. The understorey generally includes frequent bramble and honeysuckle. The ground flora can include bluebell *Hyacinthoides non-scripta*, creeping soft grass *Holcus* mollis and bracken, and ferns such as male fern *Dryopteris filix-mas* and broad-buckler fern.

4.34 The W10 community is found on survey areas WL1, WL2, WL3, WL6, WL8, WL9, WL10, WL11, WL12, WL13, WL14, WL15 and WL16. In WL9, 11, and 13 the canopy is very narrow, in places only one tree deep. More generally in the W10 areas, pedunculate oak is the dominant canopy tree, with downy birch also frequent. The understorey includes rowan, grey willow and holly, and

also abundant bramble. The ground flora includes frequent ivy, with scattered broad-buckler fern, lady fern *Athyrium filix-femina* and hard fern *Blechnum spicant*. Creeping bent, common bent, bluebell *Hyacinthoides non-scripta*, creeping buttercup and soft rush are amongst other species occasionally present.

4.35 In survey area WL1, the W10 woodland has a relatively sparse and uniform open canopy. Part of WL1 follows a high voltage overhead power line, and presumably tall vegetation is regularly cleared from this area. The canopy here is particularly open and the understorey has a high level of rowan. The field layer in WL1 is dominated by grasses (such as Yorkshire fog and rough meadow-grass *Poa trivialis*), with some woodland species (such as bluebell, and foxglove), and (in places) indicators of damp ground (wavy bitter-cress *Cardamine flexuosa* and creeping buttercup). This field layer shows some similarity with MG10 rush pasture, except for the absence of rushes (*Juncus* sp.); and with MG9 grassland, except for the absence of tufted hair-grass *Deschampsia cespitosa*. The poor fit with plant communities described in the NVC may result from the on-going management in this area. Here, the vegetation is considered to be sparse W10 woodland with a grass-dominated field layer.

Presence of NERC Act Section 42 habitats

4.36 Table 3 summarises the results of the survey by survey area, with reference to the presence or otherwise of NERC Act Section 42 habitats. This has been determined by reference to the document "UK Biodiversity Action Plan Priority Habitat Descriptions"[4] which was used as a reference to draw up the Section 42 list.

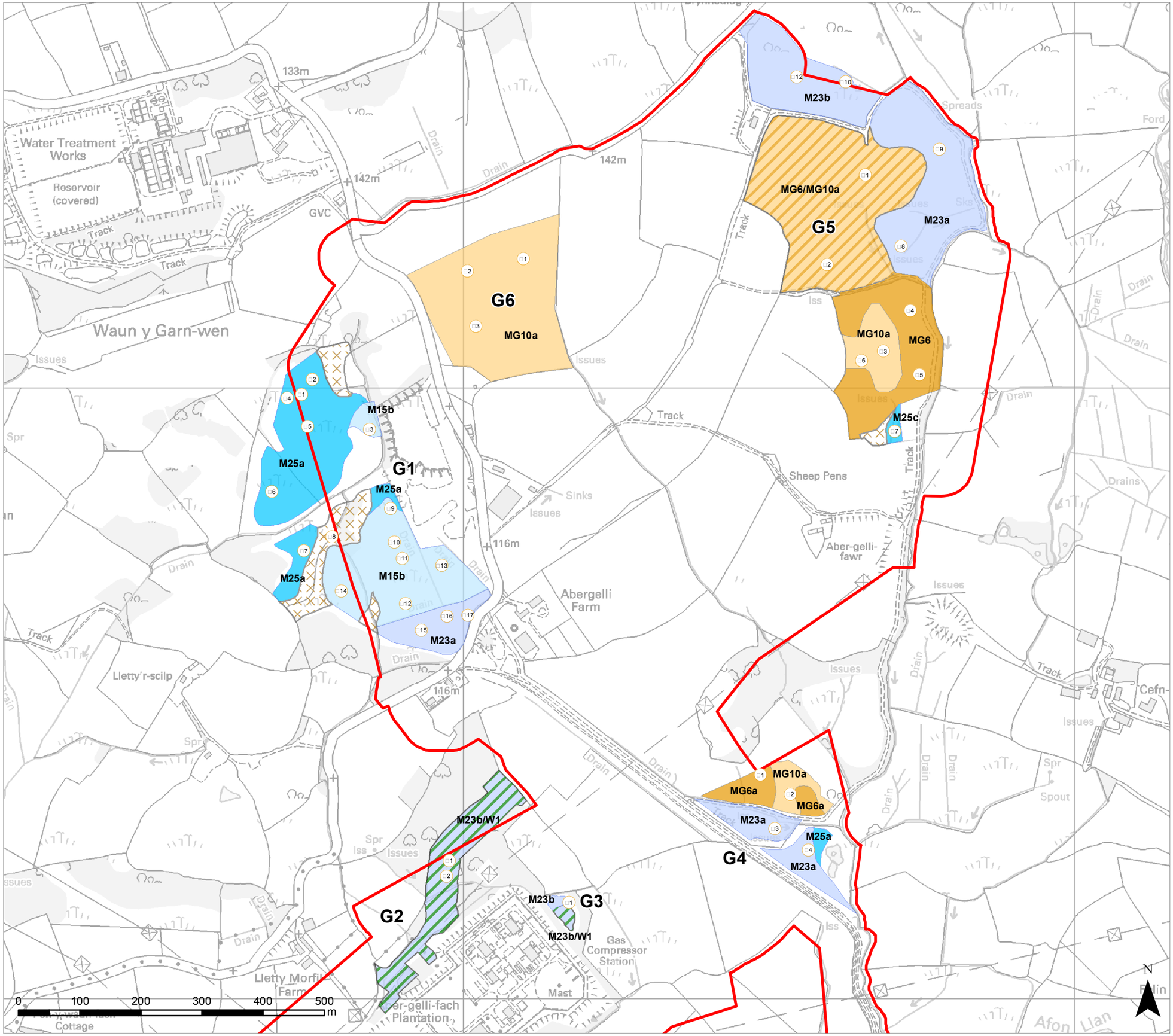
[4] Maddock Ant (Ed), 2008. UK Biodiversity Action Plan Priority Habitat Descriptions. Updated 2011.

Table 3: NERC Act Section 42 Habitats

Survey Area	NVC	Section 42 NERC Act Habitats Present?
G1	M15b, M23a, M25a	Upland heathland
G2	M23b/W1 mosaic	Wet woodland
G3	M23b/W1 mosaic	Wet woodland
G4	MG6a, MG10a, M23a, M25a	Wet woodland
G5	MG6A, MG10a, M23a, M23b, M25a, M25c	Upland flushes, fens and swamps
G6	MG10a	None
WL1	W10	Lowland mixed deciduous woodland
WL2	W10	Lowland mixed deciduous woodland
WL3	W10	Lowland mixed deciduous woodland
WL4	W6e	Wet woodland
WL5	W6e	Wet woodland
WL6	W10	Lowland mixed deciduous woodland
WL7	W6e	Wet woodland
WL8	W10	Lowland mixed deciduous woodland
WL9	W10	Hedgerow
WL10	W10	Lowland mixed deciduous woodland
WL11	W10	Hedgerow
WL12	W10	Lowland mixed deciduous woodland
WL13	W10	Lowland mixed deciduous woodland
WL14	W10	Lowland mixed deciduous woodland
WL15	W10	Lowland mixed deciduous woodland
WL16	W7/W10 mosaic	Wet woodland / lowland mixed deciduous woodland
WL17	W7	Wet woodland

Appendix 1 – Figures

(Overleaf)



LEGEND

- Survey Site boundary
- 1 Grassland survey quadrats
- G1 NVC compartment reference

Grassland survey NVC communities

- M15
- M23
- M23b/W1 mosaic
- M25
- MG6
- MG6/MG10 mosaic
- MG10
- Bracken

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PROJECT TITLE
ABERGELLI POWER PLANT

DRAWING TITLE
Figure 1: NVC survey results (grassland)

DATE: 02.10.2014 CHECKED: AG SCALE: 1:6,000
DRAWN: COH APPROVED: JG STATUS: FINAL

Sources: BSG Ecology survey data, Ordnance Survey, site boundary supplied by Watt Power

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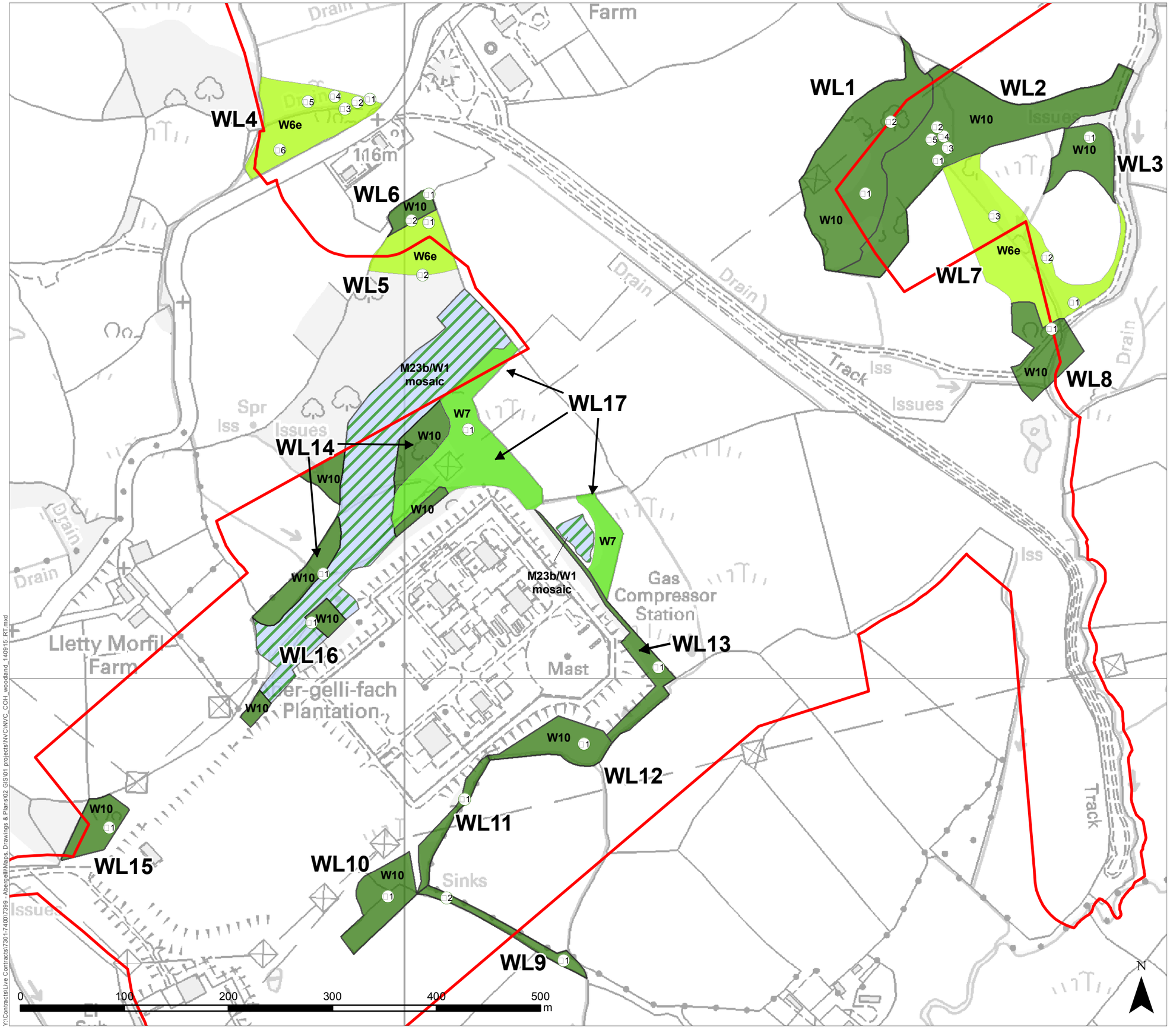

LEGEND

- Survey Site boundary
- 1 Woodland survey quadrats
- WL1 NVC compartment reference

Woodland survey NVC communities

- M23b/W1 mosaic
- W6
- W7
- W10

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PROJECT TITLE
ABERGELLI POWER PLANT

DRAWING TITLE
Figure 2: NVC survey results (woodland)

DATE: 02.10.2014 CHECKED: NL SCALE: 1:3,500
DRAWN: COH APPROVED: JG STATUS: FINAL

Sources: BSG Ecology survey data, Ordnance Survey, site boundary supplied by Watt Power

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Appendix 2 - Legislation

Natural Environment and Rural Communities (NERC) Act 2006

Section 40 of the Natural Environment and Rural Community Act (NERC) 2006 sets out the duty which public authorities have to conserve biodiversity. Section 40 States that: “every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity”. The term Public Authority includes local authorities and local planning authorities.

Paragraph 40(3) goes on to state that “conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat”.

Paragraph 42(1) states that “the Secretary of State must, as respects Wales, publish a list of the living organisms and types of habitat which in the Secretary of State’s opinion are of principal importance for the purpose of conserving biodiversity”. This replaces a similar reference to the list that was found in Section 74 of the Countryside and Rights of Way Act 2000 (the CRoW Act).

Appendix 3 – Results

A quantitative measure of abundance of every species was recorded using the Domin scale (Rodwell 1991, 1992) as shown below.

Domin Scale

Cover	Domin Score
91 – 100%	10
76 – 90%	9
51 -75%	8
34 -50%	7
26 -33%	6
11 -24%	5
4 – 10%	4
<4% (with many individuals)	3
<4% (with several individuals)	2
<4% (with few individuals)	1

Appendix 8.3

Invertebrate Survey Report

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Abergelli Power Project

Invertebrate Survey Report

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Client	Stag Energy
Job	Abergelli Power Project
Report title	Invertebrate Survey Report
Draft version/final	FINAL
File reference	7399_R_Final Invert Survey Report_APPR (3)_20112014.docx

	Name	**Position**	**Date**
Originated	Matt Hobbs	Principal Ecologist	04 August 2014
Reviewed	Jim Fairclough	Principal Ecologist	14 August 2014
Approved for issue to client	Jim Fairclough	Principal Ecologist	14 August 2014
Issued to client	Jim Fairclough	Principal Ecologist	15 August 2014
Report update	Matt Hobbs	Principal Ecologist	23 October 2014
Final issue to client	Matt Hobbs	Principal Ecologist	20 November 2014

Contents

1 Summary

1.1 Abergelli Power Limited (APL) is promoting a new Power Generation Plant with its associated Gas and Electricity Connections (the 'Project') on agricultural land within Abergelli Farm, north of Swansea in the City and County of Swansea (approximately at National Grid Reference 265284, 201431).

1.2 As part of the Preliminary Ecological Appraisal (PEA) (BSG Ecology, 2014a) for the Project Site (hereafter referred to as the 'Survey Site'), a request was made to the South East Wales Biodiversity Records Centre (SEWBReC) and Swansea Council for information on designated sites and protected or otherwise notable species within 2 km of the 'Survey Site'. The desk study provided 40 records of four Lepidoptera[1] 'species of principal importance for nature conservation' as referred to in Section 42 of the NERC Act 2006 (S42), within 2 km of the Survey Site, including 29 records of marsh fritillary butterfly *Euphydryas aurinia*. In addition, the desk study revealed that three Sites of Importance for Nature Conservation (SINC) lie within the Survey Site boundary and contain some potentially valuable habitats for invertebrates, with S42 invertebrate species recorded at two of them. The PEA confirmed the presence of several potentially valuable habitats for invertebrates, particularly woodland, marshy grassland, watercourses and ponds.

1.3 APL commissioned BSG Ecology to undertake invertebrate surveys of suitable habitats within the Survey Site boundary. Surveys were carried out during June-September 2014 for moths, marsh fritillary (adult and larval stages), terrestrial Coleoptera[2], and aquatic macroinvertebrates[3] (in ponds and watercourses). The purpose of the surveys was to inform and support an application for Development Consent for the Project.

1.4 A total of 384 species were recorded from the Survey Site. One species is Red Data Book (insufficiently known[4]), two are nationally scarce and fourteen are S42 species. The results of each survey is summarised as follows:

- Terrestrial Coleoptera survey: 150 species were recorded during two surveys (in July and September). These included 112 species of Coleoptera, 20 of which are saproxylic[5] species (see 3.6) although none are indicative of continuous saproxylic habitat, which may be taken as an indicator of the quality of ancient woodland habitat;
- Marsh fritillary survey: This species was not recorded during surveys for adult or larval stages, although seven butterfly and two day-flying moth species were observed. These included one S42 species;
- Moth survey: 118 species of moth were recorded during two night-time surveys. Three locally notable species (see 4.36) were recorded and 13 S42 species;
- Pond survey: 48 species of aquatic macroinvertebrates were recorded during the survey of Ponds 11 and 16, with the highest diversity of species recorded at Pond 11. No scarce or threatened aquatic invertebrates were identified within the samples; and
- Watercourse survey: all of the watercourses sampled were of very good quality. 59 species were recorded with no scarce or threatened aquatic invertebrates identified within the samples.

[1] Butterflies and moths.
[2] Beetles.
[3] An invertebrate that is large enough to be seen without the use of a microscope.
[4] The category insufficiently known refers to species for which insufficient data exists to assign that species to another RDB category, e.g. rare or vulnerable.
[5] Beetles which live in or on dead wood or involved in or dependent on wood decay

2 Introduction

2.1 Abergelli Power Limited commissioned BSG Ecology to undertake an invertebrate survey in 2014 to inform and support an application for Development Consent for the Project described below.

Site Description

2.2 The Survey Site consists of approximately 150 ha of pastoral farmland primarily grazed by horses. The extent of the Survey Site is shown in Figure 1 (Figures are located in Appendix 1) and is centred at National Grid Reference 265284, 201431. The nearest settlement is Felindre, which is located approximately 2 km to the north of the Survey Site, with Swansea approximately 5 km to the south.

2.3 The Survey Site is largely agriculturally improved pasture with several areas of marshy grassland, particularly in the north, south and north-western extents of the Survey Site. The fields are bounded by fences, running along the line of defunct hedgerows, and often accompanied by ditches. There is a block of broadleaved woodland on the eastern boundary of the Survey Site and other areas of woodland around the marshy grassland to the west of the Survey Site, and around Felindre Gas Compressor Station and the two National Grid 400 kV electrical substations that lie at the south-west end of the Survey Site. The habitats in the surrounding landscape are similar to those within the Survey Site boundary comprising a mixture of improved and marshy grassland interspersed with occasional patches of woodland.

Description of Project

2.4 APL is promoting a new Power Generation Plant with associated Gas and Electricity Connections within Abergelli Farm. The Power Generation Plant would operate as a Simple Cycle Gas Turbine (SCGT) peaking plant and would be designed to provide an electrical capacity of up to 299 Megawatts (MW). It would be fuelled by natural gas, supplied by a new underground gas pipeline connecting the Power Generation Plant to the existing National Grid Gas (NGG) National Transmission System (NTS). It would also connect to the National Grid Electrical Transmission System (NETS) via underground cable or overhead lines.

2.5 BSG Ecology has been appointed as the ecological consultant to undertake ecology surveys, including a PEA as well as a range of Phase 2 surveys, including invertebrate surveys. These baseline surveys will be included in an appendix to an ecology chapter of an Environmental Statement, which is intended for submission, in support of the application for Development Consent.

Aims of Study

2.6 The aims of the invertebrate survey were to indicate the quality of habitats present on the Survey Site that are potentially important for invertebrates; and to identify whether any notable species (e.g. rare, scarce or nationally threatened species of invertebrate, including S42 species), are present and if present, to indicate their likely distribution across the Survey Site.

3 Methods

Desk Study

3.1 Existing ecological information for the Survey Site and its surrounding area was requested from the South East Wales Biodiversity Records Centre (SEWBReC). Information on protected[6] or notable species (particularly those identified as S42 species and/or of local conservation importance or LBAP[7] species), including invertebrates, was requested covering the Survey Site and land up to 2 km from the Survey Site boundary. In addition, on-line resources including the Multi Agency Geographic Information for the Countryside (MAGIC, www.magic.gov.uk) website[8] and aerial photography of the area were also reviewed.

Habitat Potential Assessment

3.2 During the Extended Phase 1 Habitat Survey of the Survey Site, carried out to inform the PEA, which was undertaken in three phases (in February, April and July 2014), consideration was given to the suitability of the Survey Site to support important invertebrate communities as well as protected and/or notable invertebrate species. Full details of the PEA are provided in the PEA report (BSG Ecology, 2014).

3.3 As part of this assessment, notes were made of the habitats present, which included observations of features that might limit invertebrate interest as well as those which might be of particular value for invertebrates. In particular, emphasis was placed on the following features (where present):

- Mature open grown trees and veteran trees: especially those with large volumes of standing dead wood;
- Woodland edge and scrub: especially where there is a diverse vegetation structure and species composition;
- Species-rich grassland: especially that in association with scrub, with a high proportion of plants providing nectar and pollen, and with a varied vegetation structure;
- Early successional habitat: (e.g. cliff faces, quarries, eroded banks, periodically disturbed bare or sparsely vegetated ground) especially on free-draining ground where there is a high proportion of exposed bare earth; and
- Wetland: including watercourses (e.g. streams, ditches, flushes and seepages), standing water or waterbodies (e.g. ponds, lakes and swamp) and associated terrestrial habitat (e.g. wet heath and marshy grassland).

3.4 A number of habitats were identified during the survey with the potential to support important invertebrate communities (which are described further in the results section). Subsequent invertebrate surveys were designed, to target key indicator groups of invertebrates within the survey area that may be associated with woodland and marshy grassland in particular, namely Coleoptera (terrestrial beetles) and Lepidoptera (marsh fritillary butterfly and moths). In addition, two ponds (see Figure 1: Pond 11 and Pond 16) and three watercourses (see Figure 2) within the Survey Site were identified as of potential value to aquatic invertebrates.

3.5 The results of these targeted surveys can be used to assess the main groups of invertebrate present within the Survey Site, and to provide an indication of the relative species diversity within the targeted groups.

Targeted Survey for Coleoptera

3.6 Features within the Survey Site that provided the most suitable habitat for this taxonomic order were selected for targeted survey. Surveys for beetles focussed on woodland and woodland edge

[6] Wildlife and Countryside Act 1981 Schedules 1, 5 & 8; Conservation of Habitats and Species Regulations 2010; Protection of Badgers Act.
[7] Those listed under Local Biodiversity Action Plans (LBAP) for Swansea.
[8] http://www.magic.gov.uk/

habitats within the Survey Site as a number of the woodland areas are listed on the Ancient Woodland Inventory for Wales and one of the aims of the survey was to identify whether the beetle fauna present within the Survey Site is indicative of high quality ancient woodland. The assessment of whether woodland is ancient and/or is of high quality to invertebrates can be indicated by surveying the saproxylic beetle fauna. The presence of a particular species or a high diversity of such species can indicate the continuity of woodland on a site. This has been used in the formulation of an Index of Ecological Continuity (Alexander, 2004) based on the scores assigned to 180 species of Coleoptera taken as 'indicative of continuity of saproxylic habitats' from a more general list of 700 saproxylic species. Across the four main areas of woodland on the Survey Site (Woodlands 1-4; see Figure 1) the following sampling methods were employed: pitfall traps, sweep netting, beating, hand searching and sieving. These methods are described below. Whilst Coleoptera formed the focus of the survey, incidental records of other invertebrate taxa were also taken. Surveys were conducted on 10 July 2014 by Don Stenhouse FRES and on 18 September 2014 by Jim Fairclough MCIEEM, both suitably qualified entomologists.

Pitfall Traps

3.7 Two or three pitfall traps were set out in each of the four woodlands within the Survey Site (shown on Figure 1). The number of traps in each woodland was dependent on the availability of suitable locations for trapping and the size and quality of the habitat. Pitfall trapping involved the use of circular plant pot trays (24 cm diameter x 5 cm depth) that were sunk into a circular hole that had been excavated using a spade. The trays were installed such that the tray rims were flush with the surrounding ground level. Preserving fluid, comprising 1 part ethylene glycol (antifreeze) to 3 parts water, was poured into the trays until they were half full. A drop of detergent was added to the fluid to break the surface tension and a layer of mesh (aperture size 2 cm x 1 cm) was balanced over the tray to prevent capture of small mammals, amphibians and reptiles. The traps were operational between 10 and 28 July 2014 as well as between 9 and 18 September 2014. Pitfall trapping is considered to be an effective method for the sampling of ground dwelling beetles, particularly those belonging to the family Carabidae (ground beetles).

Sweep Netting

3.8 Sweep netting involved walking at a steady pace and passing a heavy duty entomologist's sweep net back and forth through scrub and understorey vegetation in a figure of eight motion. This method is particularly suitable for capturing phytophagous (foliage-feeding) families such as Curculionidae (weevils), Chrysomelidae (leaf or flea beetles), Nitidulidae (pollen beetles) and Cantharidae (soldier beetles).

Beating

3.9 Beating is an appropriate technique for extracting beetles from overhanging branches. This method involves placing a beating tray beneath a branch before delivering several sharp blows to the branch and sending any dislodged invertebrates into the beating tray for inspection. This method may uncover a diverse array of beetle families that are similar to those found during the sweeping, and may additionally produce Cerambycids (longhorn beetles) or Elaterids (click beetles), many of which are associated with dead wood habitats.

Hand-searching and Sieving

3.10 Hand searching under logs and bark of dead trees, as well as grass tussocks and pleurocarpous (spreading and branched) mosses is a useful additional technique of extracting invertebrates by hand. In addition, samples of rotten wood, leaf/grass litter or moss were sieved into a white tray to extract additional samples. This technique is particularly appropriate to aid detection of small, often obscure beetles such as Staphylinidae (rove beetles), Anobiidae (wood-boring beetles) and Cryptophagidae (silken fungus beetles).

Weather Conditions

3.11 For the first survey the weather had been warm and settled in the preceding weeks with some rain in the days immediately preceding the survey. On the first survey visit, conducted on 10 July 2014, the weather was dry, sunny and warm (maximum temperature 22°C), with a light wind.

3.12 For the second survey, conditions in the week preceding the survey were dry and warm. On the second survey visit, conducted on 18 September, the weather was overcast but dry with a light wind and a temperature of 19°C.

3.13 The weather during both periods of pitfall trapping was generally warm and dry.

Sample Sorting and Identification

3.14 Whilst some species could be identified in the field, the majority of specimens were stored in 70% methanol solution for subsequent identification, using a stereoscopic microscope with the aid of identification literature. Don Stenhouse carried out identification of all terrestrial invertebrate samples collected from the Survey Site.

Targeted Survey for Marsh Fritillary

Survey for Adult Butterflies

3.15 On 7 and 17 June 2014, Matthew Hobbs MCIEEM, an experienced butterfly surveyor, visited the Survey Site to conduct a walked butterfly transect survey following standard methods described below, with a focus on recording marsh fritillary butterfly in its adult stage.

3.16 A transect route was selected to cover an area of marshy grassland in the north-west of the Survey Site that forms part of the Waun Garn Wen SINC. Marsh fritillary butterfly has apparently not been previously recorded within this SINC, as no desk study records were received and the species is not mentioned in the SINC citation. However, some areas of the marshy grassland habitat comprise the National Vegetation Classification (NVC) habitat type, M25 *Molinia caerulea – Potentilla erecta* mire[9]. This habitat supports a number of devil's bit scabious *Succisa pratensis* plants within the sward. Marsh fritillary larvae will only feed on scabious plants (with devil's bit scabious the most important larval host plant) and this species is the only scabious species present within the Survey Site. As such, this is the only area that has the potential to support a breeding population of marsh fritillary within the Survey Site and is the only area that was surveyed. The area that the transect route covered is shown on Figure 1. The methodology used for the survey adapted the protocol used within the UK Butterfly Monitoring Scheme (UKBMS)[10], as follows:

- Timed counts were made between 10:00 and 16:30 hours, and only carried out in warm, bright and dry weather, with no more than moderate winds;
- A transect route was devised (Figure 1), which was split into sections, each section being of similar length and covering discreet 'field' or habitat types;
- Each section was walked at a slow, steady pace counting all butterflies seen within a fixed distance, 2.5 m either side of the transect line and 5 m ahead;
- Care was taken to maintain a steady pace and avoid waiting at favoured hotspots to improve the count and bias the results;
- Butterfly numbers and percentage of sunshine in each section were recorded using the standard UKBMS proforma. Wind speed was estimated using the Beaufort scale (0 - no wind, 6 - very strong wind); and
- During surveys, species of butterfly other than marsh fritillary and day-flying moths were also recorded.

3.17 During the two surveys on 7 and 17 June, the wind speed was measured as 3 and 2 respectively (light wind) and the average temperature was 16°C and 21°C respectively.

Survey for Larvae

3.18 A second stage of surveys for marsh fritillary, which involved looking for larval webs of this species, was undertaken on 20 August 2014, by Greg Chamberlain MCIEEM, an experienced marsh fritillary surveyor. The survey followed standard methods derived from the UK Butterfly Monitoring

[9] A National Vegetation Classification survey was carried out in 2014 and details are included in the report: BSG Ecology (2014). Abergelli Power Project: National Vegetation Classification Survey Report.
[10] http://www.ukbms.org/Downloads/UKBMS%20G2%20Transect%20field%20guidance%20%20notes.pdf

Scheme (UKBMS)[11]. The survey involved walking 2-5 m strip width transects across the marshy grassland within the Waun Garn Wen SINC which encompassed a similar area to the one used in the surveys for adult marsh fritillary described above. The survey took into account any devil's bit scabious plants that had been recorded in the transect area during other surveys. Following the adult surveys in June, access was no longer available to the northern part of the area surveyed for adults and the larval surveys were restricted to the southern area, where devil's bit scabious had not been recorded. During the June survey no examples of this plant were recorded and no further surveys were scheduled for marsh fritillary larvae.

Targeted Survey for Moths

3.19 Night-time moth surveys were undertaken twice, on 16 June and 14 August 2014. The first survey was conducted by Owain Gabb MCIEEM and Matthew Hobbs MCIEEM, both ecologists competent in moth survey and identification, with the second undertaken by Owain Gabb, with Caitlin McCann assisting. A single 125W Robinson moth trap (using a mercury vapour bulb) and two 40W heath traps (using actinic bulbs) were used during both surveys, with the aim of attracting the greatest number and variety of moths. The traps were positioned on both occasions in habitat areas within the Survey Site that were expected to give the greatest range of species (see Figure 1 for trap locations).

- **Trap M1**: the first heath trap was located in an area of dry heath and rush pasture in the west of the Survey Site;
- **Trap M2**: the Robinson trap was located on a sloping track close to horse-grazed pasture, woodland, scrub, neutral grassland and ruderal vegetation; and
- **Trap M3**: the second heath trap was located on a track bordered with scrub and neutral grassland in horse-grazed pasture between two areas of woodland.

3.20 Weather conditions during the survey on 16 June were good with a temperature range of 13-18ºC, with no rain and little or no wind. On 13 August, conditions were again good with a temperature range of 14-18ºC with a light wind and no rain.

3.21 The lights were switched on approximately 20 minutes before dusk and remained lit until they were switched off after dawn. The Robinson trap was powered via mains electricity (and an extension lead) from a house on site, and the two heath traps by external 12V leisure batteries (and timer switches).

3.22 The Robinson trap was manned for the first few hours of darkness to capture moths drawn to the light but not entering the trap, with the other traps visited periodically. The traps were systematically emptied, and all moths determined to species level the following morning.

3.23 A number of micro-moths were externally determined / verified by Barry Stewart, one of the three authors of The Moths of Glamorgan (Gilmore *et al*., 2014), on the day following each survey.

Targeted Survey of Ponds

3.24 The survey focussed on two of the three ponds present within the Survey Site (Ponds 11 and 16) (for numbering of ponds please see Figure 1 in the great-crested newt survey report (BSG Ecology, 2014b)). A third pond (Pond 17) was not surveyed as it was thought to be suboptimal for aquatic invertebrates due to shading, lack of vegetation and very shallow water levels. The survey was undertaken on 28 July 2014 by Dr Jessica Frame MCIEEM and Rachel Taylor ACIEEM, both skilled freshwater ecologists.

3.25 Benthic macroinvertebrates were collected at the two ponds using standard 3-minute kick sample methodology (Biggs *et al*., 1998) using a 1 mm mesh hand net. One minute of hand searching (of rocks, logs, leaf packs and other submerged debris) was then carried out in search of invertebrates (e.g. caddis fly larvae (Trichoptera), pond skaters (Gerrida) and whirligig beetles (Gyrinida) that might otherwise have been missed during the net sampling.

3.26 Invertebrates were separated from detritus and bed material in the field and preserved immediately in 70% Industrial Methylated Spirit (IMS) for subsequent laboratory analysis.

[11] http://www.ukbms.org/Downloads/UKBMS%20Ng2%20-%20Marsh%20Frit%20Webs%20guidance%20notes.pdf

3.27 A number of water quality parameters, including pH, dissolved oxygen, conductivity and total dissolved solids were also recorded at each pond.

3.28 The weather during the survey was warm (18°), dry, with intermittent sun and a light wind. The location of each of the ponds surveyed is shown in Figure 1.

Targeted Survey of Watercourses

3.29 Surveys of watercourses were carried out on 19 September 2014 by Jim Fairclough and Rachel Taylor, both skilled freshwater ecologists. The survey techniques used at each sampling point are described in detail below.

Sample point selection

3.30 To be effective, biological sampling should ideally use watercourses with a range of habitats that are most likely to yield a diverse invertebrate community sensitive enough to detect changes in biological water quality. Accordingly, sampling locations included reaches of approximately 10 linear metres, typically centred on a shallow fast-moving section of the stream (riffle), across which a sample was collected.

Sample collection

3.31 At each sample point, one minute of hand searching (of rocks, logs, leaf packs and other submerged debris) was carried out in search of invertebrates (e.g. caddis larvae, pond skaters or whirligigs) that might otherwise have been missed during the subsequent kick sampling. Three minutes of kick sampling was then carried out for each sample point. Pond nets were used for sampling and these conformed to Environment Agency standards (1 mm mesh and 0.5 m deep). Care was taken to avoid deep accumulations of soft sediment because this makes sample sorting extremely difficult. Similarly, the netting of large volumes of plant material was avoided.

Sample sorting and identification

3.32 The sample was placed into a sorting tray and all invertebrates were placed in a collection jar for identification in the laboratory. The tray was carefully checked to ensure that no species were missed. Specimens were stored in 70% methanol solution. Any necessary species identification was carried out by a suitably experienced entomologist (Dr Jessica Frame) using a stereoscopic microscope with the aid of identification literature.

Water Quality Assessment

3.33 Assessment of aquatic invertebrate composition and diversity is recognised as an effective way of measuring the water quality and habitat quality of wetland habitat. A common method for the assessment of water quality is the Biological Monitoring Working Party (BMWP) index. This gives a score to freshwater habitat based upon the number of families of invertebrates found in a sample.

3.34 The BMWP works on the basic principle that freshwater pollution levels affect invertebrate families differently. Thus, certain families that are most susceptible to pollution score maximum points. These include many families belonging to the mayflies (Ephemeroptera), stoneflies (Plecoptera) and caddis (Trichoptera). Conversely, those families tolerant of polluted waters score the fewest points, and include families such as the leeches (Hirudinea), worms (Oligochaeta), chironomid midges (Diptera) and the freshwater hog-louse (Isopoda). Accordingly, cleaner watercourses, which have higher water quality, score the highest number of points, whilst polluted watercourses score the lowest. In the mid-1990s, Walley and Hawkes carried out a computer-based revision of the BMWP Scoring System, using data from the 1990 River Quality Survey of England and Wales (Walley and Hawkes, 1996, 1997). This is thought to be a more objective approach to allocating BMWP scores which would lead to a more accurate reflection of the impacts of pollution on invertebrate fauna. For the purposes of this report the revised scores have been calculated.

3.35 An alternative way of expressing the BMWP score is by measuring the Average Score per Taxon (ASPT). This is obtained by dividing the BMWP score by the number of scoring families. This score is sometimes preferred to the BMWP score, since it eliminates any discrepancies associated with ‘recorder effort’. As with the BMWP score, the higher the ASPT per sample the cleaner the

watercourse. The cleanest waters might therefore have an ASPT close to '10', whilst the most polluted waters lie closer to '1'. In general terms an ASPT greater than the 'benchline' mark of '5' is indicative of a watercourse in reasonable condition. Water quality monitoring can be carried out using the same scoring index each time and comparing the results.

Laboratory Identification

3.36 All aquatic macroinvertebrate individuals (excluding fly larvae and worms) collected in the field were identified to species-level under a stereoscopic microscope (up to 70 x magnification) using the most up-to-date identification keys available. Identification of aquatic macroinvertebrates was completed by Dr Jessica Frame of BSG Ecology.

Survey Limitations

3.37 It was not possible to access the northern part of the marshy grassland in the north-west of the Survey Site after July and therefore larval surveys for marsh fritillary were not carried out in this area. This is the only area that devil's bit scabious was recorded in the Survey Site and is the only area where there was potential for marsh fritillary to occur. Since the restrictions to land access were applied the Project Site has been subsequently refined due to changes in the design of the Project and the Project Site no longer includes this area.

3.38 No other constraints to the efficacy of the surveys were recorded.

4 Results

Desk Study

4.1 SEWBReC provided 40 records of Section 42 Lepidoptera species. The species recorded are marsh fritillary, dingy skipper *Erynnis tages*, narrow-bordered bee hawk-moth *Hemaris tityus* and small pearl-bordered fritillary *Boloria selene*. Twenty nine of the records are of marsh fritillary; the closest of these is located approximately 0.7 km west of the Survey Site boundary in 2009. This location also contains the closest of the four dingy skipper records, as well as the closest of the five small pearl-bordered fritillary records and the only narrow-bordered bee hawk-moth record. The results of the Habitat Potential Assessment (below) include a discussion regarding whether suitable habitats to support any of these species are present within the Survey Site.

Habitat Potential Assessment

4.2 The results of the desk study were taken into account to assess whether there is suitable habitat for the *Lepidoptera* species within 2 km of the Survey Site and whether further survey for any of these species was justified. The marshy grassland in the north-west of the Survey Site provides broadly suitable habitat for marsh fritillary (see 3.14), although the food plant devil's-bit scabious was only noted in small patches in M25 grassland during the NVC survey (see Figure 1). Of the other Section 42 species recorded from the desk study, suitable habitat is present for narrow-bordered bee hawk-moth, which also largely relies on devil's bit scabious. The methods employed during the marsh fritillary transect surveys (see 3.1.5) included recording of day-flying moths such as this species. For dingy skipper, there are few areas of bare ground, where this species prefers to bask and no areas where it's usual egg-laying food plant, bird's foot trefoil *Lotus corniculatus*, is found in any quantity. Small pearl-bordered fritillary is reliant on violets (*Viola sp*.) as its egg-laying plant, and violets have not been recorded during the PEA (the April survey was timed to record them in flower). It is unlikely that either of these latter two species are present within the Survey Site.

4.3 Much of the Survey Site is pastoral farmland. The fields are grazed by horses and sheep, and are largely bounded by fences with occasional trees, scrub and defunct hedgerows. These areas were discounted from further study on the basis of the habitat being of poor suitability for invertebrates. Only common and widespread species might be expected to occur in association with such habitat.

4.4 Away from these areas, there are four key habitats that have the potential to be important for assemblages of invertebrates, including those that are rare, scarce or nationally threatened. These are:

- The area of marshy grassland in the north-west of the Survey Site, which contains a mosaic of habitats, including M25 grassland, that has the potential to support marsh fritillary;
- Several areas of woodland within the Survey Site, most of which are included on the Ancient Woodland Inventory for Wales and are also SINCs;
- Numerous watercourses on site, mostly in the form of ditches along field boundaries, and also four streams; and
- The two ponds (Ponds 11 and 16) within the Survey Site.

4.5 These habitats formed the main focus of the targeted surveys and are described below.

Marshy grassland

4.6 Most areas of marshy grassland within the Survey Site were degraded due to grazing pressure and were not identified as providing potentially high quality habitat for invertebrates. However, the marshy grassland habitat in the north-west of the Survey Site forms part of the Waun Garn Wen SINC and is of higher quality.

4.7 This area was composed of mire (dominated by purple moor grass *Molinia caerulea*) to the north, with wet heath to the south and rush pasture around the margins. The northern area was characterised by the dominance of purple moor grass, which distinguishes it from the rush pasture

described below. Other species were limited in number and abundance. Soft rush *Juncus effusus* and sharp-flowered rush *Juncus acutiflorus* can be frequent, but tormentil *Potentilla erecta* is the only broad-leaved species that occurred regularly. Other potential food and nectar plants for invertebrates included cross-leaved heath *Erica tetralix*, bilberry *Vaccinium myrtillus*, devil's-bit scabious, marsh bedstraw *Galium palustre*, greater bird's-foot trefoil and wild angelica *Angelica sylvestris*.

4.8 The southern area was largely wet heath, characterised by a mixture of varying quantities of purple moor-grass, deer grass *Trichophorum cespitosum*, cross-leaved heath and heather *Calluna vulgaris*. Other species included wavy hair grass *Deschampsia flexuosa*, small amounts of hare's-tail cotton grass *Eriophorum vaginatum*, heath milkwort *Polygala serpyllifolia* and marsh lousewort *Pedicularis palustris*.

4.9 Around the fringes of this area there were pockets of rush pasture, which were defined by the presence of an abundance of soft rush and/or sharp-flowered rush amongst mesophytic herbs widely occurring in moister agricultural grasslands. This was not a species-rich habitat, but other species present included marsh bedstraw and marsh thistle *Cirsium palustre*, ragged robin *Lychnis flos-cuculi*, bulrush *Typha latifolium*, and lesser spearwort *Ranunculus flammula*. Species more typical of scrubby margins were also present, including bramble *Rubus fruticosus* agg., rosebay willowherb *Chamerion angustifolium*, great willowherb *Epilobium hirsutum* and hemp agrimony *Eupatorium cannabinum*.

4.10 This area was also crossed by wet ditches and contained areas of young woodland and small trees scattered around the edges of the habitat mosaic. It formed part of a much larger area of similar habitats (mostly contained within the Waun Garn Wen SINC) that extend to the west.

4.11 This combination of habitats may provide an important reservoir for invertebrates within the wider landscape, where it is intensively farmed. The grassland habitat is complemented by ruderal vegetation, stands of bracken *Pteridium aquilinum*, wet ditches, trees and scrub; the combination of which should provide complex transitional zones that are often rich in invertebrates, due to the structural diversity they create and the variety of foraging opportunities they provide. The added height and often permanency of features such as grass and sedge tussocks, scrub and trees offers important refuges for invertebrates especially during winter when penetrating frosts may otherwise have adverse consequences.

Woodland

4.12 There were several areas of woodland within the Survey Site. There was a block of broadleaved woodland along the eastern boundary of the Survey Site (Woodland 4; Figure 1). The western end being on a hill, and is dry with widely-spaced trees and a grazed grassland ground flora including common grassland species. The trees here were small to medium-stemmed with very little understorey, and included: silver birch *Betula pendula*, crab-apple *Malus sylvestris*, holly *Ilex aquifolium* and pedunculate oak *Quercus robur*. Dead wood and bracket fungi were also present, which can provide suitable habitat for a range of saproxylic invertebrates. The hill slopes down steeply to the east, where a stream delineates a lower, wetter area of woodland. Here the tree species composition was similar but the understorey was more dense, with bramble predominating. There were also extensive areas of ground flora that were dominated by purple moor-grass with *Sphagnum* moss species also present.

4.13 Another relatively extensive area of broad-leaved woodland was present at the south-west end of the Survey Site around Felindre Gas Compressor Station and the two National Grid 400kV electrical substations (Woodland 1; Figure 1). This formed a strip to the south and a more continuous block to the north of Felindre Gas Compressor Station and the two National Grid 400kV electrical substations. The woodland was generally quite wet, with alder *Alnus glutinous* and willow species *Salix* spp. frequent along with pedunculate oak, birch and holly. The trees were growing close together and were generally small-stemmed and straggly. The understorey was comprised of dense bramble, whilst the ground flora was largely absent. Where the woodland opened out, for example around the margins of Felindre Gas Compressor Station and the two National Grid 400kV electrical substations, soft-rush dominated marshy grassland was present. This woodland is listed as ancient woodland but lacks most features of ancient woodland habitat, including significant dead wood and diverse understorey layers that would be suitable for supporting a diverse invertebrate fauna. To the north, Woodland 2 (Figure 1) was dominated by semi-mature oak, alder, willow and birch with a thick bramble understorey.

4.14 There were also patches of deciduous woodland around the edges of the marshy grassland on the block of land to the west of the road that runs through the Survey Site (Woodland 3). Tree species were largely immature and included oak, birch, holly, hawthorn *Crataegus monogyna* and an understorey dominated by bramble, but also including ivy *Hedera helix*, creeping bent *Agrostis stolonifera*, Yorkshire fog *Holcus lanatus*, soft rush, hard fern *Blechnum spicant*, scaly male fern *Dryopteris affinis* and bracken. The ground flora included nettle *Urtica dioica*, lady fern *Athyrium filix-femina,* wood false brome *Brachypodium sylvaticum* and abundant Himalayan balsam *Impatiens glandulifera*. There was some dead wood present in this area of woodland but it lacked features characteristic of ancient woodland habitat that would be suitable for supporting a diverse invertebrate fauna.

Watercourses

4.15 There were numerous small water courses within the Survey Site. These were mostly ditches along field boundaries, but there were also some larger streams. The block of marshy grassland to the west was criss-crossed by numerous ditches, which were largely dry or with marshy bases when visited in April. There was also a stream that flowed through this block of land – this was shaded by flanking woodland, with a stone bed and shallow banks. These were all deemed unsuitable for survey at the time of watercourse sampling in September.

4.16 Another stream flowed south-east through the Survey Site and was split into smaller tributaries through Woodland 4 (See Figures 1 and 2). It was overgrown with scrub in many places and was shallow and fast-flowing with riffles and pools along its uniform bank structure and stony bed. This stream exhibited local detritus but there was no sewage present. No macrophyte cover was found and in the most heavily shaded sample point (See Figure 2; Sample Point 3) a brown trout *Salmo trutta* (parr) was caught during a standard kick sample.

4.17 Another larger stream flowed along the eastern boundary of the Survey Site. This was relatively unshaded, with a bed of mud, gravel and rocks. The upstream portion of this watercourse was approximately 1.5 m in width and the water depth ranged from approximately 10 cm to 20 cm where pools formed. It was fast flowing and appeared to be clean as there was no turbidity, detritus or sewage. Another brown trout (parr) was caught during kick sampling at Sample Point 1 (See Figure 2). Further downstream where two additional kick samples were taken (Sample Points 5 & 6), the stream widened and formed a wide pool at Sample Point 6. The stream had moderate shade and slight turbidity, was surrounded by scrub and trees and had a substrate of pebbles, sand and silt.

4.18 There were also small watercourses present around the margin of Felindre Gas Compressor Station and the two National Grid 400kV electrical substations. These streams were on average 0.5 m wide and 0.3 m deep with the average bank height being 0.4 m. The first stretch sampled (Sample Point 7) was heavily impinged upon by bank vegetation, mostly scrub that covered the majority of its length (see Image 14). The flow in this watercourse was low both upstream and downstream with only riffles over a substrate of gravel and silt. Pastoral land sits on either side of both streams.

4.19 All features that were visited in February had flowing water, reflecting a period of prolonged wet weather preceding the survey. This was not the case when sampling took place in September. Aquatic vegetation was not apparent in any of the watercourses, but marginal vegetation included frequent soft rush, occasional purple moor-grass and scattered gorse *Ulex europaeus* and bramble.

4.20 Watercourses can support rich and varied assemblages of invertebrates adapted to highly specialised niches across the reach of a watercourse. Taxonomic orders including Ephemeroptera (mayflies), Plecoptera (stoneflies), Trichoptera (caddisflies), Odonata (dragonflies), Diptera (true flies) and aquatic Coleoptera tend to be well represented in such habitats, especially where water quality appears to be unimpaired.

Ponds

4.21 Although neither Pond 11 nor 16 forms part of a wider cluster of ponds or other waterbodies, both were located in good quality habitat, either surrounded by marshy grassland and scrub (Pond 11) or between woodland and neutral grassland (Pond 16). There is likely to be a wide range of

species potentially associated with such ponds, including (but not limited to): snails (Gastropoda), diving beetles (Dytiscidae), water beetles (Hydrophilidae), dragonflies and caddisflies.

Targeted Surveys

4.22 Overall, a total of 384 species were recorded during the targeted invertebrate surveys, the results of which are fully described in the following sections.

Coleoptera

4.23 From the first survey 150 specimens were examined and 95 invertebrate species were identified. Coleoptera was the dominant order recorded with 70 species recorded, reflecting the search emphasis, with Hemiptera making up the majority of other records. Hemiptera were taken more as incidental material and have been included for completeness. During the second survey, 71 species were recorded. Coleoptera was the dominant order recorded with 46 species (four of which were also recorded during the first survey), with Hemiptera well represented at 13 species and a small number of incidental records, such as millipedes, making up the rest. The full list of Coleoptera species recorded within the four woodlands surveyed is displayed in tabular format in Appendix 2.

4.24 The four woodlands produced 19 saproxylic species from the first survey with one more species added from the second survey visit. These species are all included in the general list of Alexander (2004) with none indicative of continuous saproxylic habitat, which may be taken as an indicator of the quality of ancient woodland habitat.

4.25 Combining results for the two sample sets results in a list of 150 species, 75% of which are in the target order, Coleoptera. A total of 20 saproxylic species were recorded, representing 2.8% of the 700 species regarded as saproxylic by Alexander (2004).

4.26 The results of the survey were analysed by measuring the number of locally rare, nationally notable and IUCN red list / RDB species.

4.27 Overall, the majority of the insects recorded are widely distributed and common, with 15 regarded as more local, and two of notable status. These notable species are discussed further in Table 1 below.

Table 1: Summary of notable beetle species status and habitat requirements.

Scientific Name	Status	Notes on Habitat Requirements
Epuraea distincta (a Nitulid beetle)	Nationally Scarce (Notable A)	This species is associated with fungi (notably bracket fungi) on trees, especially in wet woodland. It is shown on the NBN Gateway as well recorded in the West Wales region. Samples were taken from pitfall traps in Woodlands 3 and 4 at the Survey Site.
Orchesia micans (a Melandryid beetle)	Nationally Scarce (Notable B)	This saproxylic species was found on the remnants of fungus on a birch tree in Woodland 4. The NBN Gateway shows this beetle as having a fairly widespread distribution in England and Wales with its core distribution between the Severn and the Wash.

Marsh Fritillary

Survey for Adult Butterflies

4.28 Seven butterfly and two day-flying moth species were observed during the transect surveys. Marsh fritillary was not recorded. A summary of the transect survey results are shown in Table 2 below and the area walked during the transect survey is shown in Figure 1.

Table 2: Summary of Transect Survey Results

		No of sightings	
Common Name	**Latin Name**	**07/06/2014**	**17/06/2014**
Common Blue	*Polyommatus icarus*	1	
Meadow Brown	*Maniola jurtina*		5
Ringlet	*Aphantopus hyperantus*		6
Large Skipper	*Ochlodes sylvanus*		3
Brimstone	*Gonepteryx rhamni*	2	
Small White	*Pieris rapae*	1	
Small Heath	*Coenonympha pamphilus*	3	
6-Spot Burnet (moth)	*Zygaena filipendulae*		4
Burnet companion (moth)	*Euclidia glyphica*	2	

4.29 The diversity of butterfly species is typical for a site of this type and location. The numbers of butterflies recorded were low with the large majority recorded in a narrow strip of flower-rich habitat in the southernmost part of the area that was surveyed. In general, a lack of flowering nectar-rich plants during the surveys is likely to have led to the low abundance of butterflies recorded. The species recorded are generally considered to be common and widespread across south Wales.

4.30 Small heath is the only species recorded that is a S42 species. Although widespread and common and found in a fairly wide variety of habitats with its main food plants being grasses (particularly Bents (various) (*Agrostis spp.*), Fescues (various) (*Festuca spp.*) and Meadow-grasses (various) (*Poa spp.*)), this species has undergone a 10 year decline of 28% (Butterfly Conservation, 2011). None of the S42 butterfly or day-flying moth species recorded from the desk study were recorded during the surveys.

Incidental sightings

4.31 In addition to the Lepidoptera species recorded above, seven green hairstreak *Callophrys rubric* butterflies were recorded while deploying reptile refugia on 16 May in the transect survey area. This species, although widespread, is relatively localised in distribution in Britain.

Survey for Larvae

4.32 No devil's bit scabious plants were recorded during the first survey, and therefore a second survey was not carried out (see 3.18). Marsh fritillary larvae are considered to be absent from the area in which the survey was carried out.

Moths

4.33 The night-time surveys produced 118 taxa of moth in total (see Appendix 3).

4.34 The macro moth fauna of Glamorgan is well recorded, with hectads[12] in Swansea and the Gower Peninsula being very well covered in a vice-county[13] context. Micro Lepidoptera are notably under recorded, however, which makes robust assessment of apparent abundance based on the number of records and/or their geographical spread within the vice-county impossible for many species (Gilmore *et al*., 2014).

4.35 Gilmore *et al.* (2014) provide a detailed summary of the number of records, by species, for all moths in Glamorgan. For macro moths, the authors attribute an assessment of abundance (very rare, rare, scarce, uncommon, common etc.) based on the number of records, qualified by further

[12] A 10 km x 10 km square often used for biological recording.
[13] A vice-county is a geographical division of the British Isles used for the purposes of biological recording and other scientific data-gathering. Glamorgan contains a single vice-county (number 41), which is split into a number of hectads, that sub-divide the vice-county into smaller recording units.

information with regard to how widespread the species is based on the number of hectads it has occurred in.

4.36 None of the macro moths recorded on the Survey Site was less frequent than 'very local', at the vice-county level. The most notable species were map-winged swift *Hepialus fusconebulosa*, and marbled brown *Drymonia dodonaea*. Prior to the survey, map-winged swift had been recorded on 200 previous occasions in the vice-county, and in 25 of the 40 10 km hectads that fall within Glamorgan. Marbled brown had occurred on 186 previous occasions and in 17 hectads: it is a very localised species in Glamorgan which only occurs regularly on the Gower Peninsula and in northern districts of the vice-county. It is associated with native oak species.

4.37 There was one locally notable micro moth species, the grass veneer *Crambus uliginosellus*. This is a localised species of damp grassland, bogs and fens. It was recorded at the heath trap in the area of marshy grassland in the north-west of the Survey Site (M1). Gilmore *et al*. (2014) state that there have been 15 previous records of this species at the vice-county level, and that the species has been noted in six hectads on Gower and at Crymlyn Bog.

4.38 Thirteen moth species collected were noteworthy due to their status as S42 species. Table 3, below gives more detailed information about each species and their habitat requirements.

Table 3: Summary of Moth Species Status and Habitat Requirements

Scientific Name	Status	Notes on Habitat Requirements
Dusky brocade *Apamea remissa*	S42: Decline of 76% over 35 years; research needed (JNCC, 2010)	Waring & Townsend (2003) state that this species is common throughout Great Britain. Gilmore *et al.* (2014) confirm this remains the case in Glamorgan. The moth is associated with grasses, and there are patches of tall grassland along tracks, roads and on waste ground within the Survey Site.
Garden tiger *Arctia caja*	S42: Decline of 86% over 35 years; research needed (JNCC, 2010)	This species has become scarce in eastern Glamorgan, but remains common in the south and west, particularly on the coast (Gilmore et al., 2014). Waring & Townsend (2003) indicate that the species could be being affected by both the general 'tidying up' of the countryside and climatic change.
Latticed heath *Chiasmia clathrata*	S42: Decline of 87% over 35 years; research needed (JNCC, 2010)	Waring & Townsend (2003) state that this species is common and well distributed in West Wales (much of England and Southern Scotland). Gilmore *et al.* (2014) indicate that it is common and widespread in southern Glamorgan.
Broom moth *Melanchra pisi*	S42: Decline of 77% over 35 years; research needed (JNCC, 2010)	Waring & Townsend (2003) state that this species is common throughout Great Britain, being most abundant on heather moorland. Gilmore *et a*l (2014) note that the moth is frequently encountered in all parts of the vice-county other than the Vale of Glamorgan. Locally, the favoured larval food plant is bracken.
Shoulder-striped wainscot *Mythimna comma*	S42: Decline of 72% over 35 years; research needed (JNCC, 2010)	Waring & Townsend (2003) state that this species is common in southern Britain. Gilmore *et al.* (2014) confirm that this status remains relevant to Glamorgan. The larvae feed on a range of grasses.
White ermine *Spilosoma lubricipeda*	S42: Decline of 77% over 35 years; research needed (JNCC, 2010)	Waring & Townsend (2003) state that this species is common and very well distributed throughout Britain. Gilmore *et al.* (2014) confirm this status for Glamorgan. The larvae feed on a range of herbaceous plants.
Buff ermine *Spilosoma luteum*	S42: Decline of 73% over 35 years; research	Waring & Townsend (2003) state that this species is common and very well distributed throughout Britain. Gilmore *et al.* (2014) confirm this status for Glamorgan.

Scientific Name	Status	Notes on Habitat Requirements
	needed (JNCC, 2010)	The larvae have relatively catholic feeding preferences.
Blood vein *Timandra comae*	S42: Decline of 79% over 35 years; research needed (JNCC, 2010)	According to Waring & Townsend (2003), this species is common across England and Wales. The moth is associated with a variety of herbaceous plants, but docks in particular, so it would have been well suited to the field margins and woodland within the Survey Site. Gilmore *et al.* (2014) state that it is common throughout Glamorgan.
Cinnabar *Tyria jacobaeae*	S42: Decline of 83% over 35 years; research needed (JNCC, 2010)	Waring & Townsend (2003) state that this species is common across England and Wales, and Gilmore *et al.* (2014) confirm that this remains its status in Glamorgan. The moth is almost exclusively associated with common ragwort *Jacobaea vulgaris* and there are some small patches of this plant within the Survey Site, many of which hold larvae of this species.
Ear moth agg. *Amphipoea oculea*	S42: Declined by 71% over the last 35 years; research needed (JNCC, 2010)	There are four species of ear moth that could account for the records. These can only be distinguished based on dissection of genitalia. All have a localised distribution, and even the commonest *Amphipoea oculea* typically occurs at low density in the UK. *Amphipoea crinanensis* has not been recorded in the vice-county to date. The three ear moths that have been recorded in Glamorgan are all either uncommon or rare in the county. However their relative abundance (in relation to each other) is currently unknown (Gilmore *et al*., 2014). Based on the habitat present, and the altitude of the site however, the records are most likely to refer to *Amphipoea oculea* as opposed to *A. fucosa paludis* or *A. lucens*. *A. oculea* is considered an uncommon but widespread resident in the county.
Small phoenix *Ecliptopera silaceata*	S42: Declined by 77% over the last 35 years; research needed (JNCC, 2010)	Waring & Townsend (2003) state that this species is common throughout mainland Britain, the Inner Hebrides and Ireland. Gilmore *et al.* (2014) state that it is a common, widespread resident in Glamorgan, and found in a range of habitats.
Dusky thorn *Ennomos fuscantaria*	S42: Declined by 98% over the last 35 years; research needed (JNCC, 2010)	A common resident that is fairly generally distributed and often frequent in England and Wales. It occurs wherever the foodplant, ash *Fraxinus excelsior* is found (Waring & Townsend, 2003). In Glamorgan the species is found throughout southern areas, but is more localised in northern districts.
Rosy rustic *Hydraecia micacea*	S42: Declined by 86% over the last 35 years; research needed (JNCC, 2010)	Occurs in a wide range of habitats including gardens, waste ground, pasture, fens, marshes and woodland rides. It is common and well distributed in Britain and Ireland (Waring & Townsend, 2003). It is a common, widespread resident in Glamorgan (Gilmore *et al*., 2014)

Ponds

4.39 A description of each of the ponds surveyed is provided in Table 4 below and images of the ponds are provided in Appendix 4.

Table 4: Pond Habitat Descriptions..

Pond Ref.	Location	Pond Description	Water Quality
11	SN6494301754	This waterbody covered an area of approximately 52 m^2 with an average depth of ca. 0.75 m and a maximum depth of over 1 m. The aquatic plant community in this pond included common bulrush *Typha latifolia*, branched bur-reed *Sparganium erectum*, broad-leaved pondweed *Potamogeton natans* and floating sweet grass *Glyceria fluitans*.	pH: 7.14 Temp: 18.05°C Conductivity: 419 µS/cm TDS*: 210 mg/L DO*: 34% (3.19 mg/L)
16	SN6560701225	This waterbody covered an area of approximately 25 m^2 with an average depth of over 0.75 m and a maximum depth of over 1 m. The aquatic plant community was dominated by water horsetail *Equisetum fluviatile* with patches of broad-leaved pondweed present. The highly invasive floating pennywort *Hydrocotyle ranunculoides* was also present at the northern end of the pond.	pH: 6.70 Temp: 18.61°C Conductivity: 103 µS/cm TDS: 52 mg/L DO: 10% (1.10 mg/L)

* TDS = total dissolved solids; DO = dissolved oxygen

4.40 Both ponds are characterised by circumneutral pH and low dissolved oxygen availability.

4.41 Forty eight different species were recorded during the pond survey. Pond 11 supported the highest diversity of aquatic macroinvertebrates, with total of 46 taxa recorded. Pond 16 supported a more moderate diversity of 32 taxa. The samples were generally dominated by beetles (21 unique taxa), followed by bugs (11 unique taxa). No scarce or threatened aquatic invertebrates were identified within the samples. A complete list of all the macroinvertebrate taxa recorded at each of the ponds can be found in Appendix 5.

4.42 Table 5 summarises the results of the aquatic invertebrate survey.

Table 5: Results summary for aquatic macroinvertebrates found in ponds.

	Pond 11	Pond 16
No. of taxa	46	32
No. of beetle taxa	21	6
No. of water bug taxa	9	8
No. of mayfly taxa	1	1
No. of caddis taxa	0	0
No. of dragonfly / damselfly taxa	2	2
No. of snail / bivalve taxa	2	3
Notable species	None	None

Watercourses

Water Quality Monitoring Baseline

4.43 The samples were analysed to at least family level as required to obtain a BMWP/ASPT score for the stream sections sampled; where possible species were also recorded for completeness and so that any rare species collected would be identified. The BMWP/ASPT score is then given a quality rating (Table 6 below). The scores and ratings calculated for the sample points are recorded in Table 7 (below), and a complete macroinvertebrate taxa list is provided in Appendix 5, Table 2.

Table 6: Ratings for BMWP and ASPT scores

BMWP		ASPT	
BMWP Score	**Quality**	**ASPT**	**Quality**
Over 150	A. Very good biological quality	Over 5.4	Very good
101 – 150	B. Good biological quality	4.81 – 5.4	Good
51 – 100	C. Fair biological quality	4.21 – 4.8	Fair
16 – 50	D. Poor biological quality	3.61 – 4.2	Poor
0 – 15	E. Very poor biological quality	3.6 or less	Very poor

Table 7: BMWP and ASPT score and rating for the samples.

Sample Point	Number of Scoring Taxa	BMWP	Quality (BMWP)	ASPT	Quality (ASPT)
1	15	104	B	6.93	Very good
2	17	119	B	7.00	Very good
3	18	115	B	6.39	Very good
4	13	85	C	6.54	Very good
5	14	89	C	6.36	Very good
6	19	118	B	6.21	Very good
7	18	105	B	5.83	Very good
8	20	119	B	5.95	Very good

4.44 The scores for the spring-fed stream (Sampling points 2-4) improve with each step downstream, but water quality was generally good. There is an increase in distance from the edge of the stream to the pastoral fields further downstream, from no buffer to a 10 m buffer with trees and scrub. This

may be a reason for the improving scores, as there is less risk of sediment deposition / spray drift from adjacent fields when a buffer is present.

5 References

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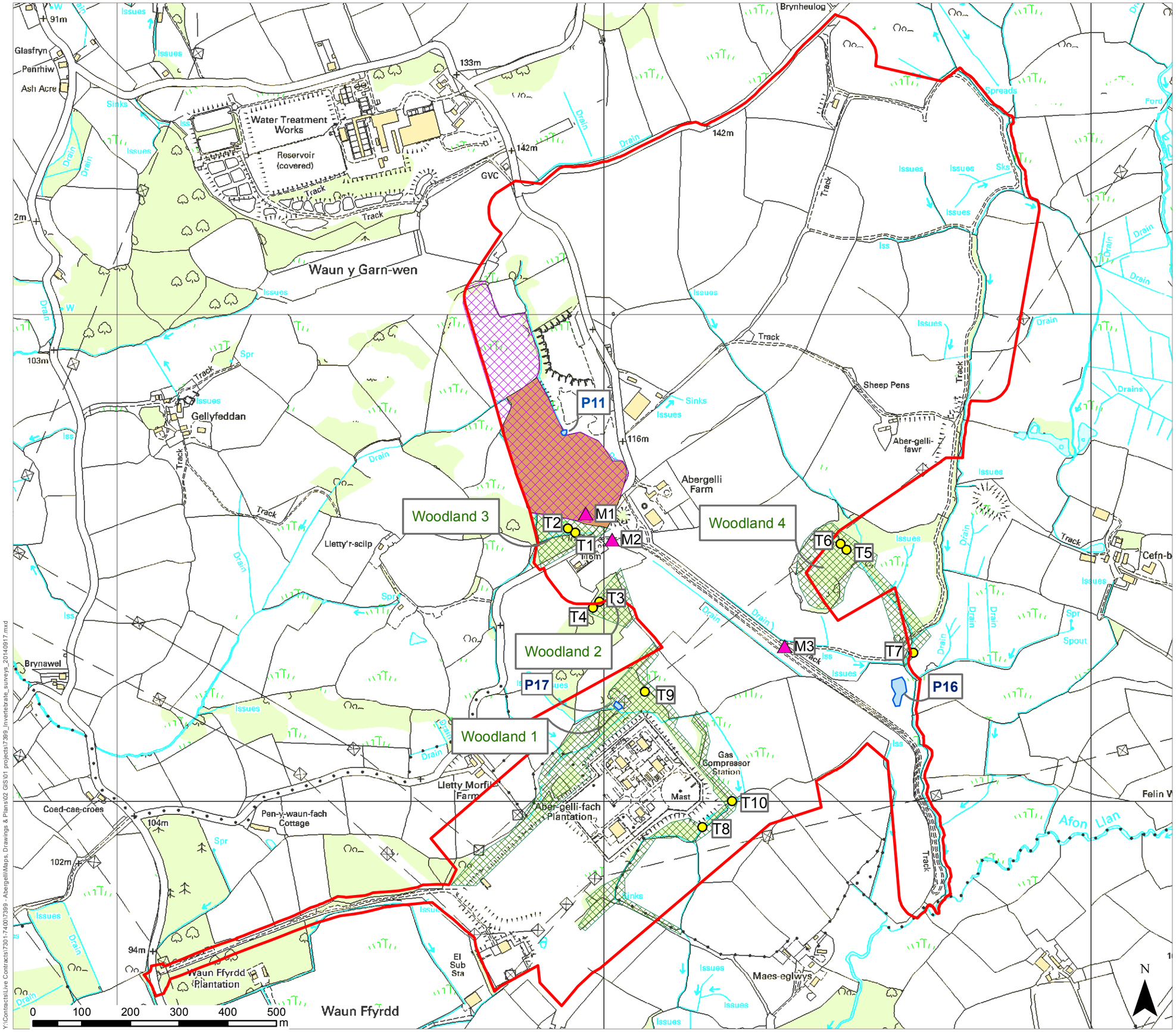
Appendix 1: Figures.

(overleaf)



LEGEND

- Survey Site Boundary
- Moth trap locations
- Terrestrial beetle pitfall trap
- Ponds within the site. Notation for the ponds, e.g. P11, is based on that used in the great-crested newt survey report (BSG Ecology, 2014)
- Marsh Fritillary butterfly transect area
- Marsh Fritillary larval search area
- Woodland surveyed for terrestrial beetles

BSG ecology

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PROJECT TITLE
ABERGELLI POWER PROJECT

DRAWING TITLE
Figure 1 - Invertebrate survey

DATE: 17.09.2014 CHECKED: MH SCALE: 1:7,500
DRAWN: RT APPROVED: MH STATUS: FINAL

Sources: BSG Ecology survey data

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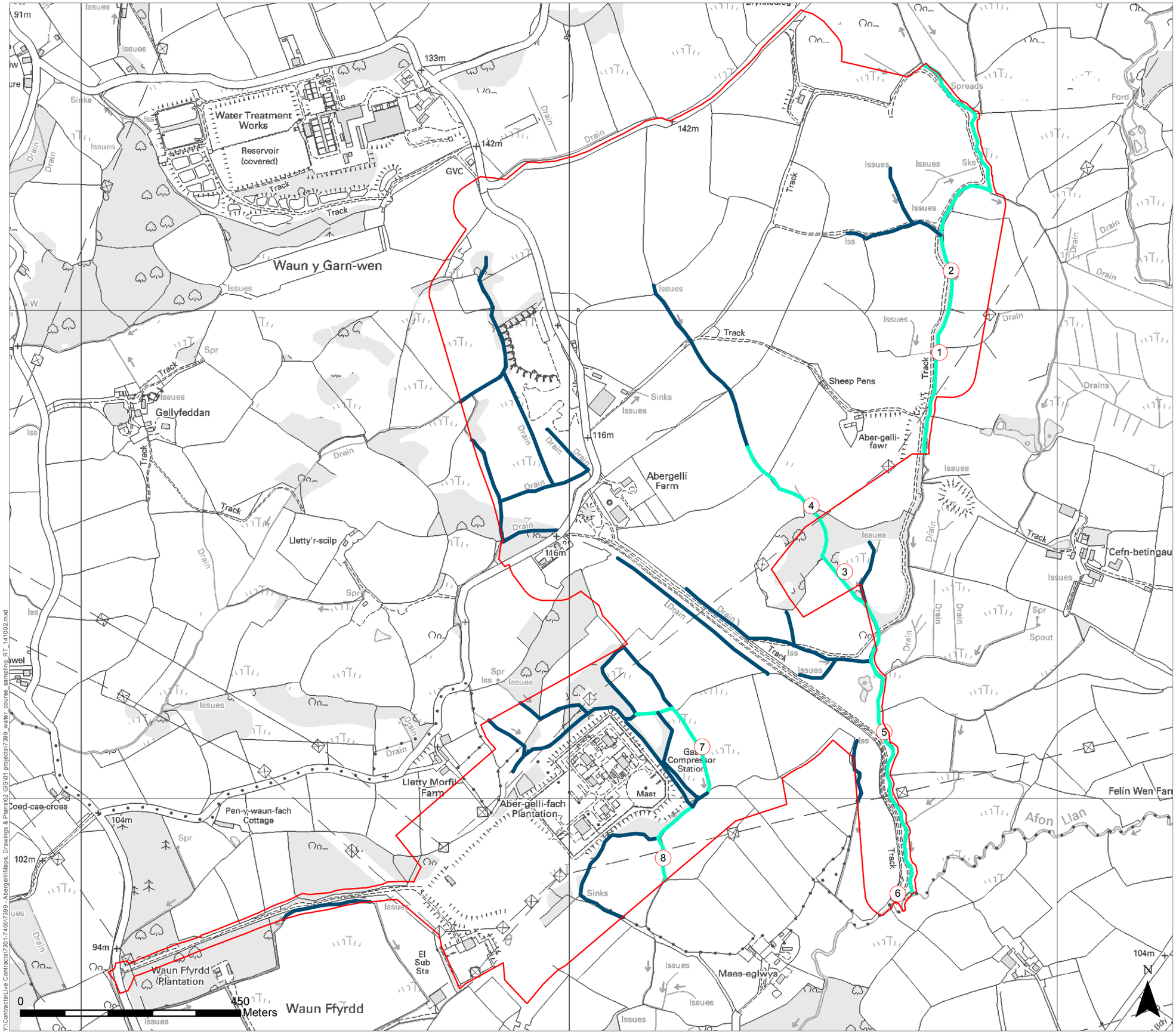

LEGEND

Survey Site boundary

Water course sample points

Water Course Suitability

Water course unsuitable for survey

Water course surveyed

BSG | ecology

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PROJECT TITLE

ABERGELLI POWER PLANT

DRAWING TITLE

Figure 2 - Water Course Invertebrate Survey

DATE: 02.10.2014 CHECKED: MH SCALE: 1:7,500

DRAWN: RT APPROVED: JG STATUS: Final

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Appendix 2: Species list from targeted Coleoptera surveys.

Species Number	Order	Family	Taxon	Status	Woodland Number	Saproxylic
1	Amphipoda	*Talitridae*	*Orchestia cavimana*	None	W2&3	
2	Coleoptera	*Apionidae*	*Exapion ulicis*	None	W1	
3	Coleoptera	*Apionidae*	*Protapion apricans*	None	W1	
4	Coleoptera	*Apionidae*	*Protapion fulvipes*	None	W4	
5	Coleoptera	*Byturidae*	*Byturus tomentosus*	None	W2	
6	Coleoptera	*Cantharidae*	*Rhagonycha fulva*	None	W4	
7	Coleoptera	*Carabidae*	*Abax parallelepipedus*	None	W2,3&4	
8	Coleoptera	*Carabidae*	*Agonum emarginatum*	Local	W1&2	
9	Coleoptera	*Carabidae*	*Bembidion mannerheimi*	Local	W1	
10	Coleoptera	*Carabidae*	*Bembidion tetracolum*	None	W2	
11	Coleoptera	*Carabidae*	*Bradycellus sharpi*	Local	W4	
12	Coleoptera	*Carabidae*	*Calathus melanocephalus*	None	W2	
13	Coleoptera	*Carabidae*	*Calodromius spilotus*	None	W4	
14	Coleoptera	*Carabidae*	*Cychrus caraboides*	Local	W1&2	
15	Coleoptera	*Carabidae*	*Elaphrus cupreus*	None	W2	
16	Coleoptera	*Carabidae*	*Leistus rufescens*	None	W1	
17	Coleoptera	*Carabidae*	*Loricera pilicornis*	None	W2&4	
18	Coleoptera	*Carabidae*	*Nebria brevicollis*	None	W2	
19	Coleoptera	*Carabidae*	*Notiophilus biguttatus*	None	W2	
20	Coleoptera	*Carabidae*	*Notiophilus rufipes*	Local	W2	
21	Coleoptera	*Carabidae*	*Ocys harpaloides*	None	W3	Y
22	Coleoptera	*Carabidae*	*Paranchus albipes*	None	W2	
23	Coleoptera	*Carabidae*	*Patrobus atrorufus*	None	W2	
24	Coleoptera	*Carabidae*	*Platynus assimilis*	None	W2&4	
25	Coleoptera	*Carabidae*	*Pterostichus diligens*	None	W4	
26	Coleoptera	*Carabidae*	*Pterostichus madidus*	None	W1,2&4	
27	Coleoptera	*Carabidae*	*Pterostichus nigrita*	None	W2	
28	Coleoptera	*Carabidae*	*Pterostichus strenuus*	None	W4	
29	Coleoptera	*Carabidae*	*Trechus quadristriatus*	None	W4	
30	Coleoptera	*Cerambycidae*	*Grammoptera ruficornis*	None	W4	Y
31	Coleoptera	*Cerambycidae*	*Pogonocherus hispidulus*	Local	W2	Y
32	Coleoptera	*Cerambycidae*	*Rhagium bifasciatum*	None	W1&4	Y
33	Coleoptera	*Cerylonidae*	*Cerylon ferrugineum*	Local	W4	Y
34	Coleoptera	*Chrysomelidae*	*Altica palustris*	None	W1	
35	Coleoptera	*Chrysomelidae*	*Chaetocnema concinna*	None	W4	
36	Coleoptera	*Chrysomelidae*	*Chrysomela aenea*	Local	W2	
37	Coleoptera	*Chrysomelidae*	*Crepidodera aurea*	None	W1,3&4	
38	Coleoptera	*Chrysomelidae*	*Crepidodera fulvicornis*	None	W1&3	
39	Coleoptera	*Chrysomelidae*	*Cryptocephalus pusillus*	Local	W1	
40	Coleoptera	*Chrysomelidae*	*Phyllotreta nemorum*	None	W4	
41	Coleoptera	*Ciidae*	*Cis boleti*	None	W3	Y
42	Coleoptera	*Ciidae*	*Octotemnus glabriculus*	None	W4	Y
43	Coleoptera	*Cryptophagidae*	*Cryptophagus dentatus*	None	W4	Y
44	Coleoptera	*Cryptophagidae*	*Cryptophagus lycoperdi*	None	W2	
45	Coleoptera	*Curculionidae*	*Barypeithes araneiformis*	None	W4	
46	Coleoptera	*Curculionidae*	*Dorytomus melanophthalmus*	Local	W4	
47	Coleoptera	*Curculionidae*	*Dorytomus taeniatus*	None	W3	
48	Coleoptera	*Curculionidae*	*Euophryum confine*	None	W2&4	Y
49	Coleoptera	*Curculionidae*	*Liophloeus tessulatus*	None	W3	
50	Coleoptera	*Curculionidae*	*Otiorhynchus singularis*	None	W2	
51	Coleoptera	*Curculionidae*	*Sitona lineatus*	None	W1	

Species Number	Order	Family	Taxon	Status	Woodland Number	Saproxylic
52	Coleoptera	*Curculionidae*	*Strophosoma melanogrammum*	None	W4	
53	Coleoptera	*Dytiscidae*	*Agabus sturmii*	None	W4	
54	Coleoptera	*Dytiscidae*	*Hydroporus memnonius*	None	W3	
55	Coleoptera	*Endomychidae*	*Mycetaea subterranea*	Local	W4	
56	Coleoptera	*Helophoridae*	*Helophorus brevipalpis*	None	W1	
57	Coleoptera	*Helophoridae*	*Helophorus grandis*	None	W1	
58	Coleoptera	*Hydraenidae*	*Hydraena riparia*	Local	W3	
59	Coleoptera	*Hydrophilidae*	*Anacaena globulus*	None	W1,3&4	
60	Coleoptera	*Hydrophilidae*	*Cercyon melanocephalus*	None	W4	
61	Coleoptera	*Hydrophilidae*	*Limnebius truncatellus*	None	W3	
62	Coleoptera	*Latridiidae*	*Cartodere nodifer*	None	W4	
63	Coleoptera	*Leiodidae*	*Catops nigrita*	None	W3	
64	Coleoptera	*Leiodidae*	*Nargus velox*	None	W1	
65	Coleoptera	*Melandryidae*	*Orchesia micans*	NbB	W4	Y
66	Coleoptera	*Nitidulidae*	*Epuraea distincta*	NbA	W3&4	Y
67	Coleoptera	*Nitidulidae*	*Meligethes aeneus*	None	W4	
68	Coleoptera	*Ptiliidae*	*Acrotrichis rosskotheni*	Local	W2	
69	Coleoptera	*Ptinidae*	*Ochina ptinoides*	Local	W4	Y
70	Coleoptera	*Ptinidae*	*Ptilinus pectinicornis*	None	W4	Y
71	Coleoptera	*Salpingidae*	*Salpingus planirostris*	None	W4	Y
72	Coleoptera	*Scirtidae*	*Cyphon coarctatus*	None	W1,2,3&4	
73	Coleoptera	*Scirtidae*	*Cyphon ochraceus*	None	W3	
74	Coleoptera	*Silphidae*	*Silpha atrata*	None	W4	
75	Coleoptera	*Sphindidae*	*Aspidiphorus orbiculatus*	Local	W2	Y
76	Coleoptera	*Staphylinidae*	*Anotylus complanatus*	None	W3	
77	Coleoptera	*Staphylinidae*	*Anotylus rugosus*	None	W1,2&4	
78	Coleoptera	*Staphylinidae*	*Anotylus sculpturatus*	None	W1	
79	Coleoptera	*Staphylinidae*	*Atheta crassicornis*	None	W1&3	
80	Coleoptera	*Staphylinidae*	*Atheta fungi*	None	W1&3	
81	Coleoptera	*Staphylinidae*	*Bisnius fimetarius*	None	W1&W2	
82	Coleoptera	*Staphylinidae*	*Bolitochara obliqua*	None	W4	Y
83	Coleoptera	*Staphylinidae*	*Bryaxis bulbifer*	None	W3	
84	Coleoptera	*Staphylinidae*	*Callicerus rigidicornis*	Local	W2	Y
85	Coleoptera	*Staphylinidae*	*Carpelimus elongatulus*	None	W3	
86	Coleoptera	*Staphylinidae*	*Gabrius splendidulus*	None	W4	Y
87	Coleoptera	*Staphylinidae*	*Halobrecta flavipes*	None	W4	
88	Coleoptera	*Staphylinidae*	*Leptusa ruficollis*	None	W3	
89	Coleoptera	*Staphylinidae*	*Lordithon trinotatus*	None	W4	
90	Coleoptera	*Staphylinidae*	*Megarthrus prosseni*	None	W1	
91	Coleoptera	*Staphylinidae*	*Microdota amicula*	None	W3	
92	Coleoptera	*Staphylinidae*	*Mocyta fungi*	None	W2	
93	Coleoptera	*Staphylinidae*	*Mycetota laticollis*	None	W1	
94	Coleoptera	*Staphylinidae*	*Ocypus olens*	None	W1,2&4	
95	Coleoptera	*Staphylinidae*	*Olophrum piceum*	None	W1	
96	Coleoptera	*Staphylinidae*	*Othius punctulatus*	None	W2	
97	Coleoptera	*Staphylinidae*	*Oxypoda vittata*	Local	W3	Y
98	Coleoptera	*Staphylinidae*	*Philonthus decorus*	None	W2,3&4	
99	Coleoptera	*Staphylinidae*	*Philonthus politus*	None	W1	
100	Coleoptera	*Staphylinidae*	*Philonthus varians*	None	W4	
101	Coleoptera	*Staphylinidae*	*Phloeopora testacea*	None	W1&4	Y
102	Coleoptera	*Staphylinidae*	*Stenichnus collaris*	Local	W4	
103	Coleoptera	*Staphylinidae*	*Stenus aceris*	None	W4	
104	Coleoptera	*Staphylinidae*	*Stenus impressus*	None	W1	
105	Coleoptera	*Staphylinidae*	*Stenus juno*	None	W1	
106	Coleoptera	*Staphylinidae*	*Stenus nitidiusculus*	None	W4	

Species Number	Order	Family	Taxon	Status	Woodland Number	Saproxylic
107	Coleoptera	*Staphylinidae*	*Stenus tarsalis*	None	W2&4	
108	Coleoptera	*Staphylinidae*	*Tachinus laticollis*	Local	W3	
109	Coleoptera	*Staphylinidae*	*Tachinus marginellus*	None	W1&4	
110	Coleoptera	*Staphylinidae*	*Tachinus rufipes*	None	W2&4	
111	Coleoptera	*Staphylinidae*	*Tachyporus chrysomelinus*	None	W1&3	
112	Coleoptera	*Staphylinidae*	*Tachyporus hypnorum*	None	W1&3	
113	Coleoptera	*Staphylinidae*	*Tasgius morsitans*	Local	W1&2	
114	Dermaptera	*Forficulidae*	*Forficula auricularia*	None	W1&4	
115	Diptera	*Ptychopteridae*	*Ptychoptera albimana*	None	W4	
116	Diptera	*Syrphidae*	*Helophilus pendulus*	None	W1	
117	Diptera	*Syrphidae*	*Sphaerophoria scripta*	None	W3	
118	Glomerida	*Glomeridae*	*Glomeris marginata*	None	W1	
119	Hemiptera	*Anthocoridae*	*Anthocoris nemorum*	None	W1,2&3	
120	Hemiptera	*Aphrophoridae*	*Aphrophora alni*	None	W3	
121	Hemiptera	*Aphrophoridae*	*Philaenus spumarius*	None	W1&4	
122	Hemiptera	*Aradidae*	*Aneurus laevis*	None	W3	
123	Hemiptera	*Berytidae*	*Metatropis rufescens*	None	W1	
124	Hemiptera	*Cicadellidae*	*Anoscopus albifrons*	None	W1	
125	Hemiptera	*Delphacidae*	*Conomelus anceps*	None	W4	
126	Hemiptera	*Lygaeidae*	*Drymus brunneus*	None	W1,2&3	
127	Hemiptera	*Lygaeidae*	*Kleidocerys resedae*	None	W1	
128	Hemiptera	*Lygaeidae*	*Lamproplax picea*	Local	W3	
129	Hemiptera	*Lygaeidae*	*Scolopostethus thomsoni*	None	W1&3	
130	Hemiptera	*Miridae*	*Bryocoris pteridis*	None	W1&2	
131	Hemiptera	*Miridae*	*Campyloneura virgula*	None	W2	
132	Hemiptera	*Miridae*	*Closterotomus norwegicus*	None	W4	
133	Hemiptera	*Miridae*	*Dicyphus epilobii*	None	W1	
134	Hemiptera	*Miridae*	*Leptopterna dolabrata*	None	W1	
135	Hemiptera	*Miridae*	*Monalocoris filicis*	None	W2	
136	Hemiptera	*Miridae*	*Neolygus contaminatus*	None	W1	
137	Hemiptera	*Miridae*	*Plagiognathus arbustorum*	None	W4	
138	Hemiptera	*Miridae*	*Stenodema calcarata*	None	W3	
139	Hemiptera	*Miridae*	*Stenodema holsata*	None	W4	
140	Hemiptera	*Pentatomidae*	*Palomena prasina*	None	W2	
141	Hemiptera	*Saldidae*	*Saldula saltatoria*	None	W2&3	
142	Hymenoptera	*Apidae*	*Apis mellifera*	None	W3	
143	Hymenoptera	*Formicidae*	*Formica fusca*	None	W3	
144	Hymenoptera	*Formicidae*	*Lasius niger*	None	W3	
145	Hymenoptera	*Formicidae*	*Myrmica ruginodis*	None	W1,2&4	
146	Isopoda	*Porcellionidae*	*Porcellio scaber*	None	W2	
147	Julida	*Julidae*	*Ommatoiulus sabulosus*	None	W3	
148	Julida	*Julidae*	*Ophyiulus pilosus*	None	W1	
149	Julida	*Julidae*	*Tachypodoiulus niger*	None	W3	
150	Opiliones	*Phalangiidae*	*Dicranopalpus ramosus*	Local	W2	

Appendix 3: Moths recorded during surveys

16th June 2014

Number	Taxon	Vernacular	Quantity	Determiner	Trap No	Status in Glamorgan (Gilmore, Slade & Stewart [2014])	Section 42 Species
1	*Abrostola tripartita*	Spectacle	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1934 records.	
2	*Acronicta leporina*	Miller	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 253 records.	
3	*Aethes cnicana*		1	Owain Gabb / Matt Hobbs	M3	Locally common: 91 records	
4	*Agrotis exclamationis*	Heart and Dart	18	Owain Gabb / Matt Hobbs	M3	Common and widespread: 5523 records	
	Agrotis exclamationis	Heart and Dart	6	Owain Gabb / Matt Hobbs	M2	Common and widespread: 5523 records	
	Agrotis exclamationis	Heart and Dart	2	Owain Gabb / Matt Hobbs	M3	Common and widespread: 5523 records	
5	*Alcis repandata*	Mottled Beauty	4	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1609 records	
	Alcis repandata	Mottled Beauty	1	Owain Gabb / Matt Hobbs	M2	Common and widespread: 1609 records	
	Alcis repandata	Mottled Beauty	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1609 records	
6	*Anaplectoides prasina*	Green Arches	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 625 records	
7	*Apamea crenata*	Clouded-bordered Brindle	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1148 records	
	Apamea crenata	Clouded-bordered Brindle	1	Owain Gabb / Matt Hobbs	M2	Common and widespread: 1148 records	
8	*Apamea monoglypha*	Dark Arches	4	Owain Gabb / Matt Hobbs	M3	Common and widespread: 4626 records	
	Apamea monoglypha	Dark Arches	1	Owain Gabb / Matt Hobbs	M2	Common and widespread: 4626 records	
9	*Apamea remissa*	Dusky Brocade	2	Owain Gabb / Matt Hobbs	M3	Common and widespread: 592 records	Yes
	Apamea remissa	Dusky Brocade	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 592 records	Yes
10	*Arctia caja*	Garden Tiger	1	Owain Gabb / Matt Hobbs	M2	Common and widespread: 606 records	Yes
11	*Axylia putris*	Flame	7	Owain Gabb /	M3	Common and widespread: 2459 records	

Number	Taxon	Vernacular	Quantity	Determiner	Trap No	Status in Glamorgan (Gilmore, Slade & Stewart [2014])	Section 42 Species
				Matt Hobbs			
12	*Bactra lancealana*		1	Barry Stewart	M3	Locally common: 426 records	
13	*Biston betularia*	Peppered Moth	5	Owain Gabb / Matt Hobbs	M3	Common and widespread: 2207 records	
	Biston betularia	Peppered Moth	5	Owain Gabb / Matt Hobbs	M2	Common and widespread: 2207 records	
	Biston betularia	Peppered Moth	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 2207 records	
14	*Blastobasis lacticolella*		1	Barry Stewart	M3	Recent addition to county fauna (common): 146 records	
15	*Cabera pusaria*	Common White Wave	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1263 records	
16	*Campaea margaritata*	Light Emerald	3	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1212 records	
17	*Celypha lacunana*		1	Barry Stewart	M3	Very common: 746 records	
18	*Celypha striana*		1	Owain Gabb / Matt Hobbs	M3	Widespread: 579 records	
19	*Chiasmia clathrata*	Latticed Heath	7	Owain Gabb / Matt Hobbs	M3	Common and widespread: 287 records	Yes
20	*Chilodes maritimus*	Silky Wainscot	1	Owain Gabb / Matt Hobbs	M3	Scarce, restricted resident. Likely wanderer. 27 records	
21	*Chrysoteuchia culmella*	Garden Grass-veneer	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1966 records	
22	*Crambus pascuella*		1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 595 records	
	Crambus pascuella		1	Owain Gabb / Matt Hobbs	M2	Common and widespread: 595 records	
	Crambus pascuella		2	Owain Gabb / Matt Hobbs	M3	Common and widespread: 595 records	
23	*Crambus uliginosellus*		3	Owain Gabb / Matt Hobbs	M3	Local: 15 records	
24	*Deilephila elpenor*	Elephant Hawk-moth	10	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1897 records	
25	*Diarsia brunnea*	Purple Clay	4	Owain Gabb / Matt Hobbs	M3	Common: 669 records	
	Diarsia brunnea	Purple Clay	1	Owain Gabb / Matt Hobbs	M3	Common: 669 records	
26	*Diarsia mendica*	Ingrailed Clay	11	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1219 records	
	Diarsia mendica	Ingrailed Clay	2	Owain Gabb / Matt Hobbs	M2	Common and widespread: 1219 records	
	Diarsia mendica	Ingrailed Clay	3	Owain Gabb /	M3	Common and widespread: 1219 records	

Number	Taxon	Vernacular	Quantity	Determiner	Trap No	Status in Glamorgan (Gilmore, Slade & Stewart [2014])	Section 42 Species
				Matt Hobbs			
27	*Diarsia rubi*	Small Square-spot	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1443 records	
28	*Drymonia dodonaea*	Marbled Brown	3	Owain Gabb / Matt Hobbs	M3	Very local / moderately common: 186 records	
29	*Drymonia dodonaea*	Marbled Brown	1	Owain Gabb / Matt Hobbs	M2	Very local / moderately common: 186 records	
	Eupithecia pulchellata	Foxglove Pug	3	Owain Gabb / Matt Hobbs	M3	Common and widespread: 562 records	
	Eupithecia pulchellata	Foxglove Pug	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 562 records	
30	*Euplexia lucipara*	Small Angle Shades	2	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1284 records	
	Euplexia lucipara	Small Angle Shades	1	Owain Gabb / Matt Hobbs	M2	Common and widespread: 1284 records	
	Euplexia lucipara	Small Angle Shades	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1284 records	
31	*Eurrhypara hortulata*	Small Magpie	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1498 records	
32	*Hepialus fusconebulosa*	Map-winged Swift	1	Owain Gabb / Matt Hobbs	M3	Moderately common, widespread: 200 records (male)	
33	*Idaea aversata*	Riband Wave	3	Owain Gabb / Matt Hobbs	M3	Common and widespread: 3536 records	
	Idaea aversata	Riband Wave	1	Owain Gabb / Matt Hobbs	M2	Common and widespread: 3536 records	
34	*Lacanobia oleracea*	Bright-line Brown-eye	14	Owain Gabb / Matt Hobbs	M3	Very common and widespread: 3388 records	
35	*Lacanobia thalassina*	Pale-shouldered Brocade	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 229 records	
36	*Lomaspilis marginata*	Clouded Border	2	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1218 records	
37	*Lycophotia porphyrea*	True Lover's Knot	11	Owain Gabb / Matt Hobbs	M3	Common and widespread: 715 records	
38	*Macaria alternata*	Sharp-angled Peacock	5	Owain Gabb / Matt Hobbs	M3	Common and widespread: 480 records	
	Macaria alternata	Sharp-angled Peacock	1	Owain Gabb / Matt Hobbs	M2	Common and widespread: 480 records	
39	*Macrothylacia rubi*	Fox Moth	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 240 records	
40	*Melanchra pisi*	Broom Moth	5	Owain Gabb / Matt Hobbs	M3	Common and widespread: 730 records	Yes
	Melanchra pisi	Broom Moth	2	Owain Gabb /	M2	Common and widespread: 730 records	Yes

Number	Taxon	Vernacular	Quantity	Determiner	Trap No	Status in Glamorgan (Gilmore, Slade & Stewart [2014])	Section 42 Species
				Matt Hobbs			
	Melanchra pisi	Broom Moth	2	Owain Gabb / Matt Hobbs	M3	Common and widespread: 730 records	Yes
41	*Mythimna comma*	Shoulder-striped Wainscot	3	Owain Gabb / Matt Hobbs	M3	Common and widespread: 704 records	Yes
42	*Noctua pronuba*	Large Yellow Underwing	4	Owain Gabb / Matt Hobbs	M3	Common and widespread: 7556 records	
	Noctua pronuba	Large Yellow Underwing	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 7556 records	
43	*Notodonta ziczac*	Pebble Prominent	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1014 records	
44	*Ochropleura plecta*	Flame Shoulder	5	Owain Gabb / Matt Hobbs	M3	Common and widespread: 4974 records	
	Ochropleura plecta	Flame Shoulder	1	Owain Gabb / Matt Hobbs	M2	Common and widespread: 4974 records	
45	*Oligia fasciuncula*	Middle-barred Minor	3	Owain Gabb / Matt Hobbs	M3	Common and widespread: 584 records	
46	*Oligia latruncula*	Tawny Marbled Minor	2	Matt Hobbs	M3	External characters alone. Identification therefore provisional.	
47	*Pandemis cerasana*	Barred Fruit-tree Tortrix	5	Owain Gabb / Matt Hobbs	M3	Widespread: 344 records	
	Pandemis cerasana	Barred Fruit-tree Tortrix	2	Owain Gabb / Matt Hobbs	M2	Widespread: 344 records	
48	*Peribatodes rhomboidaria*	Willow Beauty	2	Owain Gabb / Matt Hobbs	M3	Common and widespread: 3383 records	
49	*Petrophora chlorosata*	Brown Silver-line	6	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1535 records	
50	*Phalera bucephala*	Buff-tip	4	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1608 records	
	Phalera bucephala	Buff-tip	1	Owain Gabb / Matt Hobbs	M2	Common and widespread: 1608 records	
	Phalera bucephala	Buff-tip	2	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1608 records	
51	*Pheosia gnoma*	Lesser Swallow Prominent	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 675 records	
52	*Plagodis dolabraria*	Scorched Wing	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 428 records	
53	*Polia nebulosa*	Grey Arches	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 389 records	
54	*Protodeltote pygarga*	Marbled White Spot	8	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1034 records	
	Protodeltote pygarga	Marbled White	1	Owain Gabb /	M2	Common and widespread: 1034 records	

Number	Taxon	Vernacular	Quantity	Determiner	Trap No	Status in Glamorgan (Gilmore, Slade & Stewart [2014])	Section 42 Species
		Spot		Matt Hobbs			
	Protodeltote pygarga	Marbled White Spot	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1034 records	
55	*Pseudargyrotoza conwagana*		1	Owain Gabb / Matt Hobbs	M3	Widespread: 263 records	
56	*Pterapherapteryx sexalata*	Small Seraphim	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 253 records	
	Pterapherapteryx sexalata	Small Seraphim	1	Owain Gabb / Matt Hobbs	M2	Common and widespread: 253 records	
57	*Ptilodon capucina*	Coxcomb Prominent	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 872 records	
58	*Rivula sericealis*	Straw Dot	3	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1731 records	
	Rivula sericealis	Straw Dot	1	Owain Gabb / Matt Hobbs	M2	Common and widespread: 1731 records	
59	*Scoparia ambigualis*		9	Barry Stewart	M3	Widespread: 845 records	
	Spilosoma lubricipeda	White Ermine	6	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1533 records	Yes
60	*Spilosoma lubricipeda*	White Ermine	9	Owain Gabb / Matt Hobbs	M2	Common and widespread: 1533 records	Yes
	Spilosoma lubricipeda	White Ermine	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1533 records	Yes
61	*Spilosoma luteum*	Buff Ermine	8	Owain Gabb / Matt Hobbs	M3	Common and widespread: 2762 records	Yes
	Spilosoma luteum	Buff Ermine	5	Owain Gabb / Matt Hobbs	M2	Common and widespread: 2762 records	Yes
62	*Stauropus fagi*	Lobster Moth	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 2762 records	
	Stauropus fagi	Lobster Moth	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 325 records	
63	*Thyatira batis*	Peach Blossom	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 325 records	
64	*Timandra comae*	Blood-vein	1	Owain Gabb / Matt Hobbs	M2	Common and widespread: 729 records	Yes
	Tyria jacobaeae	Cinnabar	10	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1485 records	Yes
65	*Tyria jacobaeae*	Cinnabar	1	Owain Gabb / Matt Hobbs	Field record/observation	Common and widespread: 1485 records	Yes
66	*Xestia triangulum*	Double Square-spot	4	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1378 records	
	Xestia triangulum	Double Square-	1	Owain Gabb /	M2	Common and widespread: 1378 records	

Number	Taxon	Vernacular	Quantity	Determiner	Trap No	Status in Glamorgan (Gilmore, Slade & Stewart [2014])	Section 42 Species
		spot		Matt Hobbs			
	Xestia triangulum	Double Square-spot	1	Owain Gabb / Matt Hobbs	M3	Common and widespread: 1378 records	

13 August 2014

Number	Taxon	Vernacular	Quantity	Determiner	Trap No.	Status in Glamorgan (Gilmore, Slade & Stewart [2014])	Section 42 Species
1	*Abrostola tripartita*	Spectacle	1	Owain Gabb	M2	Common and widespread: 1934 records	
	Abrostola tripartita	Spectacle	2	Owain Gabb	M1	Common and widespread: 1934 records	
2	*Agonopterix angelicella*		1	Barry Stewart	M1	Few modern records: 7 records	
3	*Agriphila latistria*		1	Owain Gabb	M1	Local: 162 records	
4	*Agriphila straminella*		2	Barry Stewart	M1	Common and widespread: 1410 records	
5	*Agriphila tristella*		4	Barry Stewart	M1	Very common: 1180 records	
6	*Agrotis exclamationis*	Heart and Dart	2	Owain Gabb	M1	Common and widespread: 5523 records	
7	*Agrotis puta*	Shuttle-shaped Dart	1	Owain Gabb	M2	Common and widespread: 2188 records	
	Agrotis puta	Shuttle-shaped Dart	1	Owain Gabb	M1	Common and widespread: 2188 records	
8	*Amphipoea oculea agg.*	Ear Moth agg.	4	Owain Gabb	M2	Three species have been recorded. Status of each is unclear.	Yes
	Amphipoea oculea agg.	Ear Moth agg.	1	Owain Gabb	M3	Three species have been recorded. Status of each is unclear.	Yes
	Amphipoea oculea agg.	Ear Moth agg.	3	Owain Gabb	M1	Three species have been recorded. Status of each is unclear.	Yes
9	*Apamea monoglypha*	Dark Arches	1	Owain Gabb	M1	Common and widespread: 4626 records	
	Apamea monoglypha	Dark Arches	1	Owain Gabb	M3	Common and widespread: 4626 records	
10	*Apotomis betuletana*		1	Barry Stewart	M1	Local at low density: 59 records	
11	*Axylia putris*	Flame	1	Owain Gabb	M3	Common and widespread: 2459 records	
	Axylia putris	Flame	2	Owain Gabb	M1	Common and widespread: 2459 records	
12	*Blastobasis adustella*		1	Owain Gabb	M1	Common and widespread: 891 records	
13	*Cabera exanthemata*	Common Wave	2	Owain Gabb	M1	Common and widespread: 979 records	
14	*Cabera pusaria*	Common White Wave	2	Owain Gabb	M1	Common and widespread: 1263 records	
15	*Celypha striana*		1	Owain Gabb	M3	Widespread: 579 records	
16	*Cerapteryx graminis*	Antler Moth	1	Owain Gabb	M3	Common and widespread: 346 records	
	Cerapteryx graminis	Antler Moth	3	Owain Gabb	M1	Common and widespread: 346 records	
17	*Chiasmia clathrata*	Latticed Heath	1	Owain Gabb	M2	Common and widespread: 287 records	Yes

Number	Taxon	Vernacular	Quantity	Determiner	Trap No.	Status in Glamorgan (Gilmore, Slade & Stewart [2014])	Section 42 Species
	Chiasmia clathrata	Latticed Heath	11	Owain Gabb	M1	Common and widespread: 287 records	Yes
18	*Chloroclysta truncata*	Common Marbled Carpet	1	Owain Gabb	M1	Common and widespread: 4419 records	
19	*Chloroclystis v-ata*	V-Pug	1	Owain Gabb	M1	Common and widespread: 884 records	
20	*Chortodes pygmina*	Small wainscot	1	Barry Stewart	M1	Common and widespread: 219 records	
21	*Cosmorhoe ocellata*	Purple Bar	1	Owain Gabb	M1	Common and widespread: 760 records	
22	*Cydia ulicetana*		1	Barry Stewart	M1	Common: 311 records	
23	*Depressaria heraclei*	Parsnip Moth	1	Barry Stewart	M1	Common: 90 records	
24	*Discestra trifolii*	Nutmeg	1	Barry Stewart	M1	Uncommon, restricted resident: 93 records	
25	*Drepana falcataria*	Pebble Hook-tip	5	Owain Gabb	M1	Common and widespread: 507 records	
26	*Ecliptopera silaceata*	Small Phoenix	5	Owain Gabb	M1	Common and widespread: 1795 records	Yes
27	*Ennomos alniaria*	Canary-shouldered Thorn	10	Owain Gabb	M1	Common and widespread: 667 records	
28	*Ennomos fuscantaria*	Dusky Thorn	1	Owain Gabb	M1	Common and widespread: 482 records	Yes
29	*Epinotia nisella*		1	Barry Stewart	M1	Common: 85 records	
30	*Epirrhoe alternata*	Common Carpet	1	Owain Gabb	M1	Common and widespread: 1936 records	
31	*Eudonia mercurella*		12	Owain Gabb	M1	Common and widespread: 696 records	
32	*Euthrix potatoria*	Drinker	1	Owain Gabb	M1	Common and widespread: 978 records	
	Euthrix potatoria	Drinker	1	Owain Gabb	M3	Common and widespread: 978 records	
	Euthrix potatoria	Drinker	1	Owain Gabb	M2	Common and widespread: 978 records	
33	*Gymnoscelis rufifasciata*	Double-striped pug	5	Barry Stewart	M1	Common and widespread: 2744 records	
34	*Hadena bicruris*	Lychnis	1	Owain Gabb	M1	Common and widespread: 571 records	
35	*Hydraecia micacea*	Rosy Rustic	2	Owain Gabb	M1	Common and widespread: 640 records	Yes
36	*Hydriomena furcata*	July Highflyer	1	Owain Gabb	M2	Common and widespread: 1074 records	
	Hydriomena furcata	July Highflyer	1	Owain Gabb	M1	Common and widespread: 1074 records	
37	*Idaea dimidiata*	Single-dotted Wave	1	Owain Gabb	M1	Common and widespread: 631 records	
38	*Ipimorpha retusa*	Double Kidney	1	Owain Gabb	M2	Uncommon, restricted resident: 97 records	
39	*Lacanobia oleracea*	Bright-line Brown-eye	1	Owain Gabb	M1	Common and widespread: 3388 records	
40	*Lomaspilis marginata*	Clouded Border	1	Owain Gabb	M1	Common and widespread: 1218 records	
41	*Luperina testacea*	Flounced Rustic	1	Owain Gabb	M1	Common and widespread: 1637 records	

Number	Taxon	Vernacular	Quantity	Determiner	Trap No.	Status in Glamorgan (Gilmore, Slade & Stewart [2014])	Section 42 Species
42	*Lycophotia porphyrea*	True Lover's Knot	2	Owain Gabb	M2	Common and widespread: 715 records	
43	*Macaria alternata*	Sharp-angled Peacock	2	Owain Gabb	M1	Common and widespread: 480 records	
44	*Mesapamea secalis agg.*	Common Rustic agg.	3	Owain Gabb	M3	Both species common and widespread	
	Mesapamea secalis agg.	Common Rustic agg.	5	Owain Gabb	M1	Both species common and widespread	
	Mesapamea secalis agg.	Common Rustic agg.	1	Owain Gabb	M2	Both species common and widespread	
45	*Miltochrista miniata*	Rosy Footman	1	Owain Gabb	M1	Common and widespread: 495 records	
46	*Mythimna impura*	Smoky Wainscot	1	Owain Gabb	M1	Common and widespread: 736 records	
47	*Nicrophorus investigator*	A burying beetle	1	Owain Gabb	M1	N/a	
48	*Noctua comes*	Lesser Yellow Underwing	1	Owain Gabb	M1	Common and widespread: 4138 records	
49	*Noctua interjecta*	Least Yellow Underwing	2	Owain Gabb	M1	Common and widespread: 354 records	
50	*Noctua janthe*	Lesser Broad-bordered Yellow Underwing	1	Owain Gabb	M3	Common and widespread: 1959 records	
	Noctua janthe	Lesser Broad-bordered Yellow Underwing	7	Owain Gabb	M1	Common and widespread: 1959 records	
	Noctua janthe	Lesser Broad-bordered Yellow Underwing	1	Owain Gabb	M1	Common and widespread: 1959 records	
51	*Noctua pronuba*	Large Yellow Underwing	60	Owain Gabb	M1	Common and widespread: 7556 records	
	Noctua pronuba	Large Yellow Underwing	1	Owain Gabb	M2	Common and widespread: 7556 records	
	Noctua pronuba	Large Yellow Underwing	4	Owain Gabb	M3	Common and widespread: 7556 records	
52	*Notodonta dromedarius*	Iron Prominent	2	Owain Gabb	M1	Common and widespread: 736 records	
53	*Notodonta ziczac*	Pebble Prominent	2	Owain Gabb	M1	Common and widespread: 1014 records	
54	*Ochropleura plecta*	Flame Shoulder	20	Owain Gabb	M1	Common and widespread: 4974 records	
	Ochropleura plecta	Flame Shoulder	8	Owain Gabb	M3	Common and widespread: 4974 records	
	Ochropleura plecta	Flame Shoulder	2	Owain Gabb	M2	Common and widespread: 4974 records	
55	*Opisthograptis luteolata*	Brimstone Moth	7	Owain Gabb	M1	Common and widespread: 5163 records	
	Opisthograptis luteolata	Brimstone Moth	1	Owain Gabb	M2	Common and widespread: 5163 records	

Number	Taxon	Vernacular	Quantity	Determiner	Trap No.	Status in Glamorgan (Gilmore, Slade & Stewart [2014])	Section 42 Species
	Opisthograptis luteolata	Brimstone Moth	1	Owain Gabb	M3	Common and widespread: 5163 records	
56	*Pandemis corylana*	Chequered Fruit-tree Tortrix	2	Owain Gabb	M1	Widespread: 172 records	
57	*Peribatodes rhomboidaria*	Willow Beauty	1	Owain Gabb	M3	Common and widespread: 3383 records	
58	*Pheosia gnoma*	Lesser Swallow Prominent	2	Owain Gabb	M1	Common and widespread: 675 records	
59	*Phlogophora meticulosa*	Angle Shades	1	Owain Gabb	M1	Common and widespread: 2812 records	
60	*Phragmatobia fuliginosa*	Ruby Tiger	1	Owain Gabb	M1	Common and widespread: 629 records	
61	*Pleuroptya ruralis*	Mother of Pearl	3	Owain Gabb	M1	Common and widespread: 1323 records	
62	*Plusia festucae*	Gold Spot	1	Owain Gabb	M3	Common and widespread: 589 records	
	Plusia festucae	Gold Spot	4	Owain Gabb	M1	Common and widespread: 589 records	
63	*Pterostoma palpina*	Pale Prominent	1	Owain Gabb	M1	Common and widespread: 675 records	
64	*Rivula sericealis*	Straw Dot	2	Owain Gabb	M3	Common and widespread: 1731 records	
	Rivula sericealis	Straw Dot	16	Owain Gabb	M1	Common and widespread: 1731 records	
65	*Schrankia costaestrigalis*	Pinion-streaked Snout	1	Owain Gabb	M1	Common and widespread: 216 records	
66	*Selenia dentaria*	Early Thorn	1	Owain Gabb	M1	Common and widespread: 1780 records	
67	*Thyatira batis*	Peach Blossom	1	Owain Gabb	M1	Common and widespread: 858 records	
68	*Timandra comae*	Blood-vein	1	Owain Gabb	M1	Common and widespread: 729 records	Yes
69	*Udea ferrugalis*	Rusty-dot Pearl	5	Owain Gabb	M1	Immigrant: 896 records	
70	*Udea ferrugalis*	Rusty-dot Pearl	1	Owain Gabb	M3	Immigrant: 896 records	
71	*Xanthorhoe designata*	Flame Carpet	1	Owain Gabb	M2	Common and widespread: 1196 records	
	Xanthorhoe designata	Flame Carpet	1	Owain Gabb	M1	Common and widespread: 1196 records	
72	*Xestia c-nigrum*	Setaceous Hebrew Character	12	Owain Gabb	M2	Common and widespread: 3440 records	
	Xestia c-nigrum	Setaceous Hebrew Character	2	Owain Gabb	M3	Common and widespread: 3440 records	
	Xestia c-nigrum	Setaceous Hebrew Character	56	Owain Gabb	M1	Common and widespread: 3440 records	
73	*Xestia xanthographa*	Square-spot Rustic	2	Owain Gabb	M1	Common and widespread: 3182 records	

Appendix 4: Images

Image 1: Woodland 1

Image 2: Woodland 4

Image 3: Marshy grassland in NW of Survey Site

Image 4: Marshy grassland in NW of Survey Site

Image 5: Pond 11

Image 6: Pond 16

Image 7: Watercourse Sampling Point 1

Image 8: Watercourse Sampling Point 2

Image 9: Watercourse Sampling Point 3

Image 10: Watercourse Sampling Point 4

Image 11: Watercourse Sampling Point 5

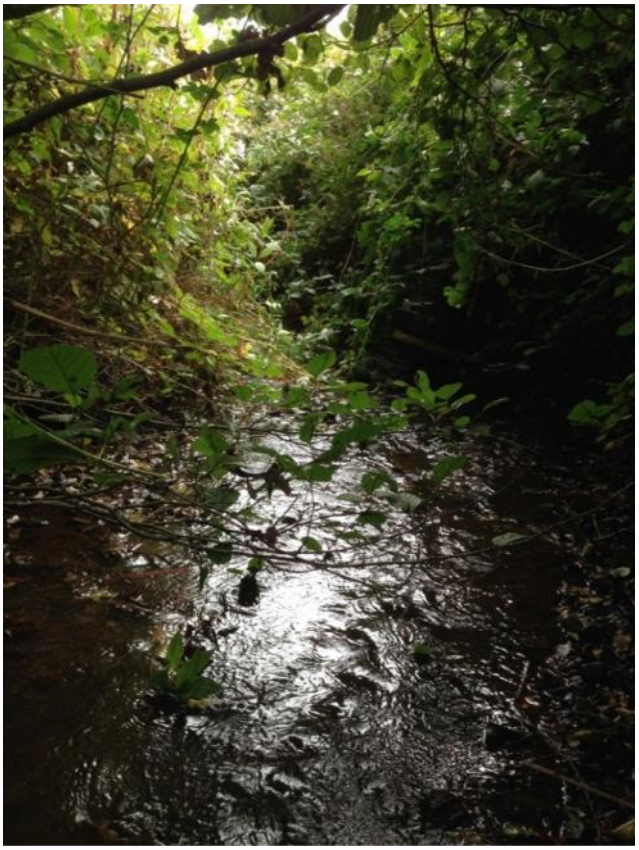

Image 12: Watercourse Sampling Point 6

Image 13: Watercourse Sampling Point 7

Image 14: Watercourse Sampling Point 8

Appendix 5: Aquatic Macroinvertebrate Data

Table 1: Pond Survey

Species Number	Taxa	Pond 11	Pond 16
1	*Crangonyx pseudogracilis*	13	15
2	*Pisidium* spp.	19	16
3	*Coleoptera* spp.	5	4
	Dytiscidae spp.	1	3
4	*Dytiscus marginalis*	1	
5	*Hydroglyphus geminus*	2	
6	*Hydroporus palustris*	1	
7	*Hydroporus pubescens*	2	
8	*Hyphydrus ovatus*	4	5
9	*Laccophilius minutus*	1	
10	*Stictonectes lepidus*	22	
11	*Gyrinus substriatus*		3
12	*Haliplus lineatocollis*	1	
13	*Haliplus ruficollis*	9	2
14	*Haliplus ruficollis* grp	24	6
15	*Helophorus brevipalpis*	80	7
16	*Helophorus flavipes*	3	
17	*Helophorus obscurus*	4	3
18	*Helophorus obscurus/flavipes grp*	15	4
19	*Hydraena gracilis*	1	
20	*Hydraena rufipes* grp	1	
21	*Anacaena limbata*	3	
22	*Anacaena lutescens*	14	1
23	*Enochrus spp.*	2	
24	*Hydrobius fuscipes*	1	
25	*Laccobius minutus*	3	
26	*Laccobius sinuatus*	1	
27	*Chaoboridae* spp.	1	1
28	*Chironimidae* spp.	3	19
29	*Diptera* spp.	1	
30	*Dixidae* spp.		2
31	*Cloeon dipterum*	29	8
32	*Lymnaea peregra*	6	5
33	*Physa fontinalis*		15
34	*Corixa panzeri*	1	
	Corixidae spp.	1	4
35	*Hesperocorixa castanea*		4
36	*Hesperocorixa linnaei*	6	
37	*Hesperocorixa sahlbergi*	2	11
38	*Sigara nigrolineata*	1	1

Species Number	Taxa	Pond 11	Pond 16
	Gerridae spp. nymph	4	3
39	*Gerris lacustris*	2	1
40	*Hydrometra stagnorum*	1	2
41	*Ilyocoris cimicoides*	8	1
42	*Nepa cinerea*		1
43	*Notonecta obliqua*	4	3
44	*Microvelia reticulata*	4	
	Microvelia spp.	4	
45	*Hydracarina*		1
46	*Sialis lutaria*		2
47	*Aeshna mixta*	1	
	Aeshnidae spp.	6	2
48	*Ishnura elegans*	12	22

Table 2: Watercourse Survey

				Sampling Point							
Species Number	**Order**	**Family**	**Taxa**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	Amphipoda	*Gammaridae*	*Gammarus pulex*	26	20	67	13	15	106	26	22
2	Anisoptera	*Cordulegasteridae*	*Cordulegaster boltonii*		1	2	1			1	1
3	Bivalvia	*Ancylidae*	*Ancylus fluviatilis*				2		3		
4	Bivalvia	*Sphaeriidae*	*Pisidium* sp.								1
5	Coleoptera	*Dytiscidae*	*Deronectes latus*								1
6	Coleoptera	*Dytiscidae*	*Dytiscidae indet*							10	27
7	Coleoptera	*Dytiscidae*	*Oreodytes sanmarkii*						53		22
8	Coleoptera	*Elmidae*	*Elmidae indet*	1	1	1	2		15	2	2
9	Coleoptera	*Elmidae*	*Elmis aenea*			1	1	2	6	2	
10	Coleoptera	*Elmidae*	*Limnius volkmari*					4	12		1
11	Coleoptera	*Gyrinidae*	*Gyrinus substriatus*				1				
12	Coleoptera	*Haliplidae*	*Haliplus lineatocollis*					2			
13	Coleoptera	*Hydraenidae*	*Hydraena gracilis*						2		
14	Coleoptera	*Hydraenidae*	*Hydraena rufipes grp*					1	1		
15	Coleoptera	*Hydrophilidae*	*Anacaena globulus*							1	
16	Coleoptera	*Scirtidae*	*Scirtidae indet*	1	3	9		1		5	
17	Diptera	*Ceratopogonidae*	*Ceratopogonidae*				1		1	1	
18	Diptera	*Chironomidae*	*Chironomidae*	8	7	16	7	10	8	19	20
19	Diptera	*Dixidae*	*Dixidae*	11	6		3	3		1	2
20	Diptera	*Empididae*	*Empididae*		1						
21	Diptera	*Pediciidae*	*Pediciidae*	2	3				2		
22	Diptera	*Psychodidae*	*Psychodidae*							1	
23	Diptera	*Simuliidae*	*Simuliidae*	5	12	4		9	2	25	
24	Diptera	*Tabanidae*	*Tabanidae*								1
25	Diptera	*Tipulidae*	*Tipulidae*					1			
26	Ephemeroptera	*Baetidae*	*Baetis* sp.	21	27	1	16	2	53	7	3
27	Ephemeroptera	*Ephemerellidae*	*Seratella ignita*	1					1		
28	Ephemeroptera	*Ephemeridae*	*Ephemera danica*		1						
29	Ephemeroptera	*Heptageniidae*	*Ecdyonurus* sp.	32	56	3	10	10	20	2	2
30	Ephemeroptera	*Leptophlebiidae*	*Paraleptophlebia* sp.			5				1	3
31	Gastropoda	*Hydrobiidae*	*Potamopyrgus antipodarum*			2					
32	Gastropoda	*Lymnaeidae*	*Lymnaea peregra*						17	6	9
33	Hemiptera	*Gerridae*	*Gerris gibbifer*								2

				Sampling Point							
Species Number	**Order**	**Family**	**Taxa**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
34	Hemiptera	*Veliidae*	*Velia caprai*				1				
35	Hemiptera	*Veliidae*	*Veliidae indet*		1		1				
36	Megaloptera	*Sialidae*	*Sialis fuliginosa*							1	1
37	Megaloptera	*Sialidae*	*Silais lutaria*								1
38	Neuroptera	*Osmylidae*	*Osmylus fulvicephalus*					1			
39	Oligochaeta	*Oligochaeta*	*Oligochaeta*			2			1	4	2
40	Plectoptera	*Leuctridae*	*Leuctra fusca*	28	39	105	49	64	31	20	17
41	Plectoptera	*Nemouridae*	*Nemoura cambrica*		1	2	2	6		1	1
42	Plectoptera	*Nemouridae*	*Nemouridae indet*				1				
43	Plectoptera	*Nemouridae*	*Protonemura praecox*						2		
44	Plectoptera	*Perlodidae*	*Perlodes microcephala*	1				1		1	
45	Trichoptera	*Glossosomatidae*	*Agapetus fuscipes*						3		
46	Trichoptera	*Hydropsychidae*	*Hydropsyche siltalai*	9	3				18	1	2
47	Trichoptera	*Lepidostomatidae*	*Lepidostoma hirtum*		2						
48	Trichoptera	*Leptoceridae*	*Mystacides azurea*					1			
49	Trichoptera	*Leptroceridae*	*Adicella reducta*			2					
50	Trichoptera	*Limnephilidae*	*Potamophylax rotundipennis*	1	1	2					
51	Trichoptera	*Odontoceridae*	*Odontocerum albicorne*	1	1				1		
52	Trichoptera	*Philopotamadie*	*Wormaldia occipitalis*	8	1	6	2				
53	Trichoptera	*Polycentropodidae*	*Plectrocnemia conspersa*			1	5				
54	Trichoptera	*Polycentropodidae*	*Polycentropus flavomaculatus*						9		
55	Trichoptera	*Rhyacophilidae*	*Rhyacophila dorsalis*	9	4	1	2		8		2
56	Trichoptera	*Rhyacophilidae*	*Rhyacophila* sp.			1					
57	Trichoptera	*Sericostomatidae*	*Sericostoma personatum*						1		1
58	Zygoptera	*Calopterygidae*	*Calopteryx virgo*								2
59	Zygoptera	*Coenagrionidae*	*Coenagrionidae indet*								1

Appendix 8.4

Great Crested Newt Survey Report

Abergelli Power Project
Great Crested Newt Survey Report

Abergelli Power Limited
May 2018

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CONTENTS

TABLES

1. Executive Summary

1.1.1 AECOM were commissioned to undertake Great Crested Newt Surveys on ponds identified as suitable to support GCN within the Project Site and within 500 m of the Project Site. The Project Site is approximately 30.66 ha and located near to the village of Felindre, Swansea.

1.1.2 The Abergelli Power Project development proposals are for a proposed 299MW Open Cycle Gas Turbine power station.

1.1.3 The Abergelli Power Project comprises the following principal elements:

- A new Power Generation Plant;
- A new integral Electrical Connection; and,
- A new integral Gas Connection.

1.1.4 The Power Generation Plant, Gas Connection and Electrical Connection together are referred to as the Project.

1.1.5 The Project will require the partial removal of terrestrial and aquatic habitat suitable to support GCN.

1.1.6 It is understood that construction is programmed to commence no sooner than 2020/2021

1.1.7 The GCN is protected under European law through Annexes II and IV of the EC Habitats Directive (Council Directive 92/43/EEC). Protection is given to all life stages (e.g. adults, sub-adults, larvae, and eggs). This is implemented into UK law under section 41 of the Conservation of Habitats and Species Regulations, 2010 where it is listed as a European protected species under Schedule 2. GCN is an Environment (Wales) Act 2016 Section 7 Priority Species.

1.1.8 A total of 26 ponds were identified within proximity of the Project Site.

1.1.9 A Habitat Suitability Index (HIS) Assessment was undertaken an all ponds within 500m of the Site and ponds outside of the 500 m but clustered with ponds within the 500m of the Project Site boundary. Further surveys were undertaken, where appropriate, following the results of the HSI Assessment.

1.1.10 Following the HSI Assessment, off the 26 ponds identified, two were classed as poor (a further survey was undertaken on one of these) nine were dry and seven were not accessible and therefore could not be surveyed. A combination of manual and eDNA surveys were undertaken on nine ponds.

1.1.11 No great crested newts were identified during the manual surveys and the eDNA surveys undertaken were all returned with a negative result. The manual surveys ceased once the results of the eDNA surveys had been received. Common amphibians were identified during the surveys.

1.1.12 Of the seven ponds that were not accessible. These are considered unlikely to support great crested newts given the lack of GCN records from the local records centre and the absence of GCN identified in other ponds during the surveys

1.1.13 No further surveys for great crested newts are required and there will be no impact on great crested newts as part of the Project.

1.1.14 The Project will require the removal of three ponds (Ponds 16, 22 and 23). Pond 22 currently supports palmate newts and is likely to support other amphibians including frogs and toads as well as a range of generalist aquatic invertebrates. Pond 16 was dry. Pond 23 could not be assessed but if it contains water has the potential to support generalist aquatic invertebrates and common amphibians.

1.1.15 Where the scheme design allows, ponds, swales or water bodies, should be considered to mitigate the loss of the ponds and enhance the Site for common amphibians.

1.1.16 Log piles and hibernacula could be created in suitable areas of habitat (such as grassland and scrub/woodland edges), to enhance the area for amphibians.

2. Introduction

2.1.1 AECOM were commissioned to undertake Great Crested Newt (GCN) Surveys on ponds identified as suitable to support GCN within the Abergelli site and within proximity of the Abergelli site (hereafter referred to as the 'Project Site'). An Habitat Suitability Index (HSI) Assessment was undertaken an all ponds, where access allowed, within 500 m of the Site and ponds outside of the 500m but clustered with ponds within the 500 m of the Project Site boundary. Further surveys were undertaken following the HSI Assessment.

2.2 The Project

2.2.1 The Project Site is located near to the village of Felindre, Swansea, as shown in Figure 1.1, and the central grid reference for the Project Site is SN65280143. A full description of the development is provided in **Chapter 3: Project and Site Description** of the ES.

2.3 Great Crested Newt Ecology

2.3.1 GCNs are one of the two European Protected Species of amphibian found in the UK.

2.3.2 GCNs, like all British amphibians, rely on water bodies for breeding but otherwise spend much of their lives on land. They are ectotherms and have permeable skins, so most movement occurs when the air temperature is above approximately 5ºC and there is, or has recently been rain.

2.3.3 Adults and immature newts spend the winter in places where they will be protected from frost and flooding. Whilst on land outside of the hibernation period, GCNs will also take refuge to shelter from extremes of weather; hence during the day they will often rest in dense vegetation, under refuges or underground. Adult GCNs normally begin moving from their over-wintering land sites between February and April, with some adult newts not reaching the desired water body until May, but this is very weather dependant. Not all life-stages enter water over the course of a year; immature newts (or efts) may spend all year on land until they reach breeding condition.

2.3.4 Upon reaching the pond, the peak courtship and egg-laying period is normally from mid-March to mid-May. The larvae hatch out after about three weeks, and then take another two to three months to complete larval development. The larvae emerge from the pond upon completion of metamorphosis and enter the eft land stage. This move usually begins in early August and lasts for about two months. Adult newts generally leave the breeding ponds from late May onwards, a movement which occurs gradually with most newts having left by August but some staying until October or even remaining over winter.

2.3.5 GCNs in a given area often form a metapopulation (a series of sub-populations that are linked by dispersal of individuals). Newt populations function in this way since they depend on habitats which vary in quality over time, and where the distribution of suitable habitats often changes. This metapopulation concept complicates the study and conservation of this species, since impacts to a single pond may have knock-on effects on newts in nearby ponds. GCNs commonly move between ponds that are up to 250 m from each other but are known to range up to 500 m from breeding ponds in some cases.

2.3.6 English Nature (Ref. 1) lists the following pond characteristics as being favourable for GCN populations:

- Surface area between 100 and 300 m^2;
- Variable depth, but preferably not so deep that aquatic and emergent vegetation is unable to take root. A maximum depth around 4 m is acceptable;
- Substantial cover of submerged and marginal vegetation;
- Open areas to facilitate courtship behaviour;
- Good populations of invertebrates and other amphibians as prey;
- Ponds in clusters rather than in isolation;
- Absence of shading on the south side;
- Absence of fish; and
- Absence of waterfowl.

2.4 Great Crested Newt Legislation

2.4.1 The GCN is protected under European law through Annexes II and IV of the EC Habitats Directive (Council Directive 92/43/EEC). Protection is given to all life stages (e.g. adults, sub-adults, larvae, and eggs). This is implemented into UK law under section 41 of the Conservation of Habitats and Species Regulations, 2010 where it is listed as a European protected species under Schedule 2, which in summary makes it an offence to:

- Deliberately take (capture), injure or kill a GCN. (In a court, 'deliberately' would probably be interpreted as someone who, although not intending to take, injure or kill a GCN, performed the relevant action, being sufficiently informed and aware of the consequence his/her action will most likely have.);
- Deliberately disturb a GCN in a way that would affect its ability to survive, breed or rear young, hibernate or migrate or significantly affect the local distribution or abundance of the species;
- Damage or destroy a breeding site or resting place of a GCN;
- Possess or control any live or dead specimen or anything derived from a GCN; and,
- Intentionally take or destroy the eggs of a GCN.

2.4.2 The GCN is also given full protection under Section 9 of the Wildlife and Countryside Act 1981 (as amended) through its inclusion on Schedule 5. In summary, the legislation makes it an offence to:

- Intentionally or recklessly take (capture), injure or kill a GCN;
- Intentionally or recklessly disturb a GCN;

- Intentionally or recklessly damage or destroy, or obstruct access to, any structure or place which a GCN uses for shelter or protection or intentionally or recklessly disturb a GCN while it uses such a place; and,
- Possess or advertise/sell/exchange a GCN (dead or alive) or any part of a GCN.

2.4.3 The inclusion of this species on Annex II of the Habitats Directive also means that a Special Area of Conservation (SAC) can be designated as a protected area due to a significant presence of this species.

2.4.4 The Natural Environment and Rural Communities (NERC) Act (2006), as amended, puts an obligation on public bodies to have regard, so far as is consistent with the proper exercise of their functions, to the purpose of conserving biodiversity. Under the terms of the Act, conserving biodiversity includes restoring or enhancing populations and/or habitats. The local planning authority (LPA) or other determining authority must therefore consider the effects of planning applications upon biodiversity and how it can be mitigated for or enhanced.

2.4.5 In addition, Government Circular ODPM 06/2005: “Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System” sets out further detail on how species and habitats should be considered during planning applications.

2.4.6 GCN is an Environment (Wales) Act 2016 Section 7 Priority Species. These are the species found in Wales which were identified as requiring action under the UK BAP and which continue to be regarded as conservation priorities under the UK Post-2010 Biodiversity Framework. As such, it is targeted for measures necessary to support its conservation status in the UK.

2.5 Quality Assurance

2.5.1 The surveys and subsequent report was undertaken in line with AECOM’s Integrated Management System (IMS). Our IMS places great emphasis on professionalism, technical excellence, quality, environmental and Health and Safety management. All staff members are committed to establishing and maintaining our certification to the international standards BS EN ISO 9001:2008 and 14001:2004 and BS OHSAS 18001:2007. In addition our IMS requires careful selection and monitoring of the performance of all sub consultants and contractors.

2.5.2 All AECOM Ecologists who led surveys and completed the reporting for this project are members of (at the appropriate level) the Chartered Institute of Ecology and Environmental Management (CIEEM) and all follow their code of professional conduct (CIEEM, 2013) when undertaking ecological work.

3. Methodology

3.1 Desk Study

3.1.1 A full desk study was not undertaken to establish the number of ponds within the Project Site and within 500 m of the Project Site as the client provided AECOM with the location and number of ponds identified by WSP/PB in March 2017 (Appendix 8.17).

Previous Surveys

3.1.2 The client provided AECOM with a copy of GCN surveys undertaken at the Project Site by BSG Ecology in 2014 (ES Appendix 8.17).

3.2 Habitat Suitability Assessment

3.2.1 The client provided AECOM with a list of 23 ponds, 19 of these had been subject to a HSI assessment undertaken by WSP/PB in March 2017. Where access allowed, these ponds were visited by AECOM in May 2017 to check the assessment score.

3.2.2 HSI is a tool used to assess the likelihood that a water body will support GCN. It incorporates ten suitability indices (SI), all of which are factors thought to affect the suitability of a water body to support GCN, such as the quality of the water and the presence / absence of different predators (particularly fish and waterfowl). Each variable is assessed separately and then mathematically combined to provide a numerical index, between 0 and 1 (Ref. 3). The HSI Categorisations is described in Table 3-1 below.

3.2.3 The following equation is used (Ref. 3):

HSI = (SI1*SI2*SI3*SI4*SI5*SI6*SI7*SI8*SI9*SI10).

Table 3-1. Categorisation of HSI Scores

HSI Score	Pond Suitability
< 0.5	Poor
0.5 - 0.59	Below Average
0.6 - 0.69	Average
0.7 - 0.79	Good
> 0.8	Excellent

3.3 Manual Surveys

3.3.1 Manual GCN surveys were undertaken on ponds (where access allowed) with a score of below average or above. GCN surveys were undertaken paying due regard to Natural England's Great Crested Newt Standing Advice (Ref. 3) and Froglife's Great Crested Newt Conservation Handbook (Ref. 1). GCN Surveys were undertaken by an appropriately licenced ecologist and in suitable weather conditions. Manual surveys ceased once a negative eDNA sampling result had been received. The manual surveys that were undertaken were carried out within the Natural Resources Wales (NRW) approved survey season window.

3.3.2 Four GCN manual survey visits are required to establish GCN presence/ absence within the period mid-March to mid-June (with at least two surveys during mid-April to mid-May). An additional two surveys (six in total) are required to estimate GCN population. Three out of five survey techniques are required on each of the ponds surveyed. A combination of four survey techniques were utilised as appropriate. Torchlight searching, bottle trapping, egg searching and netting. All manual survey methods were undertaken by at least one NRW GCN licence holder. A description of the survey techniques used is as follows:

a) Torching

3.3.3 The water body was thoroughly searched using torch light between dusk and midnight. The surveyor walked slowly around the perimeter of the water body once (where access was possible), checking for newts in the torch beam every 2 – 3 m, paying particular attention to marginal vegetation and potential display areas on the pond bottom. Care was taken with the torch to minimise disturbance to the newts and other wildlife which may have been present (e.g. nesting birds). To allow comparison between ponds, the same power of torch (between 100,000 – 1,000,000 candlepower) was used on every occasion.

b) Bottle Trapping

3.3.4 Bottle traps were set around the margin of the water body in the evening and left overnight to catch adults during the breeding season. Traps were set at an appropriate density of one trap per two metres of shoreline dependent upon individual site variations. The guidelines set out by Natural England, Froglife, and the Herpetofauna Workers Manual was followed strictly to ensure the welfare of trapped newts and other aquatic organisms.

c) Egg Searching

3.3.5 Submerged and floating aquatic vegetation was checked by the surveyor in order to locate great crested newt eggs. Egg searches are terminated when presence of great crested newt eggs is confirmed. This method is unreliable for population estimates. Terminated egg searches where great crested newt eggs have been identified avoids excess damage to the eggs by minimising impacts of predation and UV light.

d) Netting

3.3.6 A sturdy dip-net with a 2 – 4 mm mesh was used for netting for fifteen minutes per 50m of pond shoreline.

3.4 eDNA Sampling

3.4.1 eDNA sampling was undertaken following the methodologies provided in Biggs et al (Ref. 5). eDNA kits were purchased from SureScreen. Water sampling was undertaken by at least one NRW GCN licenced surveyor per pond. Water samples were taken from 20 locations around each pond as described in the instructions provided by SureScreen and in Ref. 5. Samples were stored in accordance with the instructions provided by SureScreen and returned to SureScreen for analysis. Care was taken at all steps in the procedure to avoid contamination of samples.

3.4.2 The following NRW GCN licenced surveyors were used to undertake the manual and eDNA surveys:

3.4.3 Clare Morgans GradCIEEM, Ben Walsh ACIEEM and Jack Muskett GradCIEEM.

3.5 Limitations

a) Pond Access

3.5.1 Of the 26 ponds identified, seven were not accessible. Six of these were not accessible due to land access restrictions (Ponds 12-14, 18, 23 and 24) and one was surrounded by a large, tall area of dense bramble vegetation (Pond 10) and therefore could not be surveyed. (see Section 4.1.2, Table 4-1).

3.5.2 Ponds 12-14 and 18 are located close to each other approximately 400-500 m east of the Project Site boundary. There is the possibility that these ponds may support GCN, although this is considered unlikely given the lack of GCN records from the local records centre and the absence of GCN identified in other ponds during the surveys.

3.5.3 Pond 10 is not considered likely to support GCN. It has previously been surveyed and no evidence of GCN was found (ES Appendix 8.17). No records of GCN were returned from the local records centre. Ponds 9 and 21 which are within close proximity were deemed not suitable to support GCN and no evidence of GCN was found in Pond 19a.

3.5.4 Pond 23 is not considered likely to support GCN given the lack of GCN records from the local records centre and the absence of GCN in other ponds within a 500 m radius.

3.5.5 Pond 24 is located to the west of the Project Site and may support GCN, although this is considered unlikely given the lack of GCN records from the local records centre and the absence of GCN identified in other ponds during the surveys.

b) Manual Surveys

3.5.6 The three required manual survey methods were not undertaken on Ponds 1b, 4, 11 and 19b (see Section 4.1.2, Table 4-1 and Section 4.2, Table 4-4) due to a combination of health and safety issues and dense vegetation.

3.5.7 Ponds 1b and 4 are within a cluster of ponds to the north west of the Project Site. No evidence of GCN was identified for Pond 7 and Pond 8 which is within this cluster of ponds and therefore the manual survey limitation is not deemed significant.

3.5.8 Pond 11 has previously been surveyed and no evidence of GCN was found (ES Appendix 8.17). Therefore the manual survey limitation is not deemed significant.

3.5.9 On the first survey visit to Pond 19b, the water level had dropped making it impossible to bottle trap. Torching was attempted but not possible due to the low water level and vegetation cover. Egg searching was not possible as the access was restricted to the vegetation due to deep soft mud. Pond 19b is connected to Pond 19a. Pond 19a was deemed poor as part of the HSI assessment. However, due to the limitation to the surveys on Pond 19b, manual surveys and an eDNA survey were undertaken on Pond 19a. No evidence of GCN was returned for Pond 19a and therefore the manual survey limitation on Pond 19b is not deemed significant.

3.5.10 Manual surveys were not undertaken on Pond 17, as AECOM did not gain land access permission to the pond within the required survey season time. However, once granted it was possible to eDNA sample Pond 17 within the approved survey season window.

3.5.11 A summary of the manual survey and eDNA limitations is given in Table 3-2.

c) eDNA Sampling

3.5.12 eDNA surveys were undertaken on all ponds, where access allowed, of below average category and above, with the exception of Ponds 19a and 19b. On the first manual survey visit to Pond 19b, the water level had dropped and deep soft mud was exposed on the edges making it unsuitable for eDNA sampling. As Pond 19b is connected to Pond 19a, the decision was taken to proceed with an eDNA survey on Pond 19a despite it being categorised as Poor. As the GCN eDNA result returned for Pond 19a was negative, it was assumed that Pond 19b was also negative as the two ponds are connected.

3.5.13 The eDNA sampling was restricted due to accessibility on Ponds 1b, 4 and 11 caused by dense vegetation and soft, deep mud. Approximately only 5% of the perimeter of the pond was accessible to sample (see Table 3-2 and Table 4-5). Usually a GCN eDNA water sample which has been taken from such a restricted area reduces the confidence in any negative result returned as GCN eDNA can be patchy depending upon where the animals have been in the pond.

3.5.14 However on this occasion, given the lack of evidence of GCN within other ponds in close proximity of Ponds 1b, 4 and 11 and the previous survey undertaken on Pond 11 which returned no results for GCN (ES Appendix 8.17). The eDNA limitation on Ponds 1b, 4 and 11 is not deemed significant.

3.6 Survey Limitations Summary

Table 3-2: Survey Limitation Summary Table

Pond Number	Manual Survey Limitation	eDNA Survey Limitation
1b	Not possible to bottle trap or net due to deep and soft mud surrounding the waterbody. Torched only from limited accessible areas.	Only 5% of pond perimeter accessible to sample.
4	Not possible to bottle trap or net due to deep and soft mud surrounding the waterbody. Torched only from limited accessible areas.	Only 5% of pond perimeter accessible to sample.
7	A dead water shrew was found in one of the bottle traps during the first survey visit in Pond 7, therefore bottle trapping ceased for Pond 7 and the netting technique was used for future surveys.	None
8	A dead water shrew was found in one of the bottle traps during the first survey visit in Pond 7. Due to the proximity of Pond 8 to Pond 7 and the risk of trapping water shrews, bottle trapping ceased for Pond 8 and the netting technique was used for future surveys.	None
11	Only approximately 5% of edge is accessible. Low water level and steep sides, not suitable for bottle trapping and dense vegetation will restrict torching. Small area was torched on 1st survey visit but ineffective. No further manual surveys were undertaken.	Only 5% of pond perimeter accessible to sample.
17	No manual surveys undertaken as access not granted within the required survey season time.	None
19b	Low water level, dense vegetation and soft mud. Not be suitable for bottle trapping, torching or egg searching. Access restricted by soft mud. Small area was torched on 1st survey visit but ineffective. No further manual surveys were undertaken on 19b. Manual surveys undertaken on Pond 19a	No eDNA sample undertaken on Pond 19b. Pond 19a was sampled instead.

	undertaken as connected to Pond 19b.	

4. Results

4.1 Desk Study

4.1.1 WSP/PB identified a total of 23 ponds within 500 m of the previous Project Site boundary and undertook a HSI assessment on 19 of these, 16 of which were considered suitable to support GCN (see Table 4-1).

4.1.2 The Preliminary Ecological Appraisal (PEA) undertaken by AECOM in May 2017 (ES Appendix 8.1) identified a further two ponds within 500 m of the Project Site (See Table 4-1 Pond 23 and 24).

4.1.3 The WSP/PB (ES Appendix 8.13) and the AECOM PEA (ES Appendix 8.1) desk study highlighted that no GCN records were returned within 2 km of the Project Site from the local records centre.

a) Previous Surveys

4.1.4 The GCN surveys undertaken by BSG Ecology in 2014 did not identify any GCN from the ponds surveyed (ES Appendix 8.17). Palmate newts Lissotriton helveticus and smooth newts Lissotriton vulgaris were identified.

b) Habitat Suitability Assessment

4.1.5 During the pond scoping survey to check the HSI categorisation AECOM identified an additional pond, Pond 1b.

4.1.6 Table 4-1 shows the number of ponds identified, the pond category given by WSP/PB, the updated AECOM pond category and change in conditions/ limitations identified by AECOM in May 2017and the approximate distance and direction to the pond from the Project Site boundary. Figure 1 shows the location of the ponds and the AECOM pond category.

Table 4-1: HSI Assessment Pond Category and Change in Conditions

Pond Number	WSP/PB HSI Assessment Pond Category	AECOM HSI Assessment Pond Category	Change in Conditions/ Limitations	Approximate Distance and Direction from the Project Site boundary
1	Below average	Dry	Unable to survey, pond is dry.	650 m west
1b	Not assessed	Below average	Not possible to bottle trap or net due to deep and soft mud surrounding the waterbody. Torched only from limited accessible areas.	670 m west
2	Below average	Dry	Unable to survey pond is dry.	600 m west
3	Average	Dry	Unable to survey pond is dry.	580 m west
4	Average	Average	Not possible to bottle trap or net due to deep and soft mud surrounding the waterbody. Torched only from limited accessible areas	560 m west
5	Below average	Dry	Unable to survey pond is dry	500 m west
6	Average	Dry	Unable to survey pond is dry	460 m west
7	Excellent	Excellent	N/A	400 m west
8	Good	Good	N/A	380 m west
9	Average	Dry	Unable to survey pond is dry.	160 m north east
10	Average	Not assessed	Could not access pond due to dense bramble.	215 m north east
11	Good	Good	Only approximately 5% of edge is accessible. Low water level and steep sides, not suitable for bottle trapping. Torching may be possible but vegetation is dense.	150 m west
12	Not assessed, no	Not assessed, no	N/A	400 m east

Pond Number	WSP/PB HSI Assessment Pond Category	AECOM HSI Assessment Pond Category	Change in Conditions/ Limitations	Approximate Distance and Direction from the Project Site boundary
	access	access		
13	Not assessed, no access	Not assessed, no access	N/A	450 m east
14	Not assessed, no access	Not assessed, no access	N/A	490 m east
15	Pond not present during March 2017.	Dry	N/A	25 m east
16	Average	Dry	Unable to survey pond is dry.	Within Project Site boundary
17	Average	Average	N/A	190 m west
18	Not assessed, no access	Not assessed, no access	N/A	415 m east
19a	Poor	Poor	N/A	440 m north
19b	Below average	Below average	Low water level, dense vegetation and soft mud. May not be suitable for bottle trapping, torching or egg searching. Access restricted by soft mud.	540 m north
20	Poor	Dry	Unable to survey pond is dry.	460 m west
21	Below average	Poor	Pond recently cleared of all vegetation.	170 m north east
22	Below average	Below average	N/A	Within Project Site boundary
23	Not assessed	Not assessed, no access	N/A	Within Project Site boundary

Pond Number	WSP/PB HSI Assessment Pond Category	AECOM HSI Assessment Pond Category	Change in Conditions/ Limitations	Approximate Distance and Direction from the Project Site boundary
24	Not assessed	Not assessed, no access	N/A	150 north west

4.2 Manual Surveys

4.2.1 Following the AECOM updated HSI assessment, manual surveys were undertaken on all ponds, where access allowed, of below average category and above (with the exception of Pond 19a see Section 3.5). Access to Pond 17 was granted at a later stage than the other ponds and part of the manual survey season was missed. Therefore manual surveys were not undertaken on this pond. eDNA sampling was undertaken on Pond 17 (see Section 4.3).

4.2.2 The results of the surveys are shown in Table 4-2 and the weather conditions are shown in Table 4-3. No GCN were recorded during any of the manual surveys. Other amphibians were present in the ponds including palmate newts, frogs and toads and a range of aquatic invertebrates including diving beetle, dragonfly nymphs and pond skaters.

4.2.3 Weather conditions were considered favourable during all of the surveys as shown in Table 4-3. The manual surveys ceased once the results of the eDNA surveys had been received.

4.2.4 In 2014 manual surveys were undertaken by BSG Ecology on Ponds 10, 11 and 15-17 and no GCN were identified (ES Appendix 8.17).

Table 4-2: Survey Results

Pond No.	Survey No.	Date	Survey Method	Great Crested Newt				Palmate Newt				Smooth Newt				Smooth/Palmate			Newt Total
				F	M	U	Total	F	M	U	Total	F	M	U	Total	F	J	Total	
1b#	1	10/05/17	Torching	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	3	0	**3**	**3**
	2	16/05/17	Torching	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	**0**	**0**
4#	1	10/05/17	Torching	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	5	0	**5**	**5**
	2	16/05/17	Torching	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	**0**	**0**
	3	17/05/17	Torching	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	1	0	**1**	**1**
7	1	10/05/17	Torching	0	0	0	**0**	0	5	0	**5**	0	0	0	**0**	3	0	**3**	**8**
		11/05/17	Bottle Trapping**	0	0	0	0	0	3	0	**3**	0	0	0	0	0	0	0	**3**
		11/05/17	Egg Searching	No Eggs or leaf folds seen															
	2	16/05/17	Torching	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	5	0	**5**	5
		17/05/17	Netting	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	**0**	0
		17/05/17	Egg Searching	No Eggs or leaf folds seen															
8	1	10/05/17	Torching	0	0	0	**0**	0	0	0	**0**	0	1	0	**1**	35	0	**35**	36
		11/05/17	Bottle Trapping**	0	0	0	**0**	5	2	0	**7**	0	0	0	**0**	0	0	**0**	7
		11/05/17	Egg Searching	No Eggs or leaf folds seen															
	2	16/05/17	Torching	0	0	0	**0**	0	2	0	**2**	0	0	0	**0**	17	0	**17**	19

Pond No.	Survey No.	Date	Survey Method	Great Crested Newt				Palmate Newt				Smooth Newt				Smooth/Palmate			Newt Total
				F	M	U	Total	F	M	U	Total	F	M	U	Total	F	J	Total	
		17/05/17	Netting	0	0	0	**0**	1	0	0	**1**	0	0	0	**0**	0	0	**0**	1
		17/05/17	Egg Searching	No Eggs or leaf folds seen															
11[#] (see Table 4-4)	1	08/05/17	Torching	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	**0**	0
				F	**M**	**U**	**Total**	**F**	**M**	**U**	**Total**	**F**	**M**	**U**	**Total**	**F**	**J**	**Total**	
19a (see Table 4-4)	1	11/05/17	Torching	0	0	0	**0**	0	3	0	**3**	0	0	0	0	12	0	12	**15**
		12/05/17	Netting	0	0	0	**0**	0	0	0	**0**	0	0	0	0	0	0	0	**0**
		12/05/17	Egg Searching	No Eggs or leaf folds seen															
19a (see Table 4-4)	2	16/05/17	Torching	0	0	0	**0**	0	3	0	**3**	0	0	0	**0**	17	0	**17**	**20**
		17/05/17	Netting	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	1	**1**	**1**
		17/05/17	Egg Searching	No Eggs or leaf folds seen															
19b[#] (see Table 4-4)	1	09/05/17	Torching	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	**0**	1
22	1	08/05/17	Torching	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	1	2	**3**	3

Pond No.	Survey No.	Date	Survey Method	Great Crested Newt				Palmate Newt				Smooth Newt				Smooth/Palmate			Newt Total
				F	M	U	Total	F	M	U	Total	F	M	U	Total	F	J	Total	
		09/05/17	Bottle Trapping	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	**0**	0
		09/05/17	Egg Searching	No Eggs or leaf folds seen															
	2	10/05/17	Torching	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	1	0	**1**	1
		11/05/17	Bottle Trapping	0	0	0	**0**	0	1	0	**1**	0	0	0	**0**	0	0	**0**	1
		11/05/17	Egg Searching	No Eggs or leaf folds seen															
	3	16/05/17	Torching	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	3	0	**3**	3
		17/05/17	Bottle Trapping	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	**0**	0
		17/05/17	Egg Searching	No Eggs or leaf folds seen															

Table 4-3: Survey Weather Conditions

Pond No.	Survey No.	Date	Survey Method	Air Temperature °C	Water Temperature °C	Conditions
1b	1	10/05/17	Torching	10.8	Gauge not working.	Dry and mild
	2	16/05/17	Torching	14.7	14	Very light rain during survey and mild
4	1	10/05/17	Torching	10.8	Gauge not working.	Dry and mild
	2	16/05/17	Torching	13.9	14.4	Very light rain during survey and mild
	3	17/05/17	Torching	11.6	12.0	Dry and mild
7	1	10/05/17	Torching	11	12.6	Dry and mild
		11/05/17	Bottle Trapping and Egg Searching	In: 16.0 Out:8.9	In:13.5 Out: 12.8	Dry and mild
	2	16/05/17	Torching	13.5	13.1	Very light rain during survey and mild
		17/05/17	Netting and Egg Searching	14.7	12.4	Dry and mild
8	1	10/05/17	Torching	11	14	Dry and mild
		11/05/17	Bottle Trapping and Egg Searching	In: 20.1 Out: 9.6	In: 15.7 Out: 12.8	Dry and mild
	2	16/05/17	Torching	13.5	13.6	Very light rain during survey and mild
		17/05/17	Netting and Egg Searching	12.8	13.5	Dry and mild

Pond No.	Survey No.	Date	Survey Method	Air Temperature °C	Water Temperature °C	Conditions
11	1	08/05/17	Torching	11.7	Gauge not working.	Dry and mild
19a	1	11/05/17	Torching	15.6	17.4	Dry and mild
		12/05/17	Netting and Egg Searching	13.5	16.0	Very light rain during survey and mild
	2	16/05/17	Torching	11.9	14.4	Very light rain during survey and mild
		17/05/17	Netting and Egg Searching	13.8	14.0	Dry and mild
19b	1	09/05/17	Torching	7.5	Gauge not working.	Dry
22	1	08/05/17	Torching	11.3	Gauge not working.	Dry and mild
		09/05/17	Bottle Trapping and Egg Searching	In:15.0 Out:8.0	Gauge not working.	Dry and mild
	2	10/05/17	Torching	13.0	9.6	Dry and mild
		11/05/17	Bottle Trapping and Egg Searching	In:15.3 Out: 12.0	In: 12.0 Out: 1.0	Dry and mild
	3	16/05/17	Torching	12.7	11.8	Very light rain during survey and mild
		17/05/17	Bottle Trapping and Egg Searching	In: 15.6 Out: 13.9	In:11.5 Out:11.6	Very light rain during survey and mild

[#]*Details for ponds which had less than the three required manual survey methods are given in Section 3.5 and in the limitations section in Table 4-1.*

***A dead water shrew was found in one of the bottle traps in Pond 7, therefore bottle trapping ceased for Ponds 7 and 8 and the netting technique was used for future surveys (see Section 3.5)*

Key: M = Male, F = Female, J = Juvenile, U = Unknown sex.

4.3 eDNA Sampling

4.3.1 Following the AECOM updated HSI assessment eDNA surveys were undertaken on all ponds, where access allowed, of below average category and above, with the exception of Pond 19a (see Section 3.5).

4.3.2 Table 4-4 lists the ponds that were sampled for GCN eDNA, the weather conditions when collecting the samples, any limitations noted during sample collection and the results returned by SureScreen.

4.3.3 All the ponds sampled for GCN eDNA came back with a negative result.

Table 4-4: eDNA Sampling Results

Pond Number	Sample Date	Air Temp °C	Limitations (see Section 3.5)	GCN Result Returned
1b	11/05/17	16.0	Only 5% of pond perimeter accessible to sample.	Negative
4	11/05/17	16.0	Only 5% of pond perimeter accessible to sample.	Negative
7	11/05/17	13.0	None	Negative
8	11/05/17	12.0	None	Negative
11	11/05/17	16.0	Only 5% of pond perimeter accessible to sample.	Negative
17	25/05/17	26.0	None	Negative
19a	11/05/17	15.0	None	Negative
22	11/05/17	15.3	None	Negative

5. Ecological Constraints and Indicative Potential Impacts

5.1.1 The indicative potential impacts of the Project on habitats and protected species are outlined below; potential impacts will be assessed fully during the Ecology Impact Assessment (EcIA).

5.1.2 No GCN were identified within nine ponds surveyed (Ponds 1b, 4, 7, 8, 11, 17, 19a, 19b and 22). The local records centre did not return any records of GCN within 2 km of the Project Site. Previous surveys of ponds 10, 11, 15, 16 and 17 by BSG Ecology in 2014 did not identify the presence of GCN (ES Appendix 8.17). Therefore, it is considered unlikely that any GCN will be present within any of the ponds that were not surveyed or within 500 m of these ponds in surrounding habitat given the absence of GCN from all nearby ponds, and it is considered that there will be no impacts on GCN.

5.1.3 The Project will require the removal of three ponds (Ponds 16, 22 and 23). Pond 22 currently supports palmate newts and is likely to support other amphibians including frogs and toads, as well as a range of generalist aquatic invertebrates. Pond 16 was dry. Pond 23 could not be assessed but if it contains water has the potential to support generalist aquatic invertebrates and common amphibians. Removal of the ponds will result in loss of habitat for a small number of common amphibians and common aquatic invertebrates.

6. Further Surveys and Recommendations

6.1 Further Surveys

6.1.1 No further surveys are recommended.

6.2 Recommendations for Mitigation and Enhancement

6.2.1 The Project will require the removal of three ponds (Ponds 16, 22 and 23). Pond 22 currently supports palmate newts and is likely to support other amphibians including frogs and toads as well as a range of generalist aquatic invertebrates. Pond 16 was dry. Pond 23 could not be assessed but if it contains water has the potential to support generalist aquatic invertebrates and common amphibians.

6.2.2 Where the scheme design allows, ponds, swales or water bodies, should be considered to mitigate the loss of the ponds and enhance the Project Site for common amphibians.

6.2.3 If a waterbody is included in the scheme design this should be managed specifically for amphibians and not stocked with fish. The waterbody could include planting of marginal and floating vegetation. The waterbody and any bankside vegetation should be managed to control over shading.

6.2.4 Log piles and hibernacula could be created in suitable areas of habitat (such as grassland and scrub/woodland edges), to enhance the area for amphibians.

7. References

Ref. 1 Langton T.E.S., Beckett, C.L. and Foster, J.P. 2001. Great Crested Newt Conservation Handbook. Froglife, Halesworth.

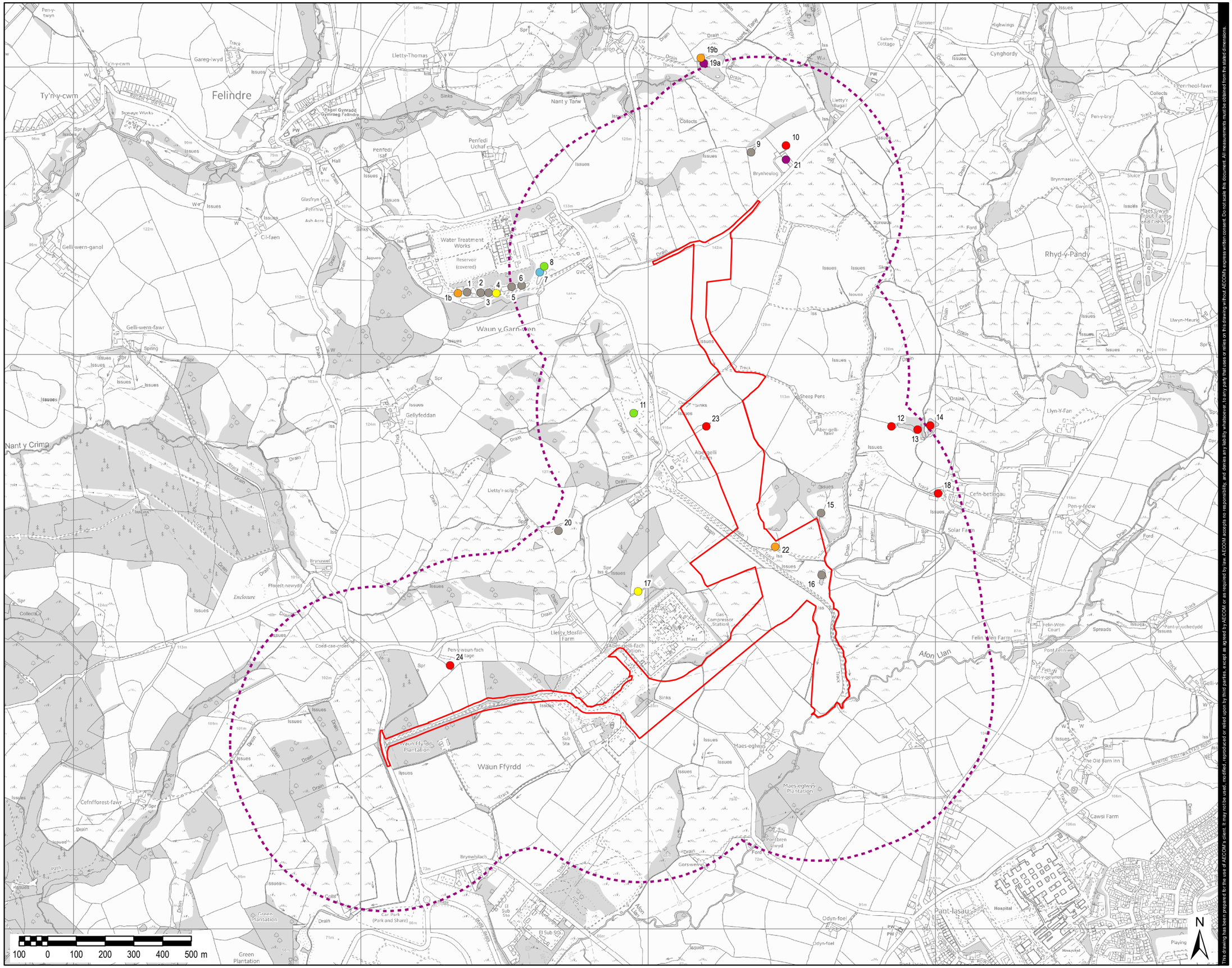
Ref. 2 CIEEM. 2013. Professional Code of Conduct. Chartered Institute of Ecology and Environmental Management (CIEEM) June 2013

Ref. 3 Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. 2000. Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus). Herpetological Journal 10(4), 143-155.

Ref. 4 Natural England. 2013. Great Crested Newt Standing Advice

Ref. 5 Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F. 2014. Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA. Freshwater Habitats Trust, Oxford.

Figure 1: AECOM 2017 Habitat Suitability Index for Pond



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Project Title:

ABERGELLI POWER PROJECT

Client:

STAG ENERGY

LEGEND

- Project Site Boundary
- 500m Study Area

GCN 2017 Pond HSI Assessment

- Poor
- Below Average
- Average
- Good
- Excellent
- Dry
- Not Assessed, No Access

AECOM Internal Project No:

60542910

Drawing Title:

GCN 2017 POND HSI ASSESSMENT

Scale at A3: 1:12,000

Drawing No:			Rev:
FIGURE A8.4.1			002
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GM	CC	CA	02/05/18

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Appendix 8.5

Reptile Survey Report

Abergelli Power Project
Reptile Survey Report

Abergelli Power Limited
May 2018

Document Control			
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Author	Ursula Jones		
Approved by (1st checker)	Melanie Pritchard		
Approved by (2nd checker)	Kevin Webb		
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24/11/2017	V1	Draft	First draft
16/04/2018	V2		Updated referencing to ES Chapter and Appendices

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APPENDICES

1. Reptile Survey Report

1.1 Introduction

1.1.1 AECOM was commissioned to undertake a suite of ecological survey work to inform the Abergelli Power Project (the "Project").

1.1.2 The Project Site is located near to the village of Felindre, Swansea, as shown in Figure 1, and the central grid reference for the Site is SN 6528 0143. A full description of the Project is provided in Chapter 3: Project and Site Description.

1.1.3 The Preliminary Ecological Appraisal Report (AECOM, June 2017) identified that surveys for reptiles were required within areas of suitable habitat at the Project Site.

1.1.4 This report outlines the presence of reptiles within the reptile survey area and outlines initial recommendations for further surveys, mitigation and enhancement.

1.1.5 The reptile survey area encompasses all suitable habitats accessible within the Project Site boundary, as shown on Figure 2.

a) Objectives of this Survey

1.1.6 The objectives of this survey were:

- To identify any designated nature conservation sites within or in the vicinity of the Project Site boundary that have the potential to support reptiles;
- To identify any known records and/or populations of reptiles in the vicinity of the Project Site boundary;
- To record and map evidence of reptiles;
- To make an initial ecological assessment of the Project Site boundary in respect to reptiles;
- To highlight any initial potential ecological constraints in respect to reptiles;
- To outline further survey work that may be required; and,
- To make initial suggestions for mitigation, compensation and enhancement of the natural features identified on the within the Project Site boundary in respect to reptiles.

1.2 Legislation

1.2.1 British reptiles are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).

1.2.2 For sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca* all parts of Section 9 apply. This prohibits:

- intentional killing;
- injuring or taking (capture. etc);
- possession;
- intentional disturbance whilst occupying a 'place used for shelter or protection' and destruction of these places; and,

- trade (i.e. sale, barter, exchange, transporting for sale and advertising to sell or to buy).

1.2.3 For the four widespread species of reptile, namely the common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, grass snake *Natrix helvetica helvetica* and European adder *Vipera berus*, only part of sub-section 9(1) and all of sub-section 9(5) apply. These prohibit:

- intentional killing;
- injuring; and,
- trade (i.e. sale, barter, exchange, transporting for sale and advertising to sell or to buy).

1.3 Quality Assurance

1.3.1 This survey and subsequent report was undertaken in line with AECOM's Integrated Management System (IMS). Our IMS places great emphasis on professionalism, technical excellence, quality, environmental and Health and Safety management. All staff members are committed to establishing and maintaining our certification to the international standards BS EN ISO 9001:2008 and 14001:2004 and BS OHSAS 18001:2007. In addition, our IMS requires careful selection and monitoring of the performance of all sub-consultants and contractors.

1.3.2 All AECOM Ecologists who worked on this project are members of (at the appropriate level) the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow their code of professional conduct (CIEEM, 2013) when undertaking ecological work.

1.4 Methodology

a) Desk study

1.4.1 The objective of the desk study is to review the existing information available in the public domain concerning species and habitats to identify the following:

- Internationally and nationally designated sites for reptiles, up to 2 km from the Project Site using the Multi Agency Geographic Information for the Countryside (MAGIC) website (www.magic.gov.uk);
- Reptile records and records of locally designated sites for reptiles up to 2 km from the Project Site, using the South East Wales Biodiversity Records Centre (SEWBReC);
- The Section 7 list of Principal Importance for Conservation of Biological Diversity in Wales was reviewed for inclusion of reptiles; and,
- Aerial photographs and Ordnance Survey (OS) maps were reviewed to identify features of ecological interest surrounding the Project Site, nearby areas of ecological interest and features connecting these habitats (hedgerows, watercourses, railway lines).

1.4.2 The reports of previous surveys undertaken by BSG Ecology were provided by the client and subsequently reviewed.

b) Reptile Presence / Likely Absence Survey

1.4.3 The Phase 1 Habitat map (AECOM, 2017) and OS mapping were used to identify habitat suitable for supporting reptiles within the Project Site boundary.

1.4.4 The reptile survey methodology paid due regard to reptile survey guidelines provided by Froglife Advice Sheet 10 (Froglife, 1999) and the Herpetofauna Workers' Manual (Gent, T and Gibson, S, 1998).

1.4.5 Artificial refugia (approximately 0.5 m x 0.5 m square sheets of heavy-duty mineral roofing felt – known as 'reptile survey mats') were placed in suitable locations within suitable habitat (e.g. sunny areas adjacent denser vegetation and south facing) on the 21st August 2017. These were left for 10 days to 'bed-in', until the start of September when the suitable reptile survey period started.

1.4.6 A total of 99 reptile survey mats were placed within an area of 3.8 ha. This exceeds the minimum density of 10 per hectare recommended in guidelines provided by Froglife, 1999.

1.4.7 Figure 1 shows the Phase 1 Habitat map used to assess suitable reptile habitat. Figure 2 shows the location of the reptile survey mats.

1.4.8 Reptile survey mats were checked on seven subsequent occasions in suitable weather conditions (within a constant temperature range of between 10 – 20°C, rain and windy conditions are usually unsuitable, sunny spells after rain can be suitable (Froglife, 1999)). Each reptile survey mat was initially inspected from a suitable distance to identify any reptiles that may be present basking on top of the reptile survey mats, without causing disturbance. The refugia were then approached quietly and carefully, and lifted swiftly to examine the ground beneath; any reptiles present were noted. During each survey, other artificial debris (such as waste wood, plastic sheeting) and other naturally occurring habitat features likely to be used by reptiles (such as small logs) were also checked for the presence of reptiles.

1.4.9 Surveys were completed by suitably qualified ecologists with at least five years' experience of ecological consultancy and with experience completing reptile surveys.

1.4.10 The weather conditions were considered largely suitable for undertaking reptile surveys. Weather conditions and survey dates are shown in Table 1.2.

c) Evaluation

1.4.11 In order to assess the value of any given reptile population, two assessment methodologies may be applied. Nationally, the guidelines for the selection of Sites of Special Scientific Interest (JNCC, 1989) provide criteria for identifying nationally important populations of reptiles. The methodology developed by Froglife (1999) used in the identification of Key Reptile Sites can be used to evaluate reptile populations at a local or regional level.

1.4.12 To qualify as a Key Reptile Site, a site must meet at least one of the following criteria:

- Supports three or more reptile species;
- Supports two snake species;
- Supports an exceptional population (see Table 1.1) of one species;
- Supports an assemblage of species scoring at least 4 (see Table 1.1); or,
- Does not meet any of the previous criteria, but is of particular regional importance due to local rarity.

Table 1.1: Key Reptile Criteria

European Adder	<5	5 – 10	>10
Grass Snake	<5	5 – 10	>10
Common Lizard	<5	5 – 20	>20
Slow-Worm	<5	5 – 20	>20

Source: Froglife, 1999.

**Figures in the table refer to the maximum number of adults seen by one person in one day.*

1.5 Limitations

1.5.1 Biological records can be received from a wide variety of sources and may or may not be comprehensive and accurate. However, if assessed in conjunction with a survey, they can contribute to a robust ecological assessment of a site.

1.5.2 Several areas of habitat suitable for supporting reptiles within the Project Site boundary could not be surveyed using artificial refugia due to the presence of grazing livestock. Artificial refugia would pose a health and safety risk to the livestock as well as posing a risk of trampling to sheltering reptile utilising the artificial refugia. These areas lacked features where reptiles might be easily observed and as such a walkover survey of these areas was not deemed appropriate. There is the potential for reptiles to have gone unrecorded in these areas. These areas have been indicated on Figure 2.

1.5.3 The survey method is designed to identify the presence or likely absence of common reptile species. There is the potential for the survey to have recorded a small sample of the populations present and if a reptile species occurs at a low density it may have been missed.

1.6 Baseline Environment

a) Desk Study Results

1.6.1 The designated habitats, sites and features within proximity to the site are listed in Table 1.2 below.

Table 1.2: Desk Study Results

Designation / Feature	Description
Nationally and Internationally Designated Sites within 2 km	There are no national or international sites designated for reptiles within 2 km of the Project Site boundary.
Locally Designated Sites within 2 km	There are no local sites designated for reptiles within 2 km of the Project Site boundary.
Reptile Records from the last 10 years within 2 km	The following reptiles records were returned from within 2 km of the Project Site boundary. Direction and approximate distance from the nearest point of the Project Site boundary have been provided: • Slow-worm: records from 1 km south and 2 km east; • Grass snake: records from 2 km south west; • Adder: records from 150 m north east, 1 km south and 2.3 km south west; • Common lizard: records from 170 m north west, 350 m south, 1 km south and 1.5 km north.
Priority Species – Section 7 List	The following reptile species are listed in the Environment Act (Wales) 2016 Section 7: • Slow-worm;

Designation / Feature	Description
	• Sand lizard; • Common lizard; • Grass snake; and, • Adder.
Surrounding Land Use	The Project Site is located to the north of Junction 46 of the M4 Motorway close to the village of Felindre, Swansea. The Project Site has agricultural fields to the east, south and north. Areas of woodland are located to the south, east and west of the Project Site. Afon Llan runs adjacent the southern Project Site boundary. Areas of the Substation and Felindre Compressor station with associated roads and buildings are partially within and adjacent to the Project Site boundary. A water treatment works is located in the north west outside of the Project Site boundary.
Ponds within 500m (See Figure 1)	OS mapping shows 25 ponds within 500 m of the Site Boundary, three of these (Ponds 16, 22 and 23) are within the Project Site boundary: • Ponds 1 – 8: Located near to waste water treatment works approximately 350 m west. Connected to the Project Site via woodland and grassland; • Ponds 9, 10 and 21: Located approximately 350 m east and connected to the north-east tip of the road boundary via grassland; • Pond 11: Approximately 210 m west of the Project Site boundary and connected to the Project Site via grassland and scrub; • Ponds 12 – 14 and 18: Located approximately 450 m east and connected to the Project Site via woodland and grassland; • Pond 15: Located approximately 130 m north and connected to the Project Site via woodland and grassland; • Pond 16: Within the Project Site boundary, dry during the Phase 1 Habitat Survey; • Pond 17: Located approximately 200 m west and connected to the Project Site via woodland, grassland and scrub; • Ponds 19a and 19b: Approximately 400 m north and connected to the Project Site via grassland; • Pond 20: Approximately 450 m north, connected to the Project Site via grassland. This pond was identified as dry in 2017; • Pond 22: Within the Project Site Boundary; • Pond 23: Within the Project Site boundary and identified during the Phase 1 Habitat Survey. This pond was not accessible due to the presence of horses; and, • Pond 24: Approximately 150 m north within the garden of Pen-y-Waun Fach Cottage. The pond is connected to the Project Site via grassland and woodland.

Designation / Feature	Description
Previous Surveys undertaken by BSG Ecology, 2014	Common Lizard A total of 163 adult and juvenile common lizard observations were recorded, with a peak count of 50 recorded on one survey visit. Observations were across the survey area within the Project Site boundary. During the course of the survey both male and female common lizard were recorded with some of the females being gravid, which confirmed that there was a breeding population present. (Appendix 8.5 of the ES). Grass Snake In total ten observations were recorded for grass snake with a peak count of five recorded on one survey visit. The majority of observations of grass snake were made in the area of marshy grassland close to a pond. Juvenile grass snake was recorded along with adults which suggested a breeding population present. As grass snake are a wide ranging species and the location of the animals recorded were near to the boundary, the presence of juveniles could not necessarily confirm that breeding was taking place within the Project Site boundary (Appendix 8.5 of the ES).

b) Reptile Survey Results

1.6.2 The weather conditions and timings for each of the reptile surveys are given in Table 1.3 and a summary of the results of the reptile survey are given in Table 1.4. For the table of the full results see Appendix A.

1.6.3 Figure EC1 shows the Phase 1 habitats and Figure EC2 shows the location of the reptile survey refugia and the distribution of the reptile survey results.

Table 1.3: Reptile Survey Weather Conditions

Survey Visit Number	Survey Date	Start Time	Temperature (°C)	Humidity (%)	Rainfall	Average Wind Speed (MPH)
1	01/09/2017	10:00	17.7	71.7	None	2.3
2	05/09/2017	08:00	15.4	99.2	None	1.3
3	08/09/2017	10:10	15.5	91.4	Rain before, none during	1.2
4	12/09/2017	08:28	13.9	83.3	None	1.2
5	14/09/2017	10:35	14.8	86.4	Rain showers before; none during	2.2
6	18/09/2017	10:22	16.5	68.6	None	0.6
7	26/09/2017	12:20	17.3	83	None	1.7

Table 1.4: Reptile Survey Results

Survey No.	Common Lizard						Other
	Male	Female	Adult (sex unknown)	Juvenile / Sub-Adult	Adult Total	Sloughed Skin	Toad
1	0	0	1	1	1	0	2
2	1	0	0	0	1	0	0
3	0	1	4	8	5	2	9
4	1	0	1	2	2	0	6
5	1	0	1	6	2	1	9
6	0	0	5	0	5	0	Not recorded
7	3	1	2	10	6	0	8

1.6.4 An incidental sighting of a common lizard was made during positioning bat survey equipment during daylight hours, this was seen basking on top of a reptile survey mat on 23 August 2017 at SN65360132, likely to be reptile refugia number 64.

1.7 Conclusions

a) Project Site Assessment

1.7.1 The desk study confirmed the presence of slow-worm, grass snake, adder and common lizard within 2 km, and the presence of grass snake and common lizard within the Project Site boundary.

1.7.2 During the 2017 reptile survey a total of 51 adult and juvenile common lizard observations were recorded, with a peak count of 6 adults recorded on one survey visit. Observations of common lizard were recorded from across the reptile survey area within the Project Site boundary. The majority of records were from the verges either side of the grassy track running through the centre of the Project Site and from the semi-improved neutral grassland present around the National Grid site.

1.7.3 During the course of the reptile survey male, female and juvenile common lizards were recorded, which confirmed that there was a breeding population present within the Project Site boundary.

1.7.4 No grass snakes were identified within the reptile survey area including the area with the highest abundance during the 2014 surveys (Appendix 8.5 of the ES). However, there is the potential for grass snake to be present within the Project Site boundary and to have gone unrecorded since:

- grass snake are wide ranging;
- Pond 16, where the majority of the 2014 records were from was mostly dry throughout the 2017 reptile survey period, making the areas less suitable for supporting grass snake; and,
- the area in the north of the reptile survey area where grass snake were recorded in 2014 could not be accessed for survey in 2017 due to grazing livestock.

1.7.5 As such, it should be assumed grass snake is likely to be present at low densities within the Project Site boundary and surrounding habitat.

b) Population and ‘Key reptile Site’ Criteria

1.7.6 Based on the survey results and the criteria laid out in Table 1.1, the Project Site supports a ‘Good population’ of common lizard.

1.7.7 The Project Site does not meet the criteria for a ‘Key Reptile Site’.

c) Amphibian Species

1.7.8 Common toads were recorded under the reptile survey mats across the reptile survey area, including juvenile and adults and as such it can be assumed that common toad is breeding within or near to the Project Site boundary.

1.8 Recommendations

d) Recommendations for Further Surveys

1.8.1 It is anticipated that no further surveys will be required.

e) Recommendations for Mitigation

1.8.2 At this stage the following key recommendations have been made:

- Prior to construction commencing, areas within the Project Site boundary that are suitable for supporting reptiles or are known to support reptiles should undergo an exclusion fencing and translocation programme, including habitat management, to move reptiles out of construction zones into suitable habitat thereby limiting harm, injury or killing;
- As part of the translocation programme, a suitable receptor site will need to be identified to accept the reptiles translocated from the areas impacted by construction phase activities and operational footprint of the Project.
- The receptor site will need a population survey for reptiles undertaken to ascertain it's suitability for holding greater numbers of reptiles, this may be possible within the Order Limits and it is proposed to discuss the findings of this report with CCS and NRW and identify an area within the existing Order Limits. An area of suitable or sub-optimal habitat can be utilised within the Project Site boundary. If the area is sub-optimal, habitat management works will be required to increase its suitability for reptiles with the aim to create structurally diverse habitats. These will include:
  - Areas of cover to provide shelter and protection from predators;
  - Open areas in sunny spots and south facing slopes to provide areas for basking; and
  - Mosaic of structural diversity including areas with different plant species, age and height.
- In addition, there must be:
  - Connectivity of habitats to allow movement between hibernating, foraging and basking areas and to allow dispersal of populations; and
  - Inclusion of habitat edges and transitional zones including woodland edges and grassland/scrub interface.
- Habitat management works may take up to two years, depending on the current condition of the area, to allow habitats to grow and develop these features suitable for supporting reptile; and,
- A Method Statement for the translocation and habitat management programme should be written by a suitability experienced ecologist and agreement of the Method Statement sought from the county ecologist.

f) Recommendations for Biodiversity Enhancement

1.8.3 At this stage the following precautionary recommendations have been made:

- Consider reptiles in the landscaping of the Project Site where possible.
- Create artificial habitat features including:
  - Log and brash piles – to create cover, provide structural diversity and enhance prey availability; and

    - Artificial hibernacula – create piles of rocks, logs, rubble etc. Some of this should be buried below ground. Southward facing and well drained locations are the most successful.
    - Basking sites – create south facing banks in open areas.
- Manage the Project Site boundary under client ownership for reptiles. Appropriate techniques should be adopted to prevent succession change in areas of suitable habitat.

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AECOM (2017). Abergelli Power Station Preliminary Ecological Appraisal Stag Energy, May 2017

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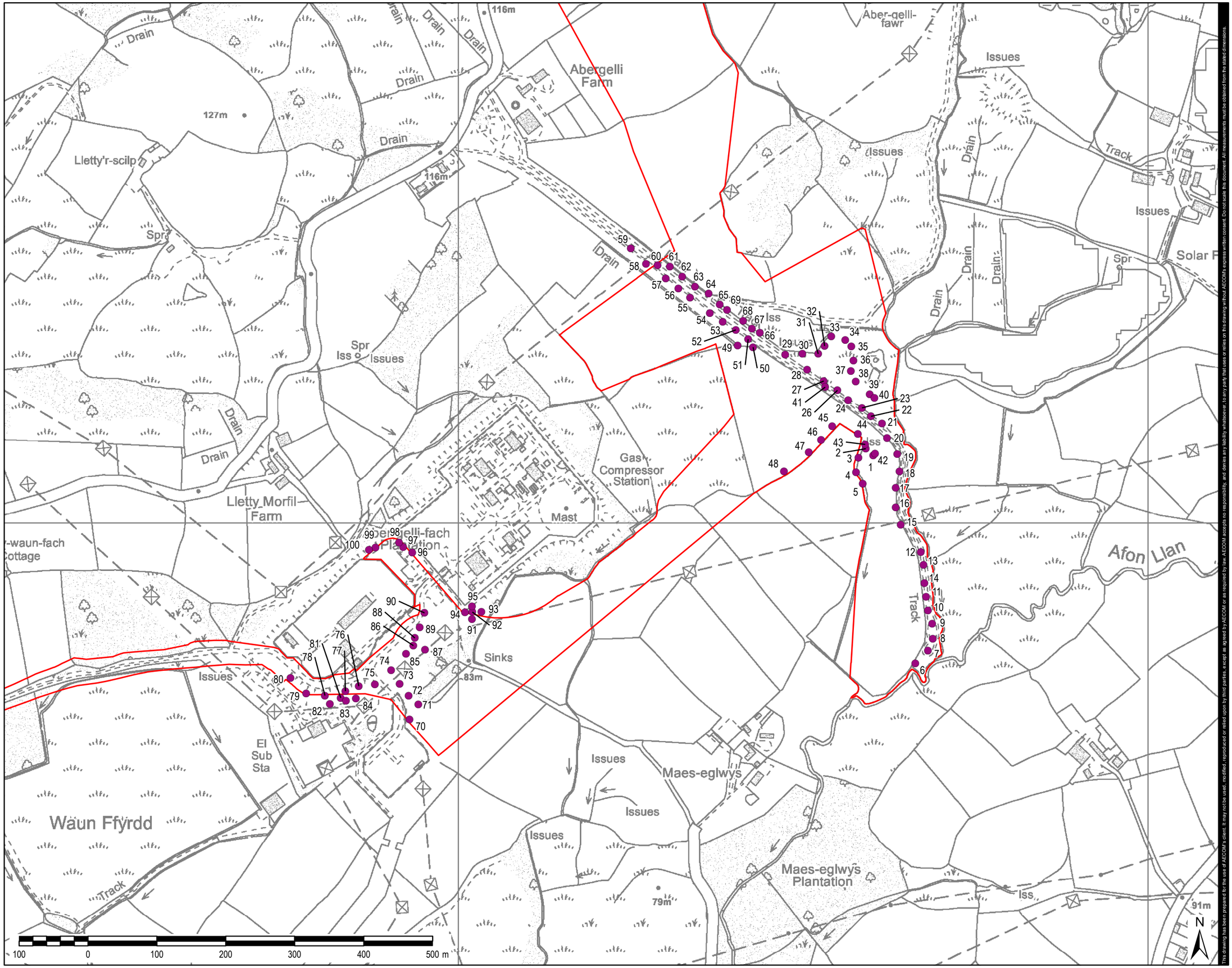
Figure 1 – Phase 1 Habitat Map



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Project Title:

ABERGELLI POWER PROJECT

Client:

STAG ENERGY

LEGEND

- Project Site Boundary
- Reptile Refugia

Copyright:

AECOM Internal Project No:

60542910

Drawing Title:

REPTILE REFUGIA OVERVIEW

Scale at A3: 1:5,000

Drawing No:			Rev:
FIGURE 1			002
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GM	CC	CA	02/05/18

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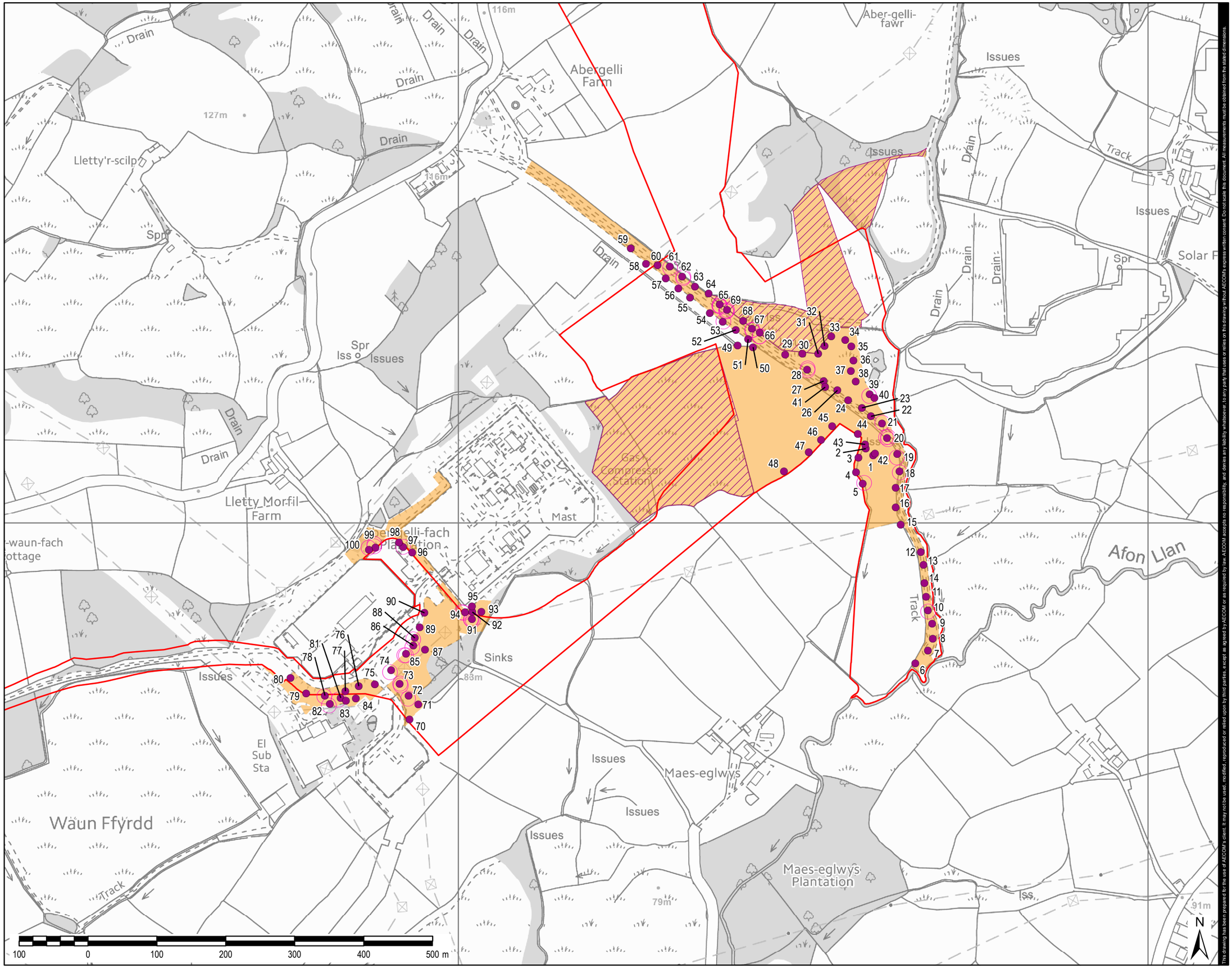
Figure 2 – Reptile Survey Results



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Project Title:

ABERGELLI POWER PROJECT

Client:

ABERGELLI POWER LTD.

LEGEND

- Project Site Boundary
- Reptile Refugia
- Reptile Identified - Viviparous Lizard
- Areas not accessible
- Areas suitable for reptiles

Copyright:

AECOM Internal Project No:

60542910

Drawing Title:

REPTILE REFUGIA OVERVIEW

Scale at A3: 1:5,000

Drawing No:			Rev:
FIGURE 2			002
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GM	CC	CA	02/05/18

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Appendix A Reptile Survey Results

Date	Species	Number	Observation	Activity	Location	Sex	Maturity	Note
01/09/2017	Common Lizard	1	Seen	Basking	39	Unknown	Juvenile	JUST SAW DISAPPEARING INTO UNDERGROWTH
01/09/2017	Common Lizard	1	Seen	Basking	91	Unknown	Adult	
06/09/2017	Common Lizard	1	Seen	Basking	62	Male	Adult	
08/09/2017	Common Lizard	1	Slough found	Basking	5	Unknown	Adult	SKIN
08/09/2017	Common Lizard	1	Slough found	Basking	28	Unknown	Adult	SKIN, REMOVED
08/09/2017	Common Lizard	1	Seen	Basking	66	Unknown	Sub-adult	ON TOP OF MAT
08/09/2017	Common Lizard	1	Seen	Basking	67	Female	Adult	
08/09/2017	Common Lizard	2	Seen	Basking	69	Unknown	Juvenile	ON TOP OF MAT
08/09/2017	Common Lizard	1	Seen	Basking	65	Unknown	Juvenile	ON TOP OF MAT
08/09/2017	Common Lizard	1	Seen	Basking	72	Unknown	Juvenile	ON TOP OF MAT
08/09/2017	Common Lizard	1	Seen	Basking	82	Unknown	Adult	ON TOP OF MAT
08/09/2017	Common Lizard	1	Seen	Basking	81	Unknown	Juvenile	ON TOP OF MAT
08/09/2017	Common Lizard	1	Seen	Basking	74	Unknown	Adult	ON TOP OF MAT
08/09/2017	Common Lizard	1	Seen	Basking	88	Unknown	Juvenile	ON TOP OF MAT
08/09/2017	Common Lizard	1	Seen	Basking	94	Unknown	Juvenile	ON TOP OF MAT
08/09/2017	Common Lizard	1	Seen	Basking	91	Unknown	Juvenile	ON TOP OF MAT
12/09/2017	Common Lizard	1	Seen	Basking	62	Male	Adult	
12/09/2017	Common Lizard	1	Seen	Basking	73	Unknown	Adult	
12/09/2017	Common Lizard	1	Seen	Basking	99	Unknown	Juvenile	
12/09/2017	Common Lizard	1	Seen	Basking	20	Unknown	Juvenile	ON TOP OF MAT
14/09/2017	Common Lizard	1	Seen	Basking	21	Unknown	Juvenile	
14/09/2017	Common Lizard	1	Seen	Basking	20	Unknown	Juvenile	

Date	Species	Number	Observation	Activity	Location	Sex	Maturity	Note
14/09/2017	Common Lizard	1	Seen	Basking	69	Unknown	Juvenile	ON TOP OF MAT
14/09/2017	Common Lizard	1	Seen	Basking	65	Male	Adult	
14/09/2017	Common Lizard	1	Seen	Basking	85	Unknown	Adult	SCURRIED AWAY
14/09/2017	Common Lizard	1	Seen	Basking	86	Female	Sub-adult	
14/09/2017	Common Lizard	1	Seen	Basking	97	Unknown	Juvenile	ON TOP OF MAT
14/09/2017	Common Lizard	1	Slough found	Basking	99	Unknown	Juvenile	
14/09/2017	Common Lizard	1	Seen	Basking	100	Unknown	Juvenile	ON TOP OF MAT
18/09/2017	Common Lizard	1	Seen	Basking	18	Unknown	Adult	
18/09/2017	Common Lizard	1	Seen	Basking	28	Unknown	Adult	
18/09/2017	Common Lizard	1	Seen	Basking	73	Unknown	Adult	
18/09/2017	Common Lizard	1	Seen	Basking	78	Unknown	Adult	
18/09/2017	Common Lizard	1	Seen	Basking	91	Unknown	Adult	
26/09/2017	Common Lizard	3	Seen	Basking	85	Unknown	Juvenile	TWO ON TOP, ONE UNDER
26/09/2017	Common Lizard	1	Seen	Basking	94	Unknown	Juvenile	
26/09/2017	Common Lizard	2	Seen	Basking	53	Unknown	Juvenile	ON TOP OF MAT
26/09/2017	Common Lizard	2	Seen	Basking	66	Unknown	Juvenile	ON TOP OF MAT
26/09/2017	Common Lizard	1	Seen	Basking	67	Female	Adult	
26/09/2017	Common Lizard	2	Seen	Basking	69	Unknown	Juvenile	ON TOP OF MAT
26/09/2017	Common Lizard	1	Seen	Basking	65	Male	Adult	ON TOP OF MAT
26/09/2017	Common Lizard	1	Seen	Basking	61	Unknown	Adult	ON TOP OF MAT
26/09/2017	Common Lizard	1	Seen	Basking	20	Male	Adult	
26/09/2017	Common Lizard	1	Seen	Basking	19	Unknown	Adult	ON TOP OF MAT
26/09/2017	Common Lizard	1	Seen	Basking	10	Male	Adult	ON TOP OF MAT

Appendix 8.6

Breeding Bird Survey Report

Abergelli Power Project
Breeding Bird Survey Report

Abergelli Power Limited
May 2018

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1. Breeding Bird Survey Report

1.1 Introduction

1.1.1 AECOM was commissioned to undertake a suite of ecological survey work to inform the Abergelli Power Project (the "Project"), and support the Environmental Statement (ES).

1.1.2 The Project Site is located near to the village of Felindre, Swansea, as shown in Figure 1, and the central grid reference for the Project Site is SN65280143. A full description of the development is provided in Chapter 3 (Project and Site Description).

1.1.3 The Preliminary Ecological Appraisal Report (AECOM, 2017) identified that surveys for breeding birds were required at the Project Site.

1.1.4 This baseline report describes the status of breeding birds within the breeding bird survey area and makes initial indications of potential effects and outlines initial recommendations for further surveys, mitigation and enhancement.

1.1.5 The breeding bird survey area encompasses all suitable and accessible areas of woodland, hedgerows and scrub within proximity of and within the Project Site boundary, as shown on Figure 1.

1.1.6 Previous surveys have been undertaken by BSG Ecology is provided in the ES Appendix 8.16.

a) Objectives of the Study

1.1.7 The objectives of this study were:

- To identify any designated nature conservation sites within or in the vicinity of the Project Site boundary that have the potential to support notable breeding bird species or assemblages;
- To identify any known records of breeding birds in the vicinity of the Project Site boundary;
- To record and map evidence of breeding bird activity;
- To make an initial ecological assessment of the value of the Project Site to breeding birds;
- To highlight any initial potential ecological constraints related to breeding birds;
- To outline further survey work that may be required; and,
- To make initial suggestions for mitigation, compensation and enhancement of the natural features identified within the Project Site with respect to the breeding bird assemblage.

1.2 Legislation

1.2.1 There are several different acts of legislation and regulations which refer to the protection of wildlife. Legislation with particular relevance to birds is outlined below.

1.2.2 This is a brief summary of the legislation and is not to be regarded as a definitive legal opinion. When dealing with individual cases, the client is advised to consult the full texts of the relevant legislation and obtain further legal advice.

b) Statutory Legislation

1.2.3 Key legislation for birds in the UK includes:

- Council Directive 79/409/EEC on the conservation of wild birds (the EC Birds Directive); and,
- Wildlife and Countryside Act 1981 (as amended) [WCA].

1.2.4 Annex 1 of the EC Birds Directive lists rare and vulnerable species of regularly occurring or migratory wild birds that are subject to special conservation measures. The Directive also provides for the designation of SPAs for the protection of these species, which form part of the Natura 2000 network of sites protected by European wildlife legislation.

1.2.5 Part 1 of the WCA sets out how the provisions of the Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention'), the EC Birds Directive and the EC Habitats Directive are implemented in Great Britain. Under Part 1, Section 1 of the WCA it is an offence to:

- Kill, injure or take any wild bird intentionally;
- Take, damage or destroy the nest of any wild bird while that nest is in use or being built; and,
- Take or destroy the egg(s) of any wild bird.

1.2.6 Schedule 1 of the WCA lists a number of species which, in addition to the provisions listed above, are protected by special penalties at all times, including against disturbance when breeding.

1.2.7 The WCA requires the prosecuting authority to prove that an offence was intentional, however the Countryside and Rights of Way (CROW) Act 2000 strengthens the provisions of the WCA by introducing an additional offence of “reckless” disturbance, which means that ignorance of the presence of a protected species cannot be used as a reliable defence should a breach of the WCA be committed. The Natural Environment and Rural Communities (NERC) Act 2006 strengthens the WCA further with respect to the protection of the nests of certain birds listed on Schedule Z1A, even when they are not in use. The NERC Act also offers additional protection to birds released into the wild as part of a repopulation programme and provides minor amendments to the WCA with respect to captive birds.

1.2.8 The Environment (Wales) Act 2016 strengthens the duty previously applied under the Natural Environment and Rural Communities Act (2006) placed on planning authorities to have due regard to biodiversity when making decisions. A number of species of bird are listed on the Environment (Wales) Act 2016 Section 7 Priority Species. These are the species found in Wales which were identified as requiring action under the UK Biodiversity Action Plan (BAP) and which continue to be regarded as conservation priorities under the UK Post-2010 Biodiversity Framework. As such, it is targeted for measures necessary to support its conservation status in the UK.

c) Non Statutory Policy

1.2.9 The RSPB (2009) and Eaton *et al*. (2009) have published lists of Birds of Conservation Concern (BoCC). Red List species are those whose breeding population or range is rapidly declining (50% or more in the last 25 years), recently or historically, and those of global conservation concern. Amber List species are those whose breeding population is in moderate decline (25 – 49% in the last 25 years), rare breeders, internationally important and localised species and those of unfavourable conservation status in Europe.

1.2.10 These lists confer no legal status; however they are useful when assessing the significance of predicted impacts and determining the level of mitigation that may be required when birds are affected by development or any other activity. Furthermore, inclusion on the Red List is a factor in determining the species which may be added to the list of species of principal importance under the Environment (Wales) Act.

1.3 Quality Assurance

1.3.1 This survey and subsequent report was undertaken in line with AECOM's Integrated Management System (IMS). Our IMS places great emphasis on professionalism, technical excellence, quality, environmental and Health and Safety management. All staff members are committed to establishing and maintaining our certification to the international standards BS EN ISO 9001:2008 and 14001:2004 and BS OHSAS 18001:2007. In addition, our IMS requires careful selection and monitoring of the performance of all sub-consultants and contractors.

1.3.2 All AECOM Ecologists who worked on this project are members of (at the appropriate level) the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow their code of professional conduct (CIEEM, 2013) when undertaking ecological work.

1.4 Methodology

a) Desk Study

1.4.1 The objective of the desk study is to review the existing information available in the public domain concerning species and habitats to identify the following:

- Internationally and nationally designated sites for birds, up to 2 km from the Project Site using the Multi Agency Geographic Information for the Countryside (MAGIC) website (NE, 2017);
- Bird records and records of locally designated sites for breeding birds up to 2 km from the Project Site, using the South East Wales Biodiversity Records Centre (SEWBReC);
- Bird species within the Section 7 list of Principal Importance for Conservation of Biological Diversity in Wales;
- Features of ecological interest surrounding the Project Site, nearby areas of ecological interest and features connecting these habitats (hedgerows, watercourses, railway lines) using aerial photographs and Ordnance Survey (OS) maps.

1.4.2 The reports of previous surveys undertaken by BSG Ecology were provided by the client and were reviewed (ES Appendix 8.16).

b) Breeding Bird Survey

1.4.3 The Project Site was visited on two occasions to identify the presence and status of breeding birds within the Project Site. Surveys were undertaken paying due regard to guidance provided in Breeding Bird Survey (BBS) methodology. All parts of the Project Site were visited on foot to within 50 m where visibility extended or closer where visibility was needed for example in woodlands or behind hedgerows. Surveys were carried out on days with little or no wind, rain or mist in order to maximise the potential for detection of birds and to avoid the possibility of bird activity being suppressed by inclement weather conditions. Surveys were completed by personnel with experience of the likely species assemblage for this geography and habitat type. Survey dates, personnel and weather conditions are shown in Table 1.1.

1.4.4 Species were identified by sight or sound and details of behaviour and activity was recorded. A range of optical equipment including binoculars and telescope were used as required and to minimise disturbance to potentially breeding species. A species list of common passerine birds was compiled for the site; details of activity and behaviour were made. The results were analysed to assess the status of the birds on site as one of the following:

- Non-breeding – Flyover or species observed within unsuitable breeding habitat;
- Possible breeding – Species observed in breeding season in suitable nesting habitat;
- Probable breeding – Pair observed in suitable nesting habitat in breeding season, territorial behaviour observed on at least two occasions, courtship and display observed, observed visiting probable nest site, agitated behaviour or anxiety calls from adults or nest building observed; or
- Confirmed breeding – Used nest or eggshells, distraction display/injury feigning observed, recently fledged young, adults on nest, adult carrying faecal sac or food, nest containing eggs or nest with young seen/heard.

Table 1.1: Survey Dates, Times, Personnel and Weather Conditions

Survey date and times	Survey Personnel	Weather Conitions
17 May 2017 19.00 – 21.25	Kevin Webb CEcol	Clear with no rain, wind speed 12mph SW and temperature at start of survey 11^0C
18 May 2017 04.55 – 11.05	Kevin Webb CEcol	Clear with no rain, wind speed 8mph W and temperature at start of survey 10^0C
14 June 2017 17.25 – 22.40	Kevin Webb CEcol	Clear with no rain, wind speed 6mph S and temperature at start of survey 17^0C
15 June 2017 04.10 – 04.45*	Kevin Webb CEcol	Clear with no rain, wind speed 2mph SW and temperature at start of survey 14^0C

* see Section 1.5: Limitations

1.5 Limitations

1.5.1 BBS methodology was not followed in its entirety; species and activity were recorded on a base map and species list and locations and behaviours recorded. This gave a broad assessment of species present, potential for breeding and potential ornithological constraints at the site. Territory mapping was not undertaken since the surveys started in the later part of the breeding season and many species had fledged and were recorded through the presence of dependent (or recently independent) young as breeding.

1.5.2 The second survey visit on 14 June included an evening survey of the northern part of the Site followed by a dusk walkover of marshy grassland in the south of the Project Site looking for evidence of crepuscular species. The intention was to complete the survey of the remainder of the Project Site the next morning (15 June) from dawn onwards but the survey was unable to be completed due to a persistent threat to surveyor safety.

1.5.3 There is potential for some birds to be missed or to go unnoticed due to the nature of breeding bird surveys and possibility of birds not vocalising and/or being present in dense vegetation. When combined with previous surveys and given the relatively simple nature of habitats it is considered that the current BBS provides an accurate assessment of the ornithological value of the Project Site to breeding birds.

1.5.4 There were no further limitations to this survey.

1.6 Baseline Environment

a) Desk Study Results

1.6.1 The designated habitats, sites and features within proximity to the site that are relevant to breeding birds are listed in Table 1.2 below.

Table 1.2: Desk Study Results

Designation / Feature	Description
Nationally and Internationally Designated Sites relevant to breeding birds within 2 km	**Nant Y Crimp Site of Special Scientific Interest (SSSI)** Distance and Direction: Approximately 1.3 km west Description: Nant y Crimp is of special interest for its wet pastures, species-rich neutral grasslands and semi-natural woodland as well as associated scrub, which are host to several uncommon plant species. Although not mentioned on the citation the site is known to support breeding lapwing *Vanellus vanellus*.
Locally Designated Sites within 2 km relevant to breeding birds	**Felindre Grasslands Site of Nature Conservation Interest (SNCI)** Distance and Direction: Adjacent to the west of the Project Site boundary. Description: Native wet woodland, lowland mixed deciduous woodland, structurally-diverse and species-rich gorse scrub, and purple moor-grass and rush pasture; and a number of Section 7 listed invertebrate and bird species, and the Schedule 1 listed birds barn owl *Tyto alba* and Northern goshawk *Accipiter gentilis*. **Rhos Fawr SNCI** Distance and Direction: Adjacent to the northern Project Site boundary Description: Supporting the habitats: woodland containing ancient woodland indicator species, structurally-diverse and species-rich scrub, species-rich neutral grassland, purple moor-grass and rush pasture, and watercourse with exposure/erosion features; and a number of Section 7 listed bird species. **Rhyd-Y-Pandy Valley and Grasslands SNCI** Distance and Direction: Approximately 50 m east Description: Supporting the habitats: native wet woodland, woodland containing ancient woodland indicator species, gorse stands, lowland meadow, species-rich neutral grassland, structurally-diverse and species-rich scrub, purple moor-grass and rush pasture, reedbeds, and watercourse with exposure/erosion features; and a number of Section 7 listed bird species, and the Schedule 1 listed birds barn owl and red kite *Milvus milvus*. **Waun Garn Wen SNCI**

Designation / Feature	Description
	Distance and Direction: Approximately 200 m west Description: Supporting the habitats: native wet woodland, structurally-diverse and species-rich scrub, purple moor-grass and rush pasture, and watercourse with exposure/erosion features; and a number of Section 7 listed bird species. **Pant Lasau SNCI** Distance and Direction: Approximately 250 m south Description: Supporting the habitats: native wet woodland, lowland mixed deciduous woodland, gorse stands, lowland fen, structurally-diverse and species-rich scrub, purple moor-grass and rush pasture, and watercourse with exposure/erosion features; and a number of Section 7 listed bird species. **Cefn Forest Stream SNCI** Distance and Direction: Approximately 300 m south west Description: Supporting the habitats: woodland containing ancient woodland indicator species, upland mixed ash woodland, native wet woodland, lowland mixed deciduous woodland, lowland meadow, species-rich neutral grassland, structurally-diverse and species-rich scrub, degraded lowland heath, lowland fen, purple moor-grass and rush pasture, ponds, and watercourse with exposure/erosion features; and a number of Section 7 listed bird species, and the Schedule 1 listed bird barn owl. **Lower Lliw Reservoir SNCI** Distance and Direction: Approximately 700 m north Description: Supporting the habitats: woodland containing ancient woodland indicator species, gorse stands, species-rich bracken, structurally-diverse and species-rich scrub, purple moor-grass and rush pasture, and watercourse with exposure/erosion features; and a number of Section 7 listed invertebrate and bird species, and the Schedule 1 listed birds kingfisher *Alcedo atthis*, merlin *Falco columbarius* and red kite. **Cefn Forest Stream SNCI** Distance and Direction: Approximately 300m south west Description: Supporting the habitats: woodland containing ancient woodland indicator species, upland mixed ash woodland, native wet woodland, lowland mixed deciduous woodland, lowland meadow, species-rich neutral grassland, structurally-diverse and species-rich scrub, degraded lowland heath, lowland fen, purple moor-grass and rush pasture, ponds, and watercourse with exposure/erosion features; and a number of Section 7 listed bird species, and the Schedule 1 listed bird barn owl.

Designation / Feature	Description
Bird records from the last 10 years within 2 km	**The following bird species have been recorded within 2 km of the Project Site within the last ten years**: Lesser redpoll *Acanthis cabaret*, goshawk, skylark *Alauda arvensis*, kingfisher, tree pipit *Anthus trivialis*, little ringed plover *Charadrius dubius*, ringed plover *Charadrius hiaticula*, black-headed gull *Chroicocephalus ridibundus*, cuckoo *Cuculus canorus*, lesser spotted woodpecker *Dendrocopos minor*, yellowhammer *Emberiza citronella*, reed bunting *Emberiza schoeniclus*, merlin, peregrine *Falco peregrinus*, hobby *Falco subbuteo*, kestrel *Falco tinnunculus*, pied flycatcher *Ficedula hypoleuca*, linnet *Linaria cannabina*, grasshopper warbler *Locustella naevia*, common crossbill *Loxia curvirostra*, common scoter *Melanitta nigra*, red kite, spotted flycatcher *Muscicapa striata*, curlew *Numenius arquata*, osprey *Pandion haliaetus*, house sparrow *Passer domesticus*, wood warbler *Phylloscopus sibilatrix*, willow tit *Poecile montana*, marsh tit *Poecile palustris*, dunnock *Prunella modularis*, bullfinch *Pyrrhula pyrrhula*, starling *Sturnus vulgaris*, redwing *Turdus iliacus*, song thrush *Turdus philomelos*, fieldfare *Turdus pilaris*, barn owl and lapwing.
Priority Species – Listed on The Environment Act (Wales) 2016 Section 7	Fifty one species are listed on Section 7 of which nineteen are of potential relevance to the Project Site: tree pipit, lesser redpoll, linnet, cuckoo, lesser spotted woodpecker, yellowhammer, reed bunting, kestrel, pied flycatcher, grasshopper warbler, yellow wagtail *Motacilla flava*, spotted flycatcher, house sparrow, dunnock, willow tit, marsh tit, bullfinch, skylark, wood warbler, turtle dove, *Streptopelia turtur*, starling, song thrush and lapwing.
Surrounding Land Use	The Project Site is located to the north of Junction 46 of the M4 Motorway close to the village of Felindre, Swansea. The Project Site has agricultural fields to the east, south and north. Areas of woodland are located to the south, east and west of the Site. Areas of the National Grid Compound with associated roads and buildings are partially within and adjacent to the Project Site boundary. A water treatment works is located in the north west outside of the Project Site boundary.
Previous Surveys undertaken by BSG Ecology	The client provided AECOM with the reports of previous surveys undertaken in 2014 by BSG Ecology within the Site (ES Appendix 8.16). The red line boundary included within these reports is different to the 2017 Project Site boundary. It was noted that the 2017 Project Site boundary is smaller than the red line boundary used by BSG Ecology in 2014. However, the current Project Site boundary is within the same area as the 2014 red line boundary provided to BSG Ecology and therefore the surveys undertaken would have captured the current Project Site area. The 2014 BSG Ecology Breeding Bird Survey Report identified 30 species of birds breeding within the Project Site and an additional 23 species using the Project Site or flying over. The surveys were

Designation / Feature	Description
	undertaken on three dates between April and June under suitable weather conditions (Appendix 8.16).

b) Breeding Bird Survey Results

1.6.2 A breeding bird survey was conducted at the Project Site on two occasions during May and June 2017. The results are summarised in Table 1.3. Birds were considered to be confirmed breeding if either direct evidence of nesting was found (active nest or adult bird carrying food or faecal pellet) or if males were observed displaying territorial behaviour (singing, calling or aggression) in suitable habitat for breeding on each visit. An assemblage of common birds typical of the habitats on Project Site was recorded. No Annex 1 or Schedule 1 birds were recorded.

1.6.3 Out of a total of 45 species recorded only swift was definitely not breeding within the Project Site boundary. Twelve species listed on Section 7 were recorded all of which may have been breeding within the Project Site boundary or immediate surrounds: bullfinch, cuckoo, dunnock, house sparrow, lapwing, lesser redpoll, linnet, reed bunting, skylark, song thrush, starling and tree pipit. Ten species are also listed on the BoCC Red list: cuckoo, house sparrow, lapwing, lesser redpoll, linnet, mistle thrush, skylark, song thrush, starling and tree pipit. Eight further species were recorded which are listed on the BoCC Amber List: bullfinch, dunnock, meadow pipit, redstart, reed bunting, swift, tawny owl and willow warbler.

Table 1.3: Summary of Birds and Behaviour recorded during Breeding Bird Survey

Species	Number Recorded		Summary	Breeding Status	Species Designation
	Visit 1	Visit 2			
Barn swallow	4	7	Hunting throughout the Site on each visit, may breed in farm buildings	Possible breeding.	
Blackbird	9	9 (5 juv)	Up to seven pairs may have bred but breeding confirmed of at least two pairs.	Confirmed breeding	
Blackcap	12	17	Up to 8 singing males recorded and fledged young recorded on second visit.	Confirmed breeding.	
Bullfinch	3	6	Recently fledged young recorded on second visit.	Confirmed breeding	Section 7 BoCC Amber List
Blue tit	24	16 (inc. juv)	Common throughout woodland and mature hedgerows. Up to 12 pairs likely to have bred.	Confirmed breeding	
Carrion crow	34	9	One active nest found on first visit and common throughout. Up to 6 pairs	Confirmed breeding	

Species	Number Recorded		Summary	Breeding Status	Species Designation
	Visit 1	Visit 2			
			likely to breed.		
Chiff-chaff	15	10	Peak count of 15 singing males on first visit indicative of likely number of pairs.	Probable breeding	
Chaffinch	16	9	Up to 16 singing/calling males recorded with 4 family parties on second visit. Likely to be up to 12 pairs breeding.	Confirmed breeding	
Collared dove	2		One pair observed on first visit only.	Possible breeding	
Common buzzard	2	2	Pair soaring over site on both visits likely to be breeding within site or locally.	Probable breeding	
Cuckoo	2	1	Male heard calling from close to substation on first visit and outside of site further west	Possible breeding	Section 7 BoCC Red List
Dunnock	8	4	Common across the Site with up to 8 pairs likely to breed	Probable breeding	Section 7 BoCC Amber List
Garden warbler	2	1	Two males singing from close to substation on visit 1 and one male in the same location on visit 2	Probable breeding	
Goldcrest	4	5	Four singing males recorded first visit and fledged young seen in family party on second visit.	Confirmed breeding	
Goldfinch	23	3	Up to six singing/calling males on first visit and small feeding groups. Up to 6 pairs likely to have bred.	Probable breeding	
Great spotted woodpecker		1	One flying over south of site on visit two	Possible breeding	
Great tit	9	2	Up to five pairs likely to breed in woodland.	Probable breeding	
Greenfinch	5	1	Up to 3 singing/calling males and two with associated females recorded on first visit	Probable breeding	
House	31	4	Present around farm	Probable	Section 7

Species	Number Recorded		Summary	Breeding Status	Species Designation
	Visit 1	Visit 2			
sparrow			buildings just outside Site. Up to 12 pairs likely to breed locally.	breeding	BoCC Red List
Jackdaw	14		Feeding flock observed on first visit only. May breed locally	Possible breeding	
Jay	2		Two birds heard calling from substation area on first visit	Possible breeding	
Lapwing	3		Up to two pairs may breed in fields to the north of the Project Site although only recorded immediately outside of Project Site boundary chasing corvids.	Possible breeding	Section 7 BoCC Red List
Lesser redpoll	6		Three pairs heard calling in flight on first visit	Possible breeding	Section 7 BoCC Red List
Lesser whitethroat	1	3	One pair bred on site in mature hedgerow in southern part of the Project Site. Observed feeding young on second visit.	Confirmed breeding	
Linnet	5		Small feeding party observed in northern part of the Project Site	Possible breeding	Section 7 BoCC Red List
Long tailed tit		6	Family party observed on second visit only near the Project Site boundary in west.	Probable breeding	
Meadow pipit	8	11	Commonly occurring and presumed breeding in marshy grassland across the Site with up to 5 pairs likely.	Probable breeding	BoCC Amber List
Mistle thrush	4	2	Small family party seen in field at northern part of the Project Site on first visit and two juveniles on second survey in same area.	Probable breeding	BoCC Red List
Nuthatch	1		One bird heard calling on first visit close to substation.	Possible breeding	
Pied wagtail	2		One pair seen carrying food near the centre of	Confirmed breeding	

Species	Number Recorded		Summary	Breeding Status	Species Designation
	Visit 1	Visit 2			
			the Site on first visit.		
Raven	1		Single bird flying over on first visit.	Possible breeding	
Robin	18	11	Common breeder with adults and young observed on each survey. Likely to be up to 15 pairs breeding.	Confirmed breeding	
Rook	45	19	Seen feeding in fields with sheep to the south of the Site on each visit.	Possible breeding	
Redstart	3	1	Three alarm calling males observed on first visit likely to be indicative of breeding of up to three pairs.	Probable breeding	BoCC Amber List
Reed bunting	3		Two males one definitely paired observed in marshy grassland.	Probable breeding.	Section 7 BoCC Amber List
Skylark	4	4	Four singing males observed on each visit three from south and one in north of Site.	Probable breeding.	Section 7 BoCC Red List
Song thrush	8	2	Eight singing males recorded on first visit although survey commenced late in season so probably under-recorded. Up to 12 pairs likely to breed.	Probable breeding.	Section 7 BoCC Red List
Stonechat	2	2	One pair observed close to the centre of the Site and a pair observed along the northern boundary on the second survey. Rookery on site.	Probable breeding.	
Starling	13	2	Small feeding flock on first visit and two fledged juveniles recorded on second visit. Likely to breed in farm buidlings within or close to Project Site.	Confirmed breeding	Section 7 BoCC Red List
Swift	16		Hunting over marshy grassland at dusk on first visit.	Not breeding	BoCC Amber List
Tawny owl		1	Male heard calling on second visit only in	Possible breeding	BoCC Amber List

Species	Number Recorded		Summary	Breeding Status	Species Designation
	Visit 1	Visit 2			
			woodland south of the Project Site boundary.		
Tree pipit	4	1	Adults only observed in south of the Project Site on both visits.	Probable breeding	Section 7 BoCC Red List
Whitethroat	13	5	Up to eight pairs likely to breed. Common in scrub and mature hedgerows across the Project Site.	Probable breeding	
Wren	21	7	Common breeding species throughout the Site with up to 15 pairs likely. Juveniles being fed observed on second visit	Confirmed breeding	
Willow warbler	24	9 (including juv recently fledged)	Common breeder throughout the Project Site. Up to 20 pairs likely.	Confirmed breeding	BoCC Amber List

1.7 Conclusions

1.7.1 The Site supports a varied assemblage of breeding birds typical of the size, habitat types and regional location. The surveys undertaken in both 2014 and 2017 produced very similar results which is unsurprising considering that the habitats and management practices have changed little between the two surveys.

1.8 Preliminary Recommendations

a) Recommendations for Further Surveys

1.8.1 A full assessment of required further surveys has been made during EcIA and reported in the ES. At this stage it is anticipated that further surveys should be undertaken in early 2018 in order to fully assess the assemblage of species using the Project Site earlier in the season.

b) Recommendations for Mitigation

1.8.2 A full series of recommendations for further surveys and mitigation at construction and operation has been undertaken for the EcIA. Mitigation should focus on avoiding removal of habitat within the bird breeding season of March – August inclusive and to ensure that replacement landscape planting seeks to provide alternative habitat for those species present.

c) Recommendations for Biodiversity Enhancement

1.8.3 A full series of recommendations for biodiversity enhancement has been made during the EcIA and reported in the ES. At this stage the following preliminary recommendations have been made for general biodiversity enhancements:

- Provide nesting boxes in woodland and buildings for a range of species including house sparrow, starling and tawny owl; and,
- Improve the availability of breeding and foraging habitat within the Project Site by planting new scrub, hedgerows, and infilling current gaps in hedgerows with whips and creating green corridors. It is recommended to use native species.

References

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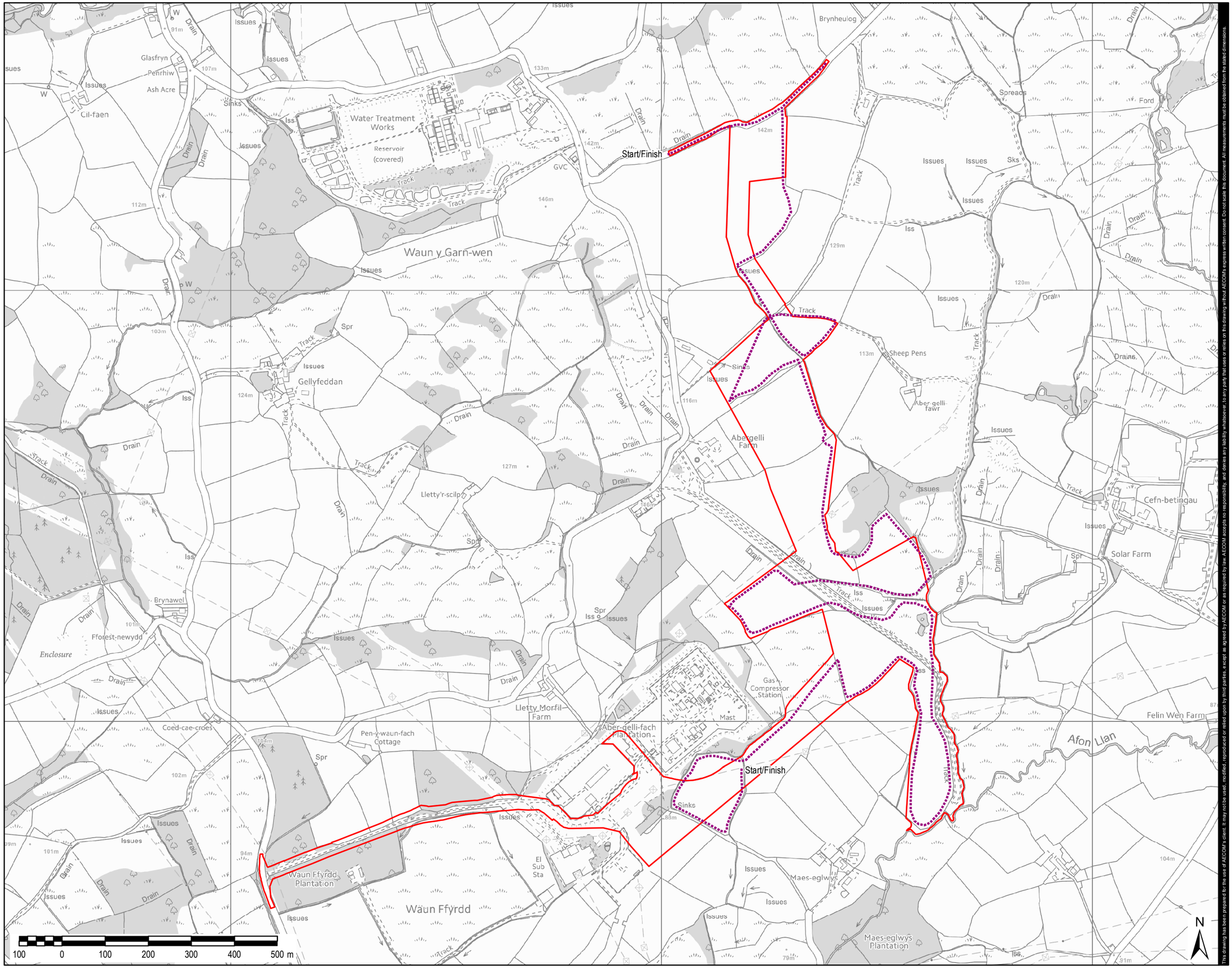
Figure 1 Breeding Bird Survey Transect



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Project Title:

ABERGELLI POWER PROJECT

Client:

ABERGELLI POWER LTD.

LEGEND

- Breeding Bird Transect
- Project Site Boundary

AECOM Internal Project No:

60542910

Drawing Title:

BREEDING BIRD SURVEY TRANSECT APRIL/MAY 2018

Scale at A3: 1:8,000

Drawing No:			Rev:
FIGURE A8.6.1			001
Drawn:	**Chk'd:**	**App'd:**	**Date:**
GM	CM	CA	02/05/18

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