

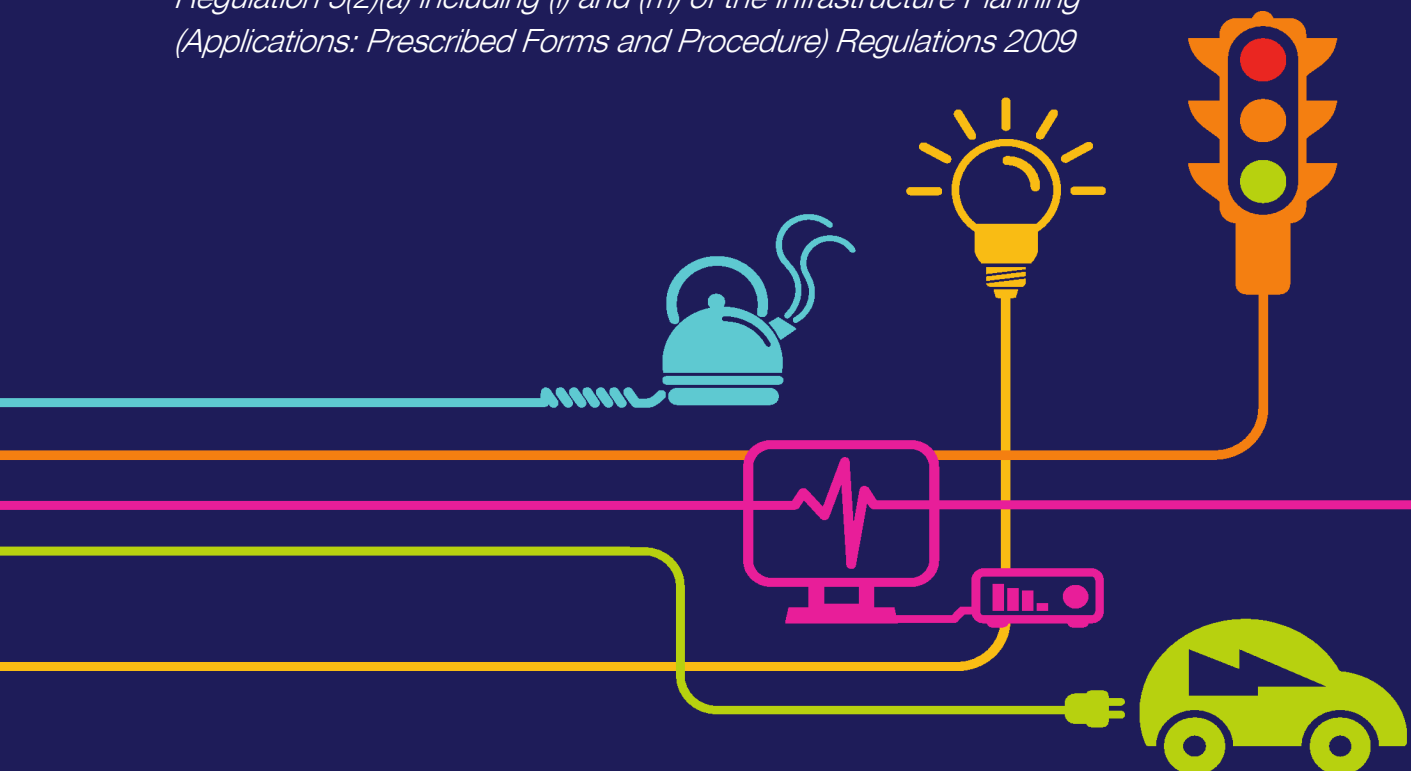
## DOCUMENT 5.9.2.14

## Terrestrial Invertebrate Report

(Confidential Information Removed)

## Chapter 9 – Appendix 14

National Grid (North Wales Connection Project)

*Regulation 5(2)(a) including (l) and (m) of the Infrastructure Planning  
(Applications: Prescribed Forms and Procedure) Regulations 2009*



# **North Wales Connection Project**

## **Volume 5**

### **Appendix 9.14 Terrestrial Invertebrate Report Document 5.9.2.14**

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# 1 Introduction

## 1.1 INTRODUCTION

### *Description of the Proposed Development*

1.1.1 The Proposed Development would provide a new 400 kilovolt (kV) connection between the existing substations at Wylfa and Pentir and includes the following principal components:

- extension to the existing substation at Wylfa;
- sections of new 400 kV overhead line between Wylfa Substation and Braint Tunnel Head House (THH) and Cable Sealing End Compound (CSEC) on Anglesey including modifications to parts of the existing 400 kV overhead line between Wylfa and Pentir;
- Braint THH and CSEC on Anglesey;
- tunnel between Braint and Tŷ Fodol THHs;
- Tŷ Fodol THH and CSEC in Gwynedd;
- new section of 400 kV overhead line between Tŷ Fodol THH and CSEC and Pentir Substation;
- extension to the existing substation at Pentir; and
- temporary construction compounds, access tracks, construction working areas, localised widening of the public highway and third party works that are required to construct the infrastructure listed above.

1.1.2 The Proposed Development has been split into six sections (A – F), see Figure 1

1.1.3 A full description of the Proposed Development is provided in Chapter 3, Description of the Proposed Development (**Document 5.3**) and Chapter 4, Construction, Operation, Maintenance and Decommissioning of the Proposed Development (**Document 5.4**).



### *Introduction to the Report*

- 1.1.4 This report identifies where terrestrial invertebrate populations have been recorded within and up to a distance of 2 km from the Order Limits through a desk-based assessment and in suitable habitat present within 50 m from the Order Limits through field surveys carried out during 2017.
- 1.1.5 This report also identifies relevant legislation and planning policy relating to these species groups, which are outlined in section 2.

### *Objectives*

- 1.1.6 The objectives of the surveys and this report are to:
- review existing ecological data to identify any records for protected or notable terrestrial invertebrates within and up to 2 km from the Order Limits, referred to as the study area in this report;
  - provide baseline information about the presence of terrestrial invertebrates within suitable habitat present within and adjacent to the Order Limits, referred to as survey areas in this report.
  - evaluate the status of these species within the survey areas;
  - use the above information to inform the Ecological Impact Assessment (EcIA) set out in Chapter 9, Ecology and Nature Conservation (**Document 5.9**) to determine whether terrestrial invertebrate populations could be affected by the Proposed Development; and
  - inform the Biodiversity Mitigation Strategy (**Document 7.7**) for the Proposed Development.

## 2 Legislation and Planning Policy

### 2.1 LEGISLATION

- 2.1.1 Several different acts of legislation and regulations refer to the protection of wildlife. Legislation relevant to terrestrial invertebrates is outlined below.

#### *The Conservation of Habitats and Species Regulations 2017*

- 2.1.2 The Conservation of Habitats and Species Regulations 2017 (referred to as the 'Habitats Regulations') consolidates all the various amendments made to the Conservation (Natural Habitats, &c.) Regulations 1994 in respect of England and Wales. The 1994 Regulations transposed Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) into national law and came into force on 30 October 1994.
- 2.1.3 The Habitats Regulations provide for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European sites.
- 2.1.4 In summary the Habitats Regulations protect European protected species against:
- deliberate capture, injury or killing;
  - deliberate disturbance, where this is likely to impair the species ability to survive, breed, reproduce, rear young, hibernate or migrate, or significantly affect the local distribution or abundance of the species;
  - deliberate destruction of eggs (where relevant); and
  - damage or destruction of a breeding or resting place.
- 2.1.5 It is also an offence to be in possession or control, transport, sell or exchange any live or dead (or part of an) wild animal listed on Schedule 2.
- 2.1.6 A number of terrestrial invertebrate species are listed under Annex II of the Council Directive 92/43/EEC which makes them European protected species; those occurring in the UK are as follows:

- Geyer's whorl snail (*Vertigo geyeri*);
- narrow-mouthed whorl snail (*Vertigo angustior*);
- round-mouthed whorl snail (*Vertigo genesii*);
- Desmoulin's whorl snail (*Vertigo moulinsiana*);
- southern damselfly (*Coenagrion mercurial*);
- marsh fritillary butterfly (*Euphydryas aurinia*);
- violet click beetle (*Limoniscus violaceus*);
- stag beetle (*Lucanus cervus*); and
- Fisher's estuarine moth (*Gortyna borelii lunata*)

#### *The Countryside and Rights of Way Act, 2000*

- 2.1.7 The Countryside and Rights of Way Act 2000 applies to England and Wales only. Part III of the Act deals specifically with wildlife protection and nature conservation.
- 2.1.8 The Act places a duty on Government Departments and the Welsh Government 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.
- 2.1.9 Schedule 12 of the Act amends the species provisions of the Wildlife and Countryside Act 1981 (as amended), strengthening the legal protection for threatened species. The provisions make certain offences 'arrestable', include an offence of reckless disturbance, confer greater powers to police and wildlife inspectors for entering premises and enable heavier penalties on conviction of wildlife offences.

#### *Wildlife and Countryside Act, 1981 (as amended)*

- 2.1.10 Twelve species of invertebrates are listed as fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), eight of which are butterflies, including the marsh fritillary (*Euphydryas aurinia*). This affords the following protections, with a further 70 species protected from sale:
- Section 9(1) of the Act makes it an offence to intentionally capture, injure or kill listed wild invertebrates;

- Section 9(2) makes it an offence to possess or control listed wild invertebrates, either alive or dead, or any part or thing derived from them;
- Section 9(4) makes it an offence to intentionally or recklessly damage, destroy or obstruct access to, any structure or place which listed wild invertebrates use for shelter or protection, or intentionally or recklessly disturb them while occupying a structure or place used for that purpose; and
- Section 9(5) makes it an offence to sell, offer or expose for sale, or possess or transport for the purpose of sale, any listed wild invertebrate, or any part or thing derived from them. It is also an offence to publish or cause to be published any advertisement likely to be understood as conveying that listed invertebrates, or parts or derived things of them are bought, sold or are intended to be. Section 9 applies to all stages in their life cycle.

*Environment (Wales) Act, 2016*

- 2.1.11 Section 6 of the Environment (Wales) Act 2016 places a duty on public authorities to 'seek to maintain and enhance biodiversity' so far as it is consistent with the proper exercise of those functions. In so doing, public authorities must also seek to 'promote the resilience of ecosystems'. The duty replaces the section 40 duty in the Natural Environment and Rural Communities Act 2006 (NERC Act 2006), in relation to Wales, and applies to those authorities that fell within the previous duty (Ref 1).
- 2.1.12 To assist in complying with this duty, public authorities must have regard to relevant evidence provided in the State of Natural Resources Report and any relevant area statement for an area in which the authority exercises functions, as well as having regard to the list of living organisms and habitats published under Section 7 of the Act (which replaces the section 42 list for Wales provided in the NERC Act 2006) (Ref 1).
- 2.1.13 Species listed under Section 7 are those species of principal importance for the purpose of maintaining and enhancing biodiversity in Wales. There are currently 188 invertebrates listed under Section 7 of the Act. This list is currently under review by the Welsh Government in consultation with National Resources Wales (NRW).

## 2.2 PLANNING POLICY

### *National Policy*

- 2.2.1 Government planning policy guidance throughout the UK requires local planning authorities to take account of the conservation of protected species when determining planning or development consent applications. This makes the presence of a protected species a material consideration when assessing a development proposal. In the case of European protected species, such as the marsh fritillary and southern damselfly (*Coenagrion mercuriale*), planning policy emphasises the strict statutory provisions to which a planning authority must have due regard.
- 2.2.2 In Wales this is implemented through Planning Policy Wales - Edition 9, November 2016, supplemented by a series of Technical Advice Notes (TANs) (Ref 2) which sets out the land use planning policies of the Welsh Government. Consultation is currently being held on the draft Planning Policy Wales – Edition 10 which was issued in February 2018; the consultation period ends in May 2018.
- 2.2.3 Chapter 5 of PPW (9) sets out the Welsh Government's objectives for the natural heritage of Wales which includes the safeguarding of protected species. It states that '*the presence of a species protected under European or UK legislation is a material consideration when a local planning authority is considering a development proposal which, if carried out, would be likely to result in disturbance or harm to the species or its habitat*'. It also states that '*an ecological survey to confirm whether a protected species is present and an assessment of the likely impact of the development on a protected species may be required in order to inform the planning decision*'.
- 2.2.4 Further information on the detail of Planning Policy Wales is provided in Chapter 9, Ecology and Nature Conservation (**Document 5.9**).

### *Local Policy*

- 2.2.5 There are a number of local planning policies set out in the Anglesey and Gwynedd Joint Local Development Plan 2017 (Ref 3) that relate to ecology and nature conservation which in combination with other planning policies will guide local authority expectations in relation to the Proposed Development:
- Strategic Policy PS 19 relates to conserving and enhancing the natural environment;
  - Policy AMG 4 relates to coastal protection;

- Policy AMG 5 relates to the protection and enhancement of local biodiversity; and
- Policy AMG 6 relates to protecting sites of regional or local significance.

### *Biodiversity Policy*

- 2.2.6 As a result of devolution, and new country-level and international drivers and requirements, much of the work previously carried out by the UK Biodiversity Action Plan (BAP) is now focussed at a country-level rather than a UK-level. The UK BAP was succeeded by the 'UK Post-2010 Biodiversity Framework' in July 2012. The UK list of priority species and habitats, however, remains an important reference source and has been used to help draw up statutory lists of priorities in England, Scotland, Wales and Northern Ireland. In Wales the current lists are those under Section 7 of the Environment (Wales) Act 2016 which includes 188 invertebrate species as priority species requiring conservation.
- 2.2.7 The national strategy for biodiversity is delivered at local level via Local Biodiversity Action Plans (LBAPs). Species and habitats of local conservation concern or value are included in the LBAP and an action plan is created for each species and certain habitat types. The LBAPs relevant to the study area for the Proposed Development are the Anglesey LBAP published by Isle of Anglesey County Council (IACC) and the Natur Gwynedd LBAP for Gwynedd developed by a partnership of organisations and individuals.
- 2.2.8 In relation to terrestrial invertebrates, southern damselfly and marsh fritillary are listed under the Anglesey LBAP while marsh fritillary and hornet robberfly (*Asilus crabroniformis*) are listed under the Natur Gwynedd LBAP.
- 2.2.9 The Wales Biodiversity Partnership (WBP) brings together key members from the public, private and voluntary sectors to promote and monitor biodiversity and ecosystem action in Wales. WBP provides a leadership role and an expert steer on priorities for action on biodiversity and ecosystems in Wales. The WBP Steering Group has now formally disbanded and the biodiversity action work programme taken on by the Wales Biodiversity Strategy Board (WBSB) and the WBP working groups.

## **2.3 IUCN RED LIST SPECIES**

- 2.3.1 The desk based study refers to species that are listed on the International Union for Conservation of Nature (IUCN) Red List (also known as the Red List of Threatened Species) (Ref 4). This comprises comprehensive lists,

which are regularly produced and updated, of endangered and threatened species.

2.3.2 The lists deal with many plants, fungi and animals, and uses a set of criteria to identify those species at greatest risk of extinction and to identify the factors responsible in order to inform conservation approaches. Species are classified into nine defined categories (Ref 5):

- extinct – when there is no reasonable doubt that the last individual has died;
- extinct in the wild – surviving in cultivation, in captivity or as a naturalised population well outside the past range;
- critically endangered – considered to be facing an extremely high risk of extinction in the wild;
- endangered - considered to be facing a very high risk of extinction in the wild;
- vulnerable - considered to be facing a high risk of extinction in the wild;
- near threatened – close to qualifying for or likely to qualify for a threatened category in the near future;
- least concern – does not qualify for the above criteria. Widespread and abundant taxa are included in this category;
- data deficient – inadequate information to make an assessment; and
- not evaluated.

## 3 Methodology

### 3.1 DESK STUDY

- 3.1.1 A desk study was carried out to identify existing information concerning the presence of protected or otherwise notable species of terrestrial invertebrates within the study area.
- 3.1.2 Relevant species record data (including protected or otherwise notable terrestrial invertebrates) were requested from Cofnod, the local environmental record centre, in February 2018; this provided an update to data obtained in November 2016 and May 2015.
- 3.1.3 Invertebrates are transient species and populations may fluctuate in response to natural and human-caused events. Therefore only records dated since 2007 were considered in the baseline study; older records were considered to offer limited value in determining current invertebrate presence and distribution.
- 3.1.4 Existing survey reports and data were reviewed where relevant to terrestrial invertebrates. The technical summary report prepared on behalf of Horizon Nuclear Power Ltd. for the proposed Wylfa Newydd Power Station project (Ref 6) was reviewed which provides a summary of terrestrial invertebrate survey work conducted at the site between 2011 and 2014. In addition the Terrestrial Invertebrate Report 2012 for the Wylfa Newydd Power Station project was also reviewed (Ref 7).
- 3.1.5 Citations for designated sites located within the study area were reviewed to determine whether any invertebrate species are listed as qualifying features. A combination of sources including: Phase 1 Habitat surveys; Ordnance Survey (OS) Mastermap 1:25000; the Multi-Agency Geographic Information for the Countryside (MAGIC) website (<http://magic.defra.gov.uk/>), NRW website and aerial photography, were used to identify potentially suitable habitat to include in the surveys and statutory and non-statutory designated sites for protected and/or notable terrestrial invertebrates, located within the study area, and determine what surveys would be required.



## 3.2 FIELD SURVEY

### *Habitat Appraisal Scoping Survey*

- 3.2.1 Surveys were designed to target butterflies and dragonflies/damselflies because, as discussed in Section 4.2, these groups are represented by species listed as qualifying features for two designated sites situated within the study area. Consideration was given to other invertebrate groups where relevant; however, surveys were focused on the qualifying mobile species associated with designated sites that could be affected due to proximity to the works.
- 3.2.2 A total of 26 sampling areas were initially identified from previously completed Phase 1 Habitat surveys and a review of OS mapping and aerial photography with having potential habitat for butterflies and/or dragonflies (Figure 2).
- 3.2.3 Each area was then visited and assessed to determine whether suitable habitat was present to support butterflies and/or Odonata and also evaluated as to whether the Proposed Development would adversely affect the habitat. Butterflies can utilise a variety of different habitats including woodland, woodland rides/glades, uncultivated grasslands (e.g. unimproved grassland), heathland, wetlands and transitional habitats such as regularly cleared woodland beneath pylons and railway embankments. They thrive best where management produces a mosaic habitat including bare ground and where habitats offer sunny but sheltered areas. Adult dragonflies and damselflies are generally found close to aquatic habitats such as lakes, ponds, slow flowing rivers, canals, ditches and marshes as these habitats are needed for their larvae to develop. Suitable feeding and roosting areas must be present adjacent to their breeding sites, similarly to butterflies they prefer sunny, sheltered habitats.

### *Transect Surveys*

- 3.2.4 Surveys were completed in general accordance with the UK Butterfly Monitoring Scheme (UKBMS) methodology (Ref 8). This included the determination of a fixed route transect which covered suitable areas of habitat within each survey area; this is also a suitable method for surveying for dragonflies.
- 3.2.5 Transects were established across each of the six sampling areas selected for survey (survey areas 10, 10a, 21, 22, 16 and 25 on Figure 3). Transects were divided into sections determined by changes in habitat or divisions including field boundaries, these are shown on Figure 3 (Sheets 1-6). Five of the survey areas contained one transect which was split into a number of

sections, however due to the size of survey area 25, it was split into five transects.

3.2.6 Surveys were conducted between June and August 2017. Each survey comprised walking transects at a slow pace between 10:45 and 15:45 when butterflies are most active. All sightings of butterflies, dragonflies and damselflies along the transect within an approximately 5 m wide band were recorded.

3.2.7 The weather conditions for surveying were as follows:

- transects were not walked when the temperature was below 13°C;
- when the temperatures were between 13-17°C, there must be at least 60% sun;
- above 17°C, transects can be surveyed in any conditions provided there was no rain; and
- transects were not walked when wind speeds were above five on the Beaufort (wind) scale.

3.2.8 Weather was recorded for each survey including; average temperature, average wind speed (Beaufort scale), wind direction, cloud cover (Oktas scale) and average percentage of sunshine..

### **3.3 ASSUMPTIONS AND LIMITATIONS**

3.3.1 The aim of a desk study is to help characterise the baseline context of a proposed development and provide valuable background information that would not be captured by surveys alone. Information obtained during the course of a desk study is dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for a particular species does not necessarily mean that the species do not occur in the study area. Likewise, the presence of records for particular species does not automatically mean that these still occur within the area of interest or are relevant in the context of the Proposed Development.

3.3.2 The detail and accuracy of the desk study records rely on those provided to Cofnod from a variety of sources. The results of the updated desk study undertaken in February 2018 have been considered for the baseline assessment. The latest desk study search was conducted on the Proposed Development layout which now covers a smaller area resulting in some records being excluded that had previously been considered. The search

also uses the latest priority and conservation lists which has also resulted in some further additions and exclusions of certain species.

- 3.3.3 Hairy dragonfly (*Brachytron pratense*) is usually the earliest species of dragonfly to emerge in the UK, as it is on the wing during May and June. As the surveys commenced on 6 June 2017 then if the species were present, including other early emerging dragonfly species, then they would have been detected in the June surveys.
- 3.3.4 One area initially identified as providing potentially suitable habitat (survey area 2) could not be accessed following the initial scoping visit as a result of works in relation to Horizon Nuclear Power Ltd. The survey area was therefore scoped out of further survey however as it is outside the 50 m buffer of the Order Limits it is not considered to affect the assessment.
- 3.3.5 Access restrictions to survey area 22 during July 2017 meant that surveys were only conducted in June and August in this area; however a good indication of the species likely to be present was obtained from the two visits within the woodland habitat.

## 4 Results

### 4.1 DESK STUDY

#### *Statutory Designations*

- 4.1.1 Two internationally designated sites, for which invertebrates are listed as qualifying features, were identified within the study area:
- Corsydd Môn/Anglesey Fens Special Area of Conservation (SAC); and
  - Corsydd Môn a Llyn/Anglesey and Llyn Fens Ramsar site.
- 4.1.2 The qualifying features of the Anglesey Fens SAC include two terrestrial European protected species of invertebrates: marsh fritillary and southern damselfly.
- 4.1.3 The qualifying features of the Anglesey and Llyn Fens Ramsar site similarly include marsh fritillary and southern damselfly.
- 4.1.4 The boundaries of Cors Erddreiniog Site of Special Scientific Interest (SSSI) and National Nature Reserve (NNR) coincide with the Anglesey Fens SAC/Anglesey and Llyn Fens Ramsar; the special features of the SSSI/NNR also include marsh fritillary and southern damselfly.
- 4.1.5 The Order Limits overlap in a few very small areas along the western boundary of the SAC/Ramsar/SSSI/NNR to facilitate drainage mitigation works.

#### *Terrestrial Invertebrate Records*

- 4.1.6 Cofnod provided 290 records of terrestrial invertebrates within the study area, including records for southern damselfly and marsh fritillary which are qualifying features of the Anglesey Fens SAC/Anglesey and Llyn Fens Ramsar site. Neither of these two species were recorded within the Order Limits.
- 4.1.7 The records are shown on Figure 1 and include beetle, butterfly, Odonata, moth and spider species. Appendix A provides the detailed data search results.

- 4.1.8 Due to the number of records received, those present within 500 m of the Order Limits have been summarised here as these are considered the most relevant to the Proposed Development. Of the 290 records received, 34 fell within 500 m of the Order Limits. The 34 records comprised 20 species of butterfly, moth, dragonfly and damselfly. The three most frequently recorded species were marsh fritillary (*Eurodryas aurina*) (four records), white ermine (*Spilosoma lubricipeda*) (four records) and variable damselfly (*Coenagrion pulchellum*) (three records). The remaining 17 species had one or two records for each species, these are summarised in Table 4.1.
- 4.1.9 Table 4.1 also summarises the conservation status of the protected or otherwise notable species of butterflies, moths and Odonata identified by the desk study that fall within 500 m of the Order Limits. Of the species recorded within 500 m, one was classified as endangered, 13 were vulnerable, five near threatened, and one of least concern under the IUCN categories.
- 4.1.10 No records were returned for within the Order Limits.

**Table 4.1 Summary of Cofnod desk study records located within 500 m of the Order Limits and their conservation status**

Common name	Scientific name	Cofnod Results	Conservation status
<b>Butterflies</b>			
Marsh fritillary	<i>Euphydryas aurina</i>	Four records between 2007 and 2012 (adults and larvae) – closest record is 196 m from Order Limits	Annex II Conservation of Habitats and Species Regulations 2017 Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Section 7 of the Environment (Wales) Act 2016 Anglesey and Natur Gwynedd LBAPs. IUCN category status - Vulnerable
Small heath	<i>Coenonympha pamphilus</i>	Two records in 2016 – closest record is 162 m from Order Limits	Section 7 of the Environment (Wales) Act 2016 IUCN category status – Near threatened

**Table 4.1 Summary of Cofnod desk study records located within 500 m of the Order Limits and their conservation status**

Common name	Scientific name	Cofnod Results	Conservation status
Small pearl-bordered fritillary	<i>Boloria selene</i>	Two records in 2009 and 2012 – closest record is 196 m from Order Limits	Section 7 of the Environment (Wales) Act 2016 IUCN category status – Near threatened.
Wall	<i>Lasiommata megera</i>	One record in 2016 – 424 m from Order Limits	Section 7 of the Environment (Wales) Act 2016 IUCN category status – Near threatened
Dragonflies / Damselflies			
Hairy dragonfly	<i>Brachytron pratense</i>	Two records in 2009 – closest record is 21 m from Order Limits	IUCN category status - Least Concern.
Scare blue-tailed damselfly	<i>Ischnura pumilio</i>	One record 2014 (6 adults) – 262 m from Order Limits	IUCN category status – Near threatened
Variable damselfly	<i>Coenagrion pulchellum</i>	Three records in 2009, 2011 and 2016 – closest record is 21 m from Order Limits	IUCN category status – Near threatened
Moths			
Broom moth	<i>Melanchra pisi</i>	One record in 2007 – 107 m from Order Limits	Section 7 of the Environment (Wales) Act 2016 IUCN category status - Vulnerable
Buff ermine	<i>Spilarctia luteum</i>	One record in 2014 (14 adults) – 135 m from Order Limits	Section 7 of the Environment (Wales) Act 2016 IUCN category status - Vulnerable
Dark-barred	<i>Xanthorhoe ferrugata</i>	One record in 2008 – 387 m from Order	Section 7 of the Environment (Wales) Act 2016

**Table 4.1 Summary of Cofnod desk study records located within 500 m of the Order Limits and their conservation status**

Common name	Scientific name	Cofnod Results	Conservation status
twin-spot carpet		Limits	IUCN category status – Endangered
Dusky brocade	<i>Apamea remissa</i>	One record in 2014 – 76 m from Order Limits	Section 7 of the Environment (Wales) Act 2016 IUCN category status - Vulnerable
Garden tiger	<i>Arctia caja</i>	One larvae record in 2013 – 322 m from Order Limits	Section 7 of the Environment (Wales) Act 2016 IUCN category status - Vulnerable
Ghost moth	<i>Hepialus humuli</i>	One record in 2007 – 175 m from Order Limits	Section 7 of the Environment (Wales) Act 2016 IUCN category status - Vulnerable
Grey dagger	<i>Acronicta psi</i>	One record in 2016 (2 adults) – 470 m from Order Limits	Section 7 of the Environment (Wales) Act 2016 IUCN category status - Vulnerable
Knot grass	<i>Acronicta rumicis</i>	Two records in 2014 and 2016 – closest record is 135 m from Order Limits	Section 7 of the Environment (Wales) Act 2016 IUCN category status - Vulnerable
Rustic	<i>Hoplodrina blanda</i>	One record in 2007 – 175 m from Order Limits	Section 7 of the Environment (Wales) Act 2016 IUCN category status - Vulnerable
Shoulder-striped wainscot	<i>Leucania comma</i>	One record in 2014 – 135 m from Order Limits	Section 7 of the Environment (Wales) Act 2016 IUCN category status - Vulnerable
Small	<i>Ecliptopera</i>	Two records in 2007 and 2013 –	Section 7 of the Environment

**Table 4.1 Summary of Cofnod desk study records located within 500 m of the Order Limits and their conservation status**

Common name	Scientific name	Cofnod Results	Conservation status
Phoenix	<i>silacea</i>	closest record is 162 m from Order Limits	(Wales) Act 2016 IUCN category status - Vulnerable
Small square-spot	<i>Diarsia rubi</i>	Two records in 2014 – closest record is 76 m from Order Limits	Section 7 of the Environment (Wales) Act 2016 IUCN category status - Vulnerable
White ermine	<i>Spilosoma lubricipeda</i>	Four records in 2013, 2014 and 2015 – closest record is 76 m from Order Limits	Section 7 of the Environment (Wales) Act 2016 IUCN category status - Vulnerable

### Report Reviews

- 4.1.11 The review of surveys conducted between 2011 and 2014 on behalf of Horizon Nuclear Power revealed the presence of notable species i.e. those that are listed on Section 7 of the Environment (Wales) Act 2016 or species that are classified as nationally rare or scarce within their survey areas (Ref 6). One of their survey areas which comprises a woodland glade is within the Order Limits and within that area 17 notable species of terrestrial invertebrates were recorded, Table 4.2 details these results.

**Table 4.2 Notable terrestrial invertebrate species recorded in the Order Limits during 2011 – 2014 surveys on behalf of Horizon Nuclear Power**

Latin Name	Common Name (where relevant)	Group	Designation / Status	Habitat
<i>Admontia grandicornis</i>		Fly	Local	Unknown
<i>Agonum emarginatum</i>		Ground beetle	Local	Hygrophilous
<i>Amara</i>		Ground beetle	Local	Hygrophilous



**Table 4.2 Notable terrestrial invertebrate species recorded in the Order Limits during 2011 – 2014 surveys on behalf of Horizon Nuclear Power**

Latin Name	Common Name (where relevant)	Group	Designation / Status	Habitat
<i>Iunicollis</i>				
<i>Atheta vaga</i>		Rove beetle	Local	Unknown
<i>Dryops ernesti</i>		Marsh beetle	Local	Hygrophilous
<i>Graptus triguttatus</i>		Weevil	Local	Hygrophilous
<i>Lasiommata mergera</i>	Wall	Butterfly	Section 7 of Environment (Wales) Act 2016	Grassland - generalist
<i>Leistus fulvibarbis</i>		Ground beetle	Local	Woodland
<i>Lema cyanella</i>		Leaf beetle	Local	Grassland – improved
<i>Lonchaea corusca</i>		Lance fly	Nationally notable	Unknown
<i>Oedemera lurida</i>		Blister beetle	Local	Grassland – generalist
<i>Paederus riparius</i>		Rove beetle	Local	Unknown
<i>Prasocuris junci</i>		Leaf beetle	Local	Hygrophilous
<i>Silpha tristis</i>		Beetle	Local	Unknown
<i>Staphylinus erythropterus</i>		Rove beetle	Local	Unknown
<i>Synapion ebeninum</i>		Weevil	Local	Grassland – unimproved
<i>Tyria jacobaeae</i>	Cinnabar moth	Moth	Section 7 of Environment (Wales) Act	Grassland – improved

**Table 4.2 Notable terrestrial invertebrate species recorded in the Order Limits during 2011 – 2014 surveys on behalf of Horizon Nuclear Power**

Latin Name	Common Name (where relevant)	Group	Designation / Status	Habitat
			2016	

4.1.12 Fifteen species of Lepidoptera (butterflies/moths) were recorded during surveys undertaken in 2011 and again in 2012. Seven species of Odonata (dragonflies/damselflies) were recorded during the surveys in 2011 and six species recorded in 2012. The survey area in Tre'r Gof SSSI adjacent to the Order Limits had the highest number of Lepidoptera and Odonata species recorded in 2012, with a total of 11 and four respectively (Ref 7).

## 4.2 FIELD SURVEY

### *Habitat Appraisal Scoping Survey*

- 4.2.1 The habitat appraisal scoping surveys identified six survey areas to be taken forward for further survey; these were sampling areas 10, 10a, 16, 21, 22 and 25 (Figure 2).
- 4.2.2 These areas had suitable habitat present and included areas of permanent land-take, areas where temporary works could adversely affect the existing habitat or where connectivity to important sites that would not be directly affected may be severed. Typically, suitable habitats included areas of wetlands and areas of marshy grassland (predominantly dominated by rushes (*Juncus* sp.), reeds and sedges which are prone to holding above-ground water; grasslands containing wild flowers; woodland rides, glades and edges and areas of scrub containing bramble (*Rubus* sp.).
- 4.2.3 Survey area 10 transect was selected as it runs through the western part of the Anglesey Fens SAC/Anglesey and Llyn Fens Ramsar and Cors Erddreiniog SSSI/NNR. The northern part of survey area 10a encroaches within the southern section of this designated site and the similar habitat to the immediate south of the designated site.
- 4.2.4 The other 20 sampling areas were scoped out of further survey either due to there being limited suitable habitat for supporting the species groups of interest or due to the distance away from the Proposed Development meaning that there would be no impact on the species groups of interest.

### *Transect Surveys*

- 4.2.5 Surveys were conducted in June, July and August 2017; where possible a minimum of three survey visits were made to each survey area. Some surveys were also repeated in June as weather conditions were sub-optimal at the beginning of the month. The weather conditions for the surveys undertaken are shown in Appendix B.
- 4.2.6 Over the course of all the surveys there were a total of 20 butterfly species and 13 dragonflies and damselflies recorded.
- 4.2.7 Table 4.3 summarises the current conservation status and distribution of the butterfly species recorded during the surveys.

Table 4.3 Butterfly species recorded			
Common name	Scientific name	Survey Area Recorded	Conservation Status and Distribution
Comma	<i>Polygonia c-album</i>	22,	Not a species of conservation concern – widespread throughout England and Wales. IUCN category status - Least Concern.
Common blue	<i>Polyommatus icarus</i>	10, 21, 25	Not a species of conservation concern – found throughout Britain and Ireland IUCN category status - Least Concern.
Gatekeeper	<i>Pyronia tithonus</i>	10, 10a, 16, 21, 22, 25	Not a species of conservation concern – found in southern Britain and far south of Ireland. IUCN category status - Least Concern.
Green-veined white	<i>Pieris napi</i>	10, 10a, 16, 21, 22, 25	Not a species of conservation concern – widespread and common throughout Britain and Ireland. IUCN category status - Least Concern.
Holly blue	<i>Celastrina</i>	16	Not a species of conservation concern - widespread in

**Table 4.3 Butterfly species recorded**

Common name	Scientific name	Survey Area Recorded	Conservation Status and Distribution
	<i>argiolus</i>		England and Wales, rarer in Ireland. IUCN category status - Least Concern.
Large skipper	<i>Ochlodes sylvanus</i>	21	Not a species of conservation concern – present in England, Wales and southern parts of Scotland. IUCN category status - Least Concern.
Large white	<i>Pieris brassicae</i>	10, 10a, 16, 22, 25	Not a species of conservation concern – widespread and common throughout Britain and Ireland. IUCN category status - Least Concern.
Meadow brown	<i>Maniola jurtina</i>	10, 10a, 16, 21, 22, 25	Not a species of conservation concern – widespread and common throughout Britain and Ireland. IUCN category status - Least Concern.
Orange-tip	<i>Anthocharis cardamines</i>	10	Not a species of conservation concern - widespread and common throughout Britain and Ireland. IUCN category status - Least Concern.
Painted lady	<i>Vanessa cardui</i>	25	Not a species of conservation concern – recorded throughout Britain and Ireland, but numbers vary greatly from year to year. IUCN category status - Least Concern.

**Table 4.3 Butterfly species recorded**

Common name	Scientific name	Survey Area Recorded	Conservation Status and Distribution
Peacock	<i>Aglais io</i>	10, 16, 21, 22, 25	Not a species of conservation concern – common throughout Britain and Ireland. IUCN category status - Least Concern.
Red admiral	<i>Vanessa atalanta</i>	10, 10a, 21, 22, 25	Not a species of conservation concern – common throughout Britain and Ireland. IUCN category status - Least Concern.
Ringlet	<i>Aphantopus hyperantus</i>	10, 10a, 16, 21, 25	Not a species of conservation concern – widespread in Britain and Ireland apart from northern Scotland. IUCN category status - Least Concern.
Small copper	<i>Lycaena phlaeas</i>	10, 16	Not a species of conservation concern – common and widespread in Britain and Ireland but declined throughout its range during the twentieth century. IUCN category status - Least Concern.
Small heath	<i>Coenonympha pamphilus</i>	10, 10a, 25	Listed under Section 7 of the Environment (Wales) Act 2016 as a species of principal importance for the purpose of maintaining and enhancing biodiversity in Wales – widespread in Britain and Ireland. IUCN category status – Near threatened
Small	<i>Thymelicus</i>	10, 10a, 16, 21, 25	Not a species of conservation

**Table 4.3 Butterfly species recorded**

Common name	Scientific name	Survey Area Recorded	Conservation Status and Distribution
skipper	<i>sylvestris</i>		concern – widespread in southern Britain but underwent a long-term decline in abundance. IUCN category status - Least Concern.
Small tortoiseshell	<i>Aglais urticae</i>	10, 10a, 25	Not a species of conservation concern – one of the most widespread species of butterfly in Britain and Ireland showing little overall change in range, though with some concern over conservation status in recent decades. IUCN category status - Least Concern.
Small white	<i>Pieris rapae</i>	10, 21, 25	Not a species of conservation concern – common and widespread in Britain and Ireland. IUCN category status - Least Concern.
Speckled wood	<i>Pararge aegeria</i>	10, 16, 21, 22, 25	Not a species of conservation concern - throughout England (except the far north), Wales and Ireland, and in northern Scotland. IUCN category status - Least Concern.
Wall	<i>Lasiommata megera</i>	10	Listed under Section 7 of the Environment (Wales) Act 2016 as a species of principal importance for the purpose of maintaining and enhancing biodiversity in Wales - widespread in England, Wales

**Table 4.3 Butterfly species recorded**

Common name	Scientific name	Survey Area Recorded	Conservation Status and Distribution
			and Ireland, but increasingly scarce inland.  IUCN category status – Near threatened

4.2.8 The full list of species and numbers recorded during the surveys for each transect section are provided in Appendix C.

4.2.9 Table 4.4 summarises the current conservation status and distribution of the dragonfly and damselfly species recorded during the surveys.

**Table 4.4 Dragonfly and damselfly species recorded**

Common name	Scientific name	Survey Area Recorded	Conservation Status and Distribution
Azure damselfly	<i>Coenagrion puella</i>	10, 10a, 16, 21, 25	Not a species of conservation concern - very common throughout the British Isles.  IUCN category status - Least Concern.
Black darter	<i>Sympetrum danae</i>	10, 10a	Not a species of conservation concern - widespread and can be abundant.  IUCN category status - Least Concern.
Blue-tailed damselfly	<i>Ischnura elegans</i>	10, 16, 22, 25	Not a species of conservation concern - abundant throughout the British Isles.  IUCN category status - Least Concern.
Broad-bodied chaser	<i>Libellula depressa</i>	10, 16	Not a species of conservation concern - widespread and common throughout southern England and Wales.  IUCN category status - Least

**Table 4.4 Dragonfly and damselfly species recorded**

Common name	Scientific name	Survey Area Recorded	Conservation Status and Distribution
			Concern.
Common blue damselfly	<i>Enallagma cyathigerum</i>	10, 22, 25	Not a species of conservation concern - abundant throughout the British Isles. IUCN category status - Least Concern.
Common darter	<i>Sympetrum striolatum</i>	10, 10a, 21, 22, 25	Not a species of conservation concern - abundant in England, Wales and Ireland. IUCN category status - Least Concern.
Common hawker	<i>Aeshna juncea</i>	10, 16	Not a species of conservation concern - common in western England, Wales, Scotland and Ireland. IUCN category status - Least Concern.
Four-spotted chaser	<i>Libellula quadrimaculata</i>	10, 10a, 16	Not a species of conservation concern - common throughout the British Isles. IUCN category status - Least Concern.
Golden-ringed dragonfly	<i>Cordulegaster boltonii</i>	10, 10a, 16, 21, 25	Not a species of conservation concern - a common riverine species of southern England, Wales, Lake District and western Scotland. IUCN category status – Not evaluated
Large red damselfly	<i>Pyrrhosoma nymphula</i>	10, 16, 25	Not a species of conservation concern - common and widespread. IUCN category status - Least Concern.
Migrant hawker	<i>Aeshna mixta</i>	16, 22	Not a species of conservation concern - common and increasing its



**Table 4.4 Dragonfly and damselfly species recorded**

Common name	Scientific name	Survey Area Recorded	Conservation Status and Distribution
			range. IUCN category status - Least Concern.
Southern hawker	<i>Aeshna cyanea</i>	10	Not a species of conservation concern - very common in southern and central England and Wales. IUCN category status - Least Concern.
Variable damselfly	<i>Coenagrion pulchellum</i>	10	Red data book (Least Concern) - scattered and uncommon in mainland Britain. IUCN category status – Near threatened

4.2.10 No protected terrestrial invertebrate species were recorded during the surveys.

4.2.11 Three notable species were recorded during the surveys. These are shown in Table 4.5. These are species listed under Section 7 of the Environment (Wales) Act 2016, and/or are included on the Red List as 'near threatened' (Ref 9 and Ref 10).

**Table 4.5 Notable species recorded**

Common name	Survey Area Recorded	Environment (Wales) Act 2016 Section 7	IUCN Red List
Small heath	10, 10a, 25	Yes	Near threatened
Wall	10	Yes	Near threatened
Variable	10	No	Near threatened

**Table 4.5 Notable species recorded**

Common name	Survey Area Recorded	Environment (Wales) Act 2016 Section 7	IUCN Red List
damselfly			

4.2.12 The survey areas and sections of the transects where these three notable species were recorded are shown in Table 4.6.

**Table 4.6 Notable species recorded on each transect and maximum count per section**

Survey Area	Transect No.	Sections	Small heath	Wall	Variable damselfly
10	1	Section 1	2		
		Section 3		2	
		Section 4			1
		Section 6	2		
		Section 7		1	
		Section 9		1	
		Section 10			1
10a	1	Section 1	3		
		Section 2	1		
25	3	Section 2	1		

4.2.13 During the June survey of survey area 16 a hawk type species was observed but could not be positively identified. Due to the early date on Anglesey there is potential for this to have been a hairy dragonfly.

### 4.3 SPECIES ACCOUNTS

4.3.1 The following text provides information on the notable target species (butterflies and Odonata) that were identified through the desk study and/or recorded during the surveys.

#### *Marsh fritillary*

4.3.2 This species was only identified by the desk study and not the field surveys.

- 4.3.3 The marsh fritillary is threatened, not only in the UK but across Europe, and is therefore the object of much conservation effort. It was once widespread in Britain and Ireland but has declined over the twentieth century largely due to loss of habitat. The species requires extensive habitats or habitat networks for its long-term survival. It is now confined to the western side of Britain and Ireland.
- 4.3.4 The species utilise three main habitat types: damp grasslands dominated by tussock forming grasses; chalk grasslands (usually on west or south-facing slopes in England); and shorter coastal grasslands (in Wales, Scotland and Northern Ireland). Temporary colonies may also exist in large (>1 ha) woodland clearings and in other grasslands.
- 4.3.5 The adults can generally be seen from the middle of May to the end of July, reaching a peak in early June. The primary larval food plant is devil's-bit scabious (*Succisa pratensis*) and the adults feed on a variety of plants including betony (*Stachys officinalis*), buttercups (*Ranunculus spp.*), dandelion (*Taraxacum agg.*) and thistles (*Cirsium spp.* and *Carduus spp.*).

#### *Small heath*

- 4.3.6 This species was only identified during the field surveys and not by the desk study.
- 4.3.7 Though still considered widespread, the small heath has undergone a severe decline in population size across much of its range over the long term and is therefore a priority species for conservation efforts. Recent fine-scale assessment of distribution data shows that the small heath has decreased by 57% since 1976, while its abundance on monitored sites has also more than halved over the same period (Ref 11).
- 4.3.8 Despite its name, this species of butterfly is not confined to heathland and can be found in a wide variety of open habitats including open mosaic habitats on previously developed land, grassland, heathland, railway embankments and disused quarries. It lives in discrete colonies with adults rarely venturing far from the home range.
- 4.3.9 Adults are generally on the wing throughout the summer in two or three broods and fly only in sunny conditions, settling close to the ground. Caterpillars of this species feed on a wide range of common fine-leaved grass species including meadow-grasses (*Poa spp.*), fescues (*Festuca spp.*) and bents (*Agrostis spp.*). Adults feed largely on bramble, buttercups, fleabane (*Pulicaria dysenterica*), common ragwort (*Senecio jacobaea*), tormentil (*Potentilla erecta*) and yarrow (*Achillea millefolium*).

- 4.3.10 The two locations of small heath recorded within survey area 10 occurred within the Anglesey Fens SAC/Anglesey and Llyn Fens Ramsar and Cors Erddreiniog SSSI/NNR.
- 4.3.11 The two locations of this species within survey area 10a were recorded to the south of Anglesey Fens SAC/Anglesey and Llyn Fens Ramsar and Cors Erddreiniog SSSI/NNR.
- 4.3.12 There was a single sighting of this species along transect 3, section 2 in survey area 25.

#### *Small pearl-bordered fritillary*

- 4.3.13 This species was only identified by the desk study and not the field surveys.
- 4.3.14 It generally emerges in the second half of May in the north and west of Wales with adults seen flying until late July or even August. Despite evidence of stability in the west and north of its range in the UK, this species has suffered a long-term decline in both distribution and population and is considered a priority species for conservation action. Generally found in open areas within deciduous woodland, such as along rides and in woodland clearings, the cessation of coppicing which creates suitable habitat conditions for the adult life stage is considered to be a primary cause of the decline.
- 4.3.15 The primary larval food plants are common dog-violet (*Viola riviniana*) and marsh violet (*Viola palustris*). Adults feed largely on species such as bugle (*Ajuga reptans*), bird's-foot trefoil (*Lotus corniculatus*), bluebell (*Hyacinthoides non-scriptus*), buttercups (*Ranunculus* spp.) and dandelion.

#### *Wall butterfly*

- 4.3.16 This species was identified during the field surveys but not by the desk study. Its name is derived from the characteristic behaviour of resting on bare surfaces including the ground, fences and walls.
- 4.3.17 Whilst this species was once found throughout much of the UK including Wales, it has suffered a severe decline over recent decades and is now largely confined to primarily coastal areas, usually on short, open grassland, where the turf is broken or stony. It is also found on dunes and other coastal habitats, as well as disused quarries, derelict land, farm tracks, railway embankments and cuttings, gardens and along field margins.
- 4.3.18 The decline of the wall butterfly is not well understood. The local extinction of colonies across southern Britain is reflected in a 77% decrease in

occurrence and an 87% decrease in abundance since 1976 (Ref 11). The wall butterfly is reported to be declining in other European countries and shows a significant decline in abundance in the European Grassland Butterfly Indicator (Ref 12) suggesting climate change may be driving the wall's decline, although other factors, including local influences, may also be involved.

- 4.3.19 The caterpillar stage of this species feeds on a range of grasses, including tor-grass (*Brachypodium pinnatum*), false brome (*Brachypodium sylvaticum*), cock's-foot (*Dactylis glomerata*), and Yorkshire-fog (*Holcus lanatus*). Adults feed on plants such as on daisy (*Bellis perennis*), hawkweeds, knapweeds (*Centaurea* spp.), ragged robin, common ragwort and thistles.
- 4.3.20 The locations of this species recorded within survey area 10 were within the Anglesey Fens SAC/Anglesey and Llyn Fens Ramsar and Cors Erddreiniog SSSI/NNR.

#### *Hairy dragonfly*

- 4.3.21 The hairy dragonfly is the earliest species of dragonfly to emerge in the UK, being on the wing between March and July, with the peak period of activity between May and June. This species was identified by the desk study and noted as a possible, but not confirmed, sighting during field surveys in survey area 16; as a medium-sized hawkler it can easily be mistaken for another species of hawkler dragonfly.
- 4.3.22 This species is generally only found above and around static or slow moving, waterbodies supporting a range of different plants, including reeds (*Phragmites* spp.), bulrushes (*Typha* spp.), bur-reeds (*Sparganium* spp.), club-rushes (*Schoenoplectus* spp.) and sedges. Wet ditches in grazing marshes, canals, disused water-filled gavel and sand pits, ponds and lakes are recognised as favoured habitats
- 4.3.23 The hairy dragonfly was, until recently, considered an uncommon species in the UK, found only on a limited number of grazing marshes and wetlands. It appears however to be increasing its range and is now widely scattered across England and Wales.

#### *Scarce blue-tailed damselfly*

- 4.3.24 This species was only identified by the desk study and not the field surveys.
- 4.3.25 This damselfly is usually found in shallow wetland sites such as bog pools or slow following water, fed by seepages and flushes. It prefers early

successional habitats with minimal vegetation and areas of bare substrate, although some emergent plants are required at breeding sites.

- 4.3.26 The scarce blue-tailed damselfly is classed as nationally scarce but has shown some range expansion in Britain in the southwest counties of England and Wales.

*Variable dragonfly*

- 4.3.27 This species was identified by both the desk study and the field surveys.
- 4.3.28 The variable damselfly is a species of Odonata which usually occurs close to well vegetated ponds or ditches and canals with slow-flowing water. Whilst considered scarce in the UK with a localised and extremely patchy distribution, where it does occur it can be abundant.
- 4.3.29 The preferred habitat requirements of this species remain something of mystery, with apparently suitable sites adjacent to known populations that do not appear to support a population. Reasons of which remain unclear, indicating a need to better understand the ecology of this species, especially as there appear to be fewer records from the last 20 years in previously known locations. To help address this lack of understanding the British Dragonfly Society is running a variable damselfly survey.
- 4.3.30 It was recorded along two sections of survey area 10 within the Anglesey Fens SAC/Anglesey and Llyn Fens Ramsar and Cors Erddreiniog SSSI/NNR.

## 5 Conclusion

5.1.1 The following notable target species (butterflies and Odonata) were identified through the desk study and/or recorded during the surveys:

- marsh fritillary;
- small heath;
- small pearl-bordered fritillary;
- wall;
- hairy dragonfly;
- scarce blue-tailed damselfly; and
- variable damselfly.

5.1.2 The two species listed as qualifying features of the Anglesey Fens SAC/Anglesey and Llyn Fens Ramsar (marsh fritillary and southern damselfly) were not identified by the transect surveys. The desk study recorded marsh fritillary within 196 m of the Order Limits and southern damselfly within 681 m of the Order Limits.

5.1.3 Twenty protected or otherwise notable terrestrial invertebrate species were identified by the Cofnod data search within 500 m of the Order Limits; none of the records received were within the Order Limits.

5.1.4 Seventeen notable terrestrial invertebrate species that were located within the Order Limits were identified through the desk study review of reports produced on behalf of Horizon Nuclear Power for the Wylfa Newydd Project. One of these was a butterfly species (wall) which is listed on Section 7 of the Environment (Wales) Act 2016.

5.1.5 Using the UK Butterfly Monitoring Scheme, one group of butterfly species of increasing conservation concern are those that were relatively widespread but have undergone major declines since the 1970s. Previous analyses of the distribution data, carried out at a coarse 10 km square resolution, almost certainly under-estimated the true scale of decline among these species which include the small pearl-bordered fritillary, wall and small heath, all of

which have suffered very substantial decreases in both abundance and occurrence over the past four decades (Ref 11).

- 5.1.6 Effects as a result of the Proposed Development and mitigation measures are detailed in Chapter 9 Ecology and Nature Conservation (**Document 5.9**). Further details on the mitigation measures are provided in the Biodiversity Mitigation Strategy (**Document 7.7**). Potential enhancement opportunities are detailed within the Enhancement Strategy (**Document 7.13**) which also includes opportunities for enhancements of habitats that would in turn benefit invertebrates.



## 6 References

Ref 1: Welsh Government. The Environment (Wales) Act Part 1 Interim Guidance  
<https://www.biodiversitywales.org.uk/Environment-Wales-Act>

Ref 2: Welsh Government (2016); Planning Policy Wales Edition 9 – November 2016. [http://gov.wales/docs/desh/publications/161117planning-policy-wales-edition-9-en.pdf?sm\\_au=iVVPMM7nPFv4ZPw7](http://gov.wales/docs/desh/publications/161117planning-policy-wales-edition-9-en.pdf?sm_au=iVVPMM7nPFv4ZPw7)

Ref 3: IACC and Gwynedd Council (2017); Anglesey and Gwynedd Joint Local Development Plan 2011-2026

Ref 4: IUCN (2018) IUCN Red List of Threatened Species. Version 2017-3. <http://www.iucnredlist.org/>

Ref 5: IUCN Standards and Petitions Subcommittee (2017) Guidelines for Using the IUCN Red List Categories and Criteria. Version 13. Prepared by the Standards and Petitions Subcommittee. <http://www.iucnredlist.org/documents/RedListGuidelines.pdf>

Ref 6: Jacobs (2015); Horizon Nuclear Power Wylfa Ltd. Wylfa Newydd Project. Terrestrial Invertebrate Technical Summary Report 2017. Document Number: 60PO8032/TER/REP/007 (Rev 2, prepared June 2017).

Ref 7: ARUP (2013) Horizon Nuclear Power Wylfa Ltd. Wylfa New Nuclear Power Station. Terrestrial Invertebrate Report 2012. Document Number: 229516-00/REP002

Ref 8: UK Butterfly Monitoring Scheme (UKBMS) methodology (2006); Fixed-route transects. <http://www.ukbms.org/methods.aspx>

Ref 9: Fox, R., Warren, M, S and Brereton, T (2010); The Butterfly Red List for Great Britain, A4, ISSN 1473-0154.

Ref 10: Daguet, C., French, G., and Taylor, P., (eds) (2008); The Odonata Red Data List for Great Britain, Species Status Assessment No 11, ISSN 1473 0154.

Ref 11: Fox, R. (2015) State of the UK's Butterflies 2015.

Ref 12: van Swaay, C., *et al.* (2013); The European Grassland Butterfly Indicator: 1990–2011. Technical report No. 11/2013, European Environment Agency.

## Websites

<https://british-dragonflies.org.uk/home> British Dragonfly Society website

<https://butterfly-conservation.org/> Butterfly Conservation

<http://gov.wales/?lang=en> Welsh Government website

<http://www.cofnod.org.uk/Home> Cofnod website

<https://www.gwynedd.llyw.cymru> Gwynedd Council website

<http://www.iucnredlist.org/> The IUCN Red List of Threatened Species

<http://www.magic.gov.uk/> MAGIC website

<http://www.ukbms.org/> UKBMS website

<https://www.biodiversitywales.org.uk/Invertebrates> Biodiversity Wales website

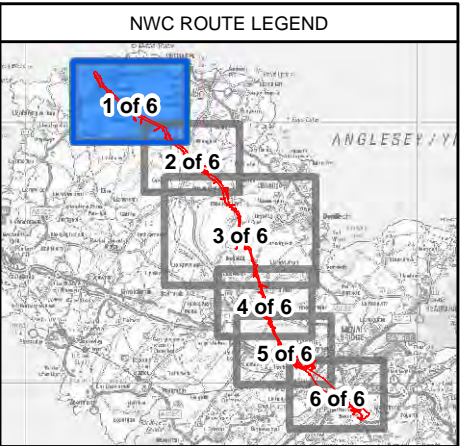
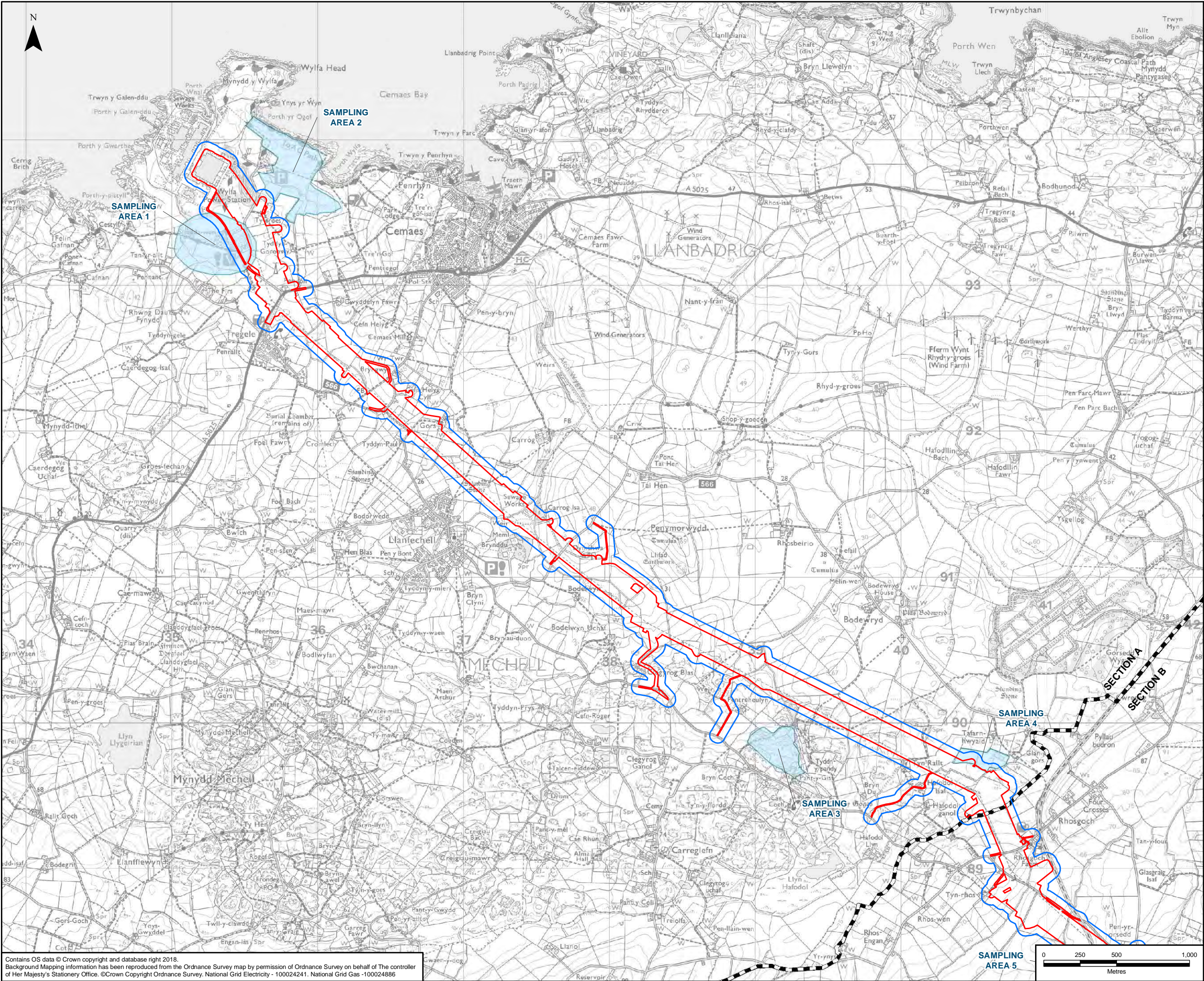
# Figures

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**LEGEND**

- ORDER LIMITS
- 50M BUFFER OF ORDER LIMITS
- SECTION CUTLINES
- TERRESTRIAL INVERTEBRATE SAMPLING AREAS
- SURVEYED
- SCOPED OUT

**NOTES**

PLEASE REFER TO APPENDIX 9.3 PHASE 1 HABITAT SURVEY REPORT (DOCUMENT 5.9.2.3) FOR HABITAT CLASSIFICATION INFORMATION.

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Rev	Date	Description	GIS	Chk	App

**nationalgrid**

Scheme: NORTH WALES CONNECTION PROJECT

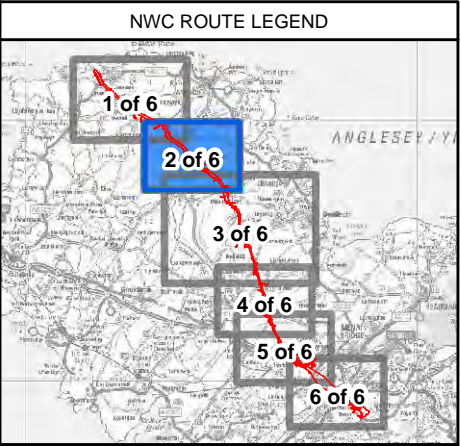
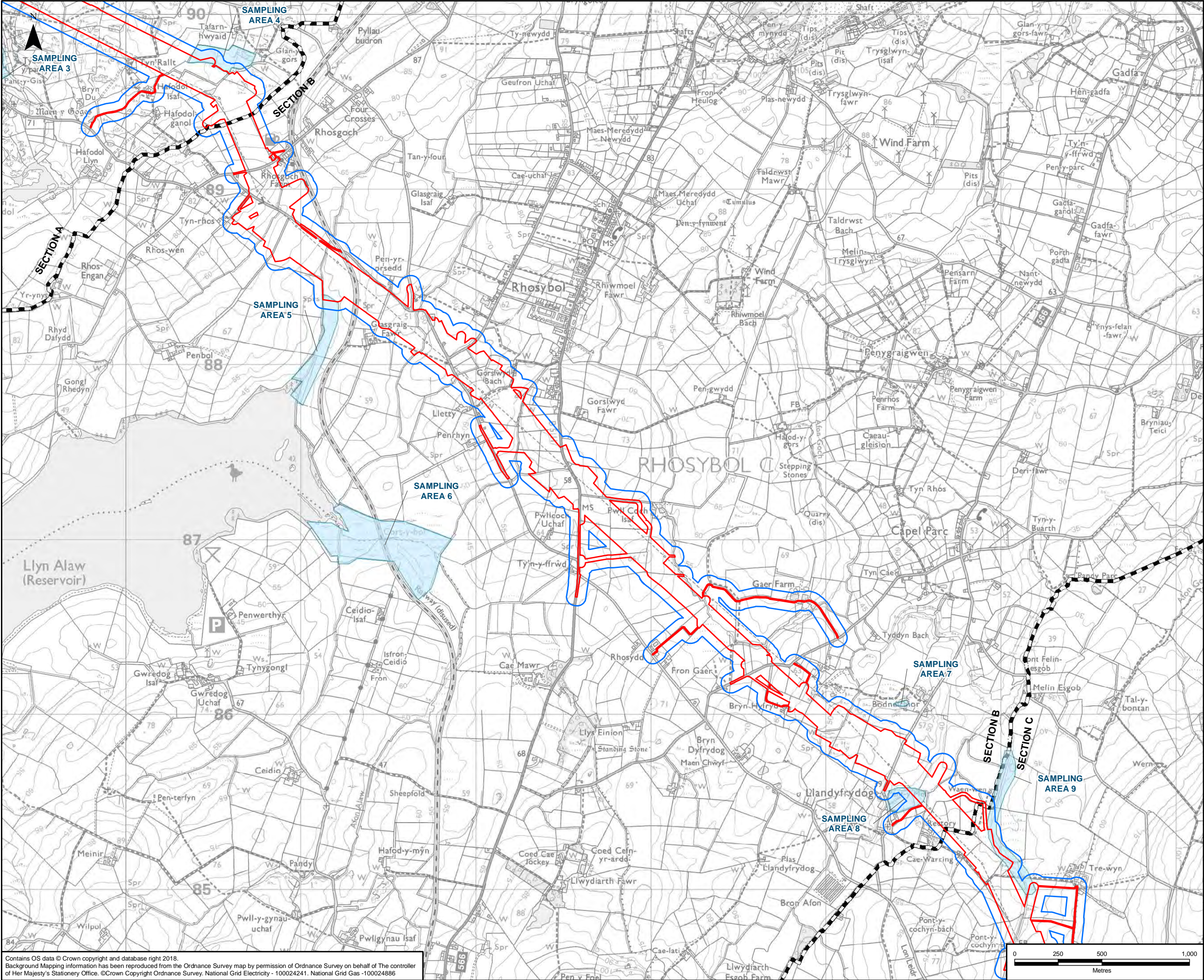
Document Number: 5.9.2.14

Document Title: FIGURE 2  
TERRESTRIAL INVERTEBRATE SAMPLING LOCATIONS  
SECTION A

Creator: AB	Date: 19/07/2018	Checker: LS	Date: 19/07/2018	Approver: NL	Date: 19/07/2018
Document Type: FIGURE	Scale: 1:24,000	Format: A3	Sheets: 1 of 6	Rev: A	

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**LEGEND**

- ORDER LIMITS
- 50M BUFFER OF ORDER LIMITS
- SECTION CUTLINES
- TERRESTRIAL INVERTEBRATE SAMPLING AREAS
  - SURVEYED
  - SCOPED OUT

**NOTES**

PLEASE REFER TO APPENDIX 9.3 PHASE 1 HABITAT SURVEY REPORT (DOCUMENT 5.9.2.3) FOR HABITAT CLASSIFICATION INFORMATION.

A	19/07/2018	ENVIRONMENTAL STATEMENT	AB	LS	NL
Rev	Date	Description	GIS	Chk	App

**nationalgrid**

Scheme: NORTH WALES CONNECTION PROJECT

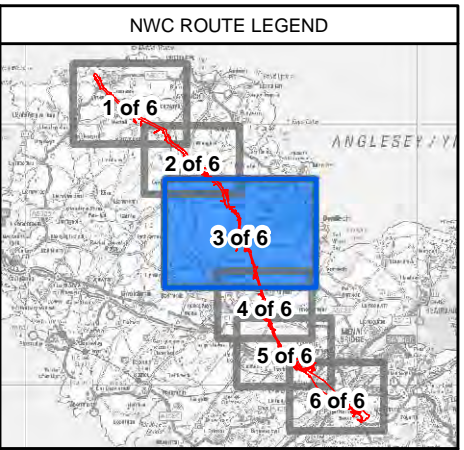
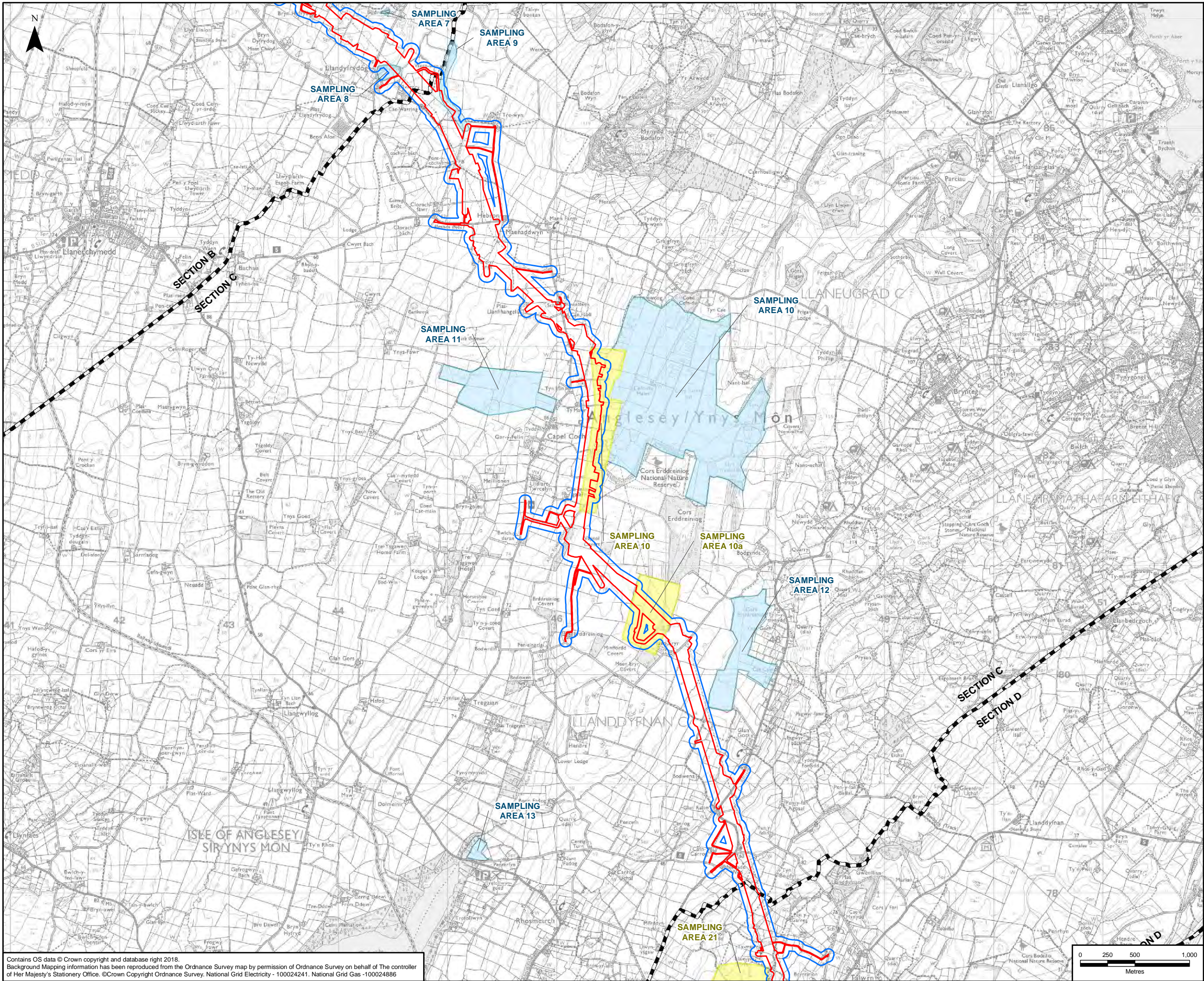
Document Number: 5.9.2.14

Document Title: FIGURE 2  
TERRESTRIAL INVERTEBRATE SAMPLING LOCATIONS  
SECTION B

Creator: AB	Date: 19/07/2018	Checker: LS	Date: 19/07/2018	Approver: NL	Date: 19/07/2018
Document Type: FIGURE	Scale: 1:20,000	Format: A3	Sheets: 2 of 6	Rev: A	

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**LEGEND**

- ORDER LIMITS - OPTION A
- 50M BUFFER OF ORDER LIMITS - OPTION A
- SECTION CUTLINES
- TERRESTRIAL INVERTEBRATE SAMPLING AREAS
  - SURVEYED
  - SCOPED OUT

**NOTES**

PLEASE REFER TO APPENDIX 9.3 PHASE 1 HABITAT SURVEY REPORT (DOCUMENT 5.9.2.3) FOR HABITAT CLASSIFICATION INFORMATION.

A	19/07/2018	ENVIRONMENTAL STATEMENT	AB	LS	NL
Rev	Date	Description	GIS	Chk	App



Scheme: NORTH WALES CONNECTION PROJECT

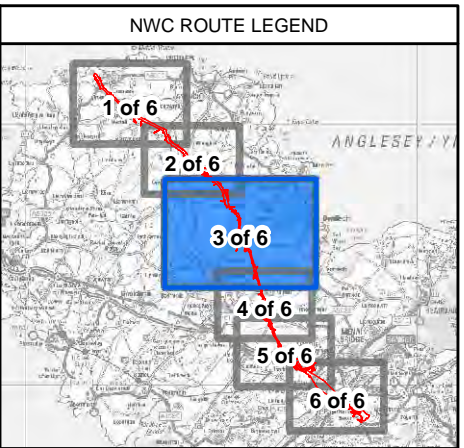
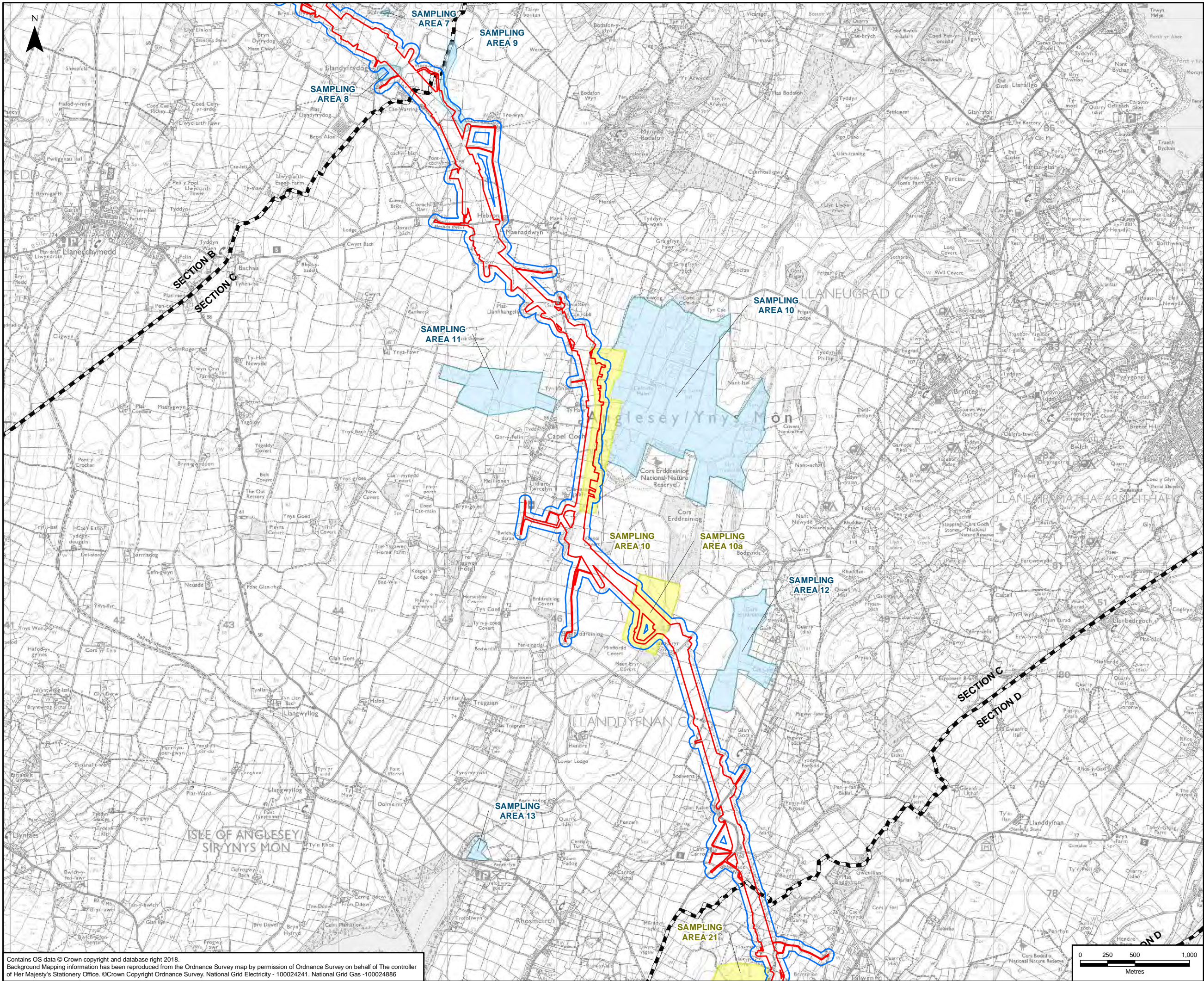
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Document Title: FIGURE 2  
TERRESTRIAL INVERTEBRATE SAMPLING LOCATIONS  
SECTION C OPTION A

Creator: AB	Date: 19/07/2018	Checker: LS	Date: 19/07/2018	Approver: NL	Date: 19/07/2018
Document Type: FIGURE	Scale: 1:32,000	Format: A3	Sheets: 3 of 6 Option A	Rev: A	

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**LEGEND**

- ORDER LIMITS - OPTION B
- 50M BUFFER OF ORDER LIMITS - OPTION B
- SECTION CUTLINES
- TERRESTRIAL INVERTEBRATE SAMPLING AREAS
  - SURVEYED
  - SCOPED OUT

**NOTES**

PLEASE REFER TO APPENDIX 9.3 PHASE 1 HABITAT SURVEY REPORT (DOCUMENT 5.9.2.3) FOR HABITAT CLASSIFICATION INFORMATION.

A	19/07/2018	ENVIRONMENTAL STATEMENT	AB	LS	NL
Rev	Date	Description	GIS	Chk	App

**nationalgrid**

Scheme: NORTH WALES CONNECTION PROJECT

Document Number: 5.9.2.14

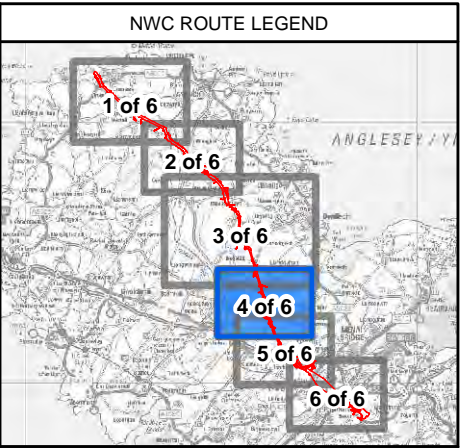
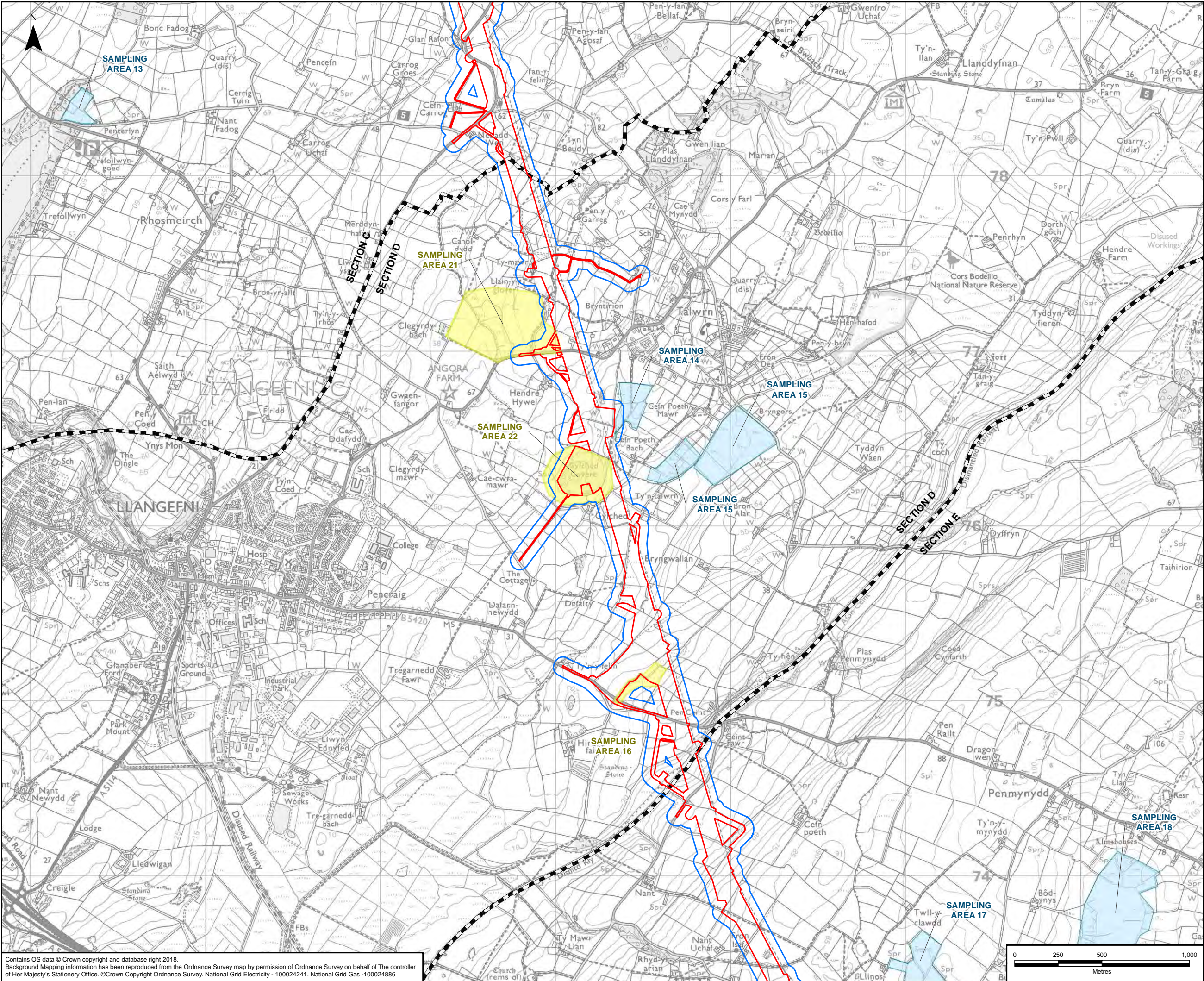
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TERRESTRIAL INVERTEBRATE SAMPLING LOCATIONS  
SECTION C OPTION B

Creator:	Date:	Checker:	Date:	Approver:	Date:
AB	19/07/2018	LS	19/07/2018	NL	19/07/2018
Document Type:	Scale:	Format:	Sheets:	Rev:	
FIGURE	1:32,000	A3	3 of 6 Option B	A	

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Document Path: F:\Proposal\3512North Wales Connection - NG\GIS\02 Maps\Ecology\ES Figs\_DCO 2018\Baseline Reports\ECO\_TINVERT\_Fig2\_TINVERT\_SURVEY\_AREAS\_Plan\_Series\_20180719\_AB.mxd





**LEGEND**

ORDER LIMITS - OPTION A

50M BUFFER OF ORDER LIMITS - OPTION A

SECTION CUTLINES

TERRESTRIAL INVERTEBRATE SAMPLING AREAS

SURVEYED

SCOPED OUT

**NOTES**

PLEASE REFER TO APPENDIX 9.3 PHASE 1 HABITAT SURVEY REPORT (DOCUMENT 5.9.2.3) FOR HABITAT CLASSIFICATION INFORMATION.

A	19/07/2018	ENVIRONMENTAL STATEMENT	AB	LS	NL
Rev	Date	Description	GIS	Chk	App

**nationalgrid**

Scheme: NORTH WALES CONNECTION PROJECT

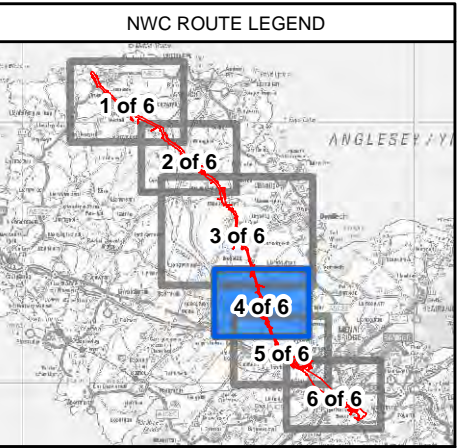
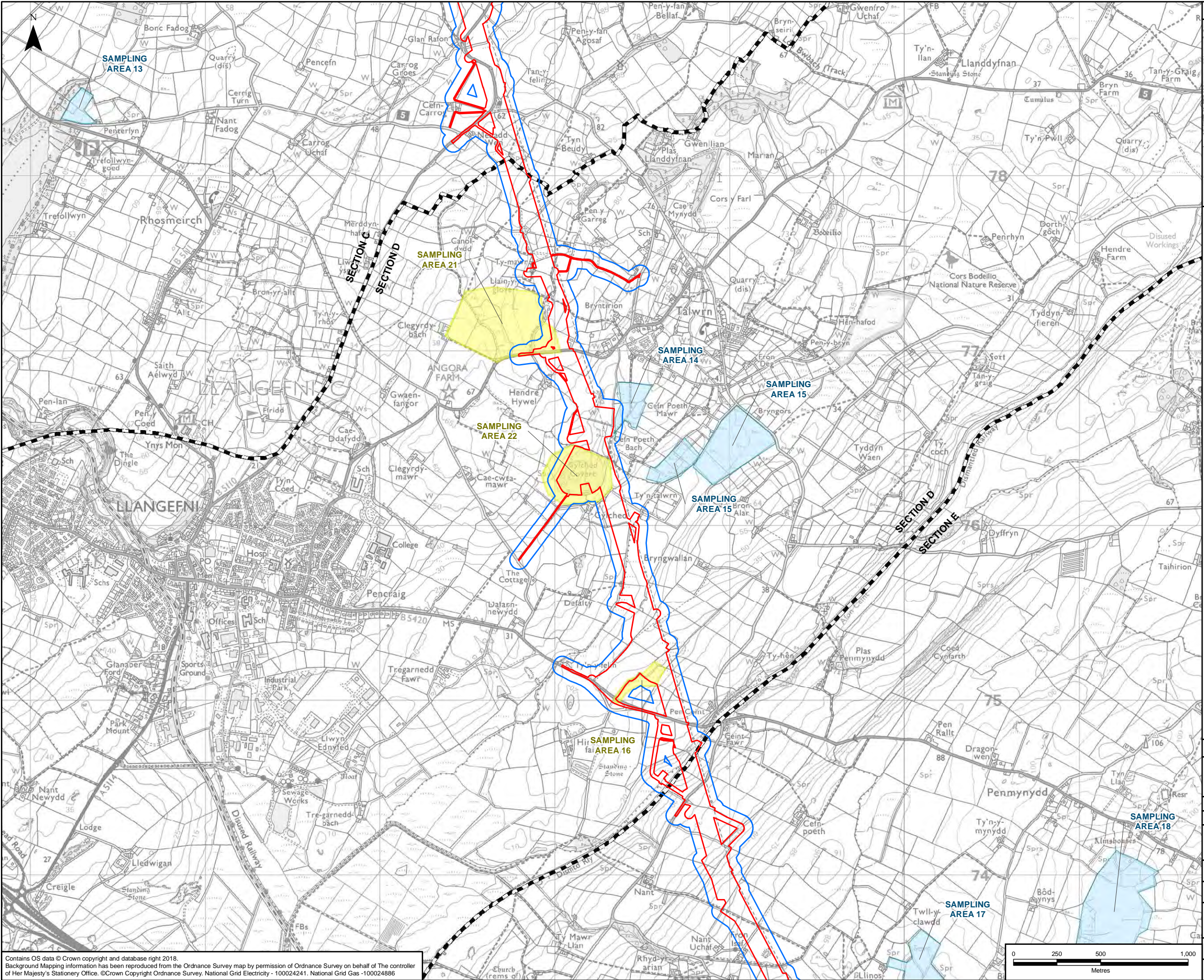
Document Number: 5.9.2.14

Document Title: FIGURE 2  
TERRESTRIAL INVERTEBRATE SAMPLING LOCATIONS  
SECTION D OPTION A

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AB	19/07/2018	LS	19/07/2018	NL	19/07/2018
Document Type:	Scale:	Format:	Sheets:	Rev:	
FIGURE	1:20,000	A3	4 of 6 Option A	A	

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**LEGEND**

- ORDER LIMITS - OPTION B
- 50M BUFFER OF ORDER LIMITS - OPTION B
- SECTION CUTLINES
- TERRESTRIAL INVERTEBRATE SAMPLING AREAS
  - SURVEYED
  - SCOPED OUT

**NOTES**

PLEASE REFER TO APPENDIX 9.3 PHASE 1 HABITAT SURVEY REPORT (DOCUMENT 5.9.2.3) FOR HABITAT CLASSIFICATION INFORMATION.

A	19/07/2018	ENVIRONMENTAL STATEMENT	AB	LS	NL
Rev	Date	Description	GIS	Chk	App

**nationalgrid**

Scheme: NORTH WALES CONNECTION PROJECT

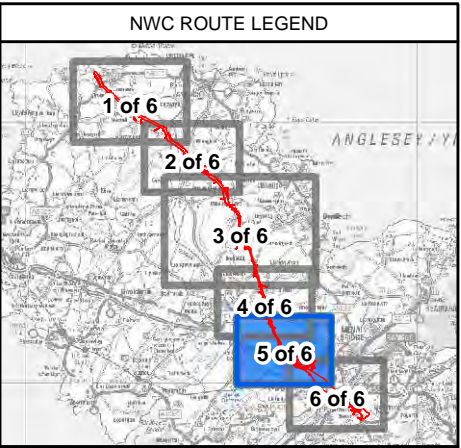
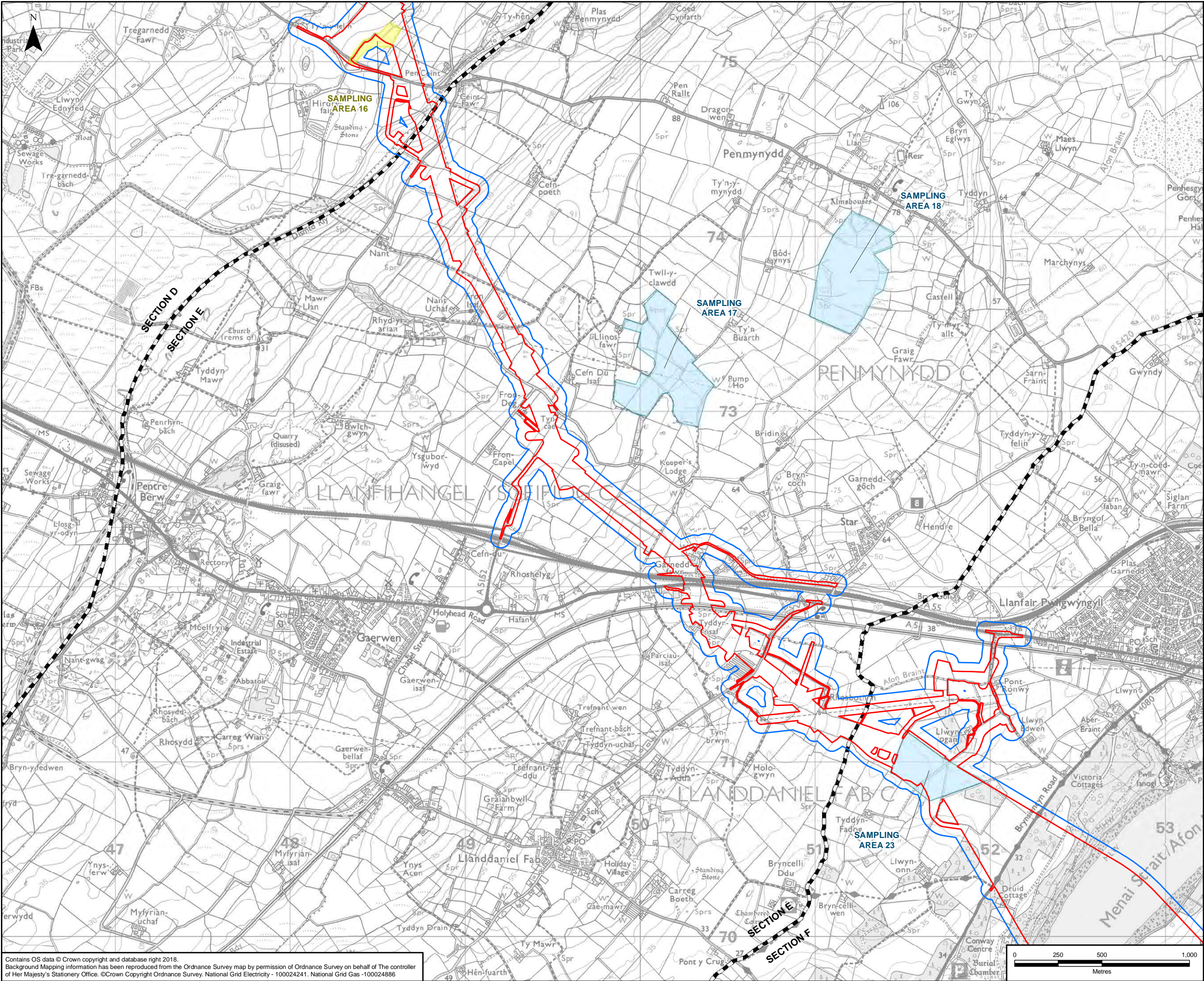
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Document Title: FIGURE 2  
TERRESTRIAL INVERTEBRATE SAMPLING LOCATIONS  
SECTION D OPTION B

Creator: AB	Date: 19/07/2018	Checker: LS	Date: 19/07/2018	Approver: NL	Date: 19/07/2018
Document Type: FIGURE	Scale: 1:20,000	Format: A3	Sheets: 4 of 6 Option B	Rev: A	

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**LEGEND**

- ORDER LIMITS
- 50M BUFFER OF ORDER LIMITS
- SECTION OUTLINES
- TERRESTRIAL INVERTEBRATE SAMPLING AREAS
  - SURVEYED
  - SCOPED OUT

**NOTES**

PLEASE REFER TO APPENDIX 9.3 PHASE 1 HABITAT SURVEY REPORT (DOCUMENT 5.9.2.3) FOR HABITAT CLASSIFICATION INFORMATION.

A	19/07/2018	ENVIRONMENTAL STATEMENT	AB	LS	NL
Rev	Date	Description	GIS	Chk	App

**nationalgrid**

Scheme: NORTH WALES CONNECTION PROJECT

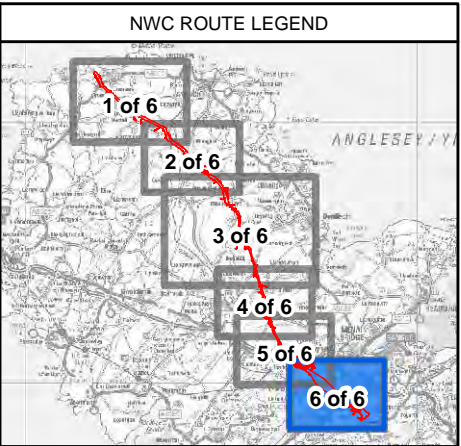
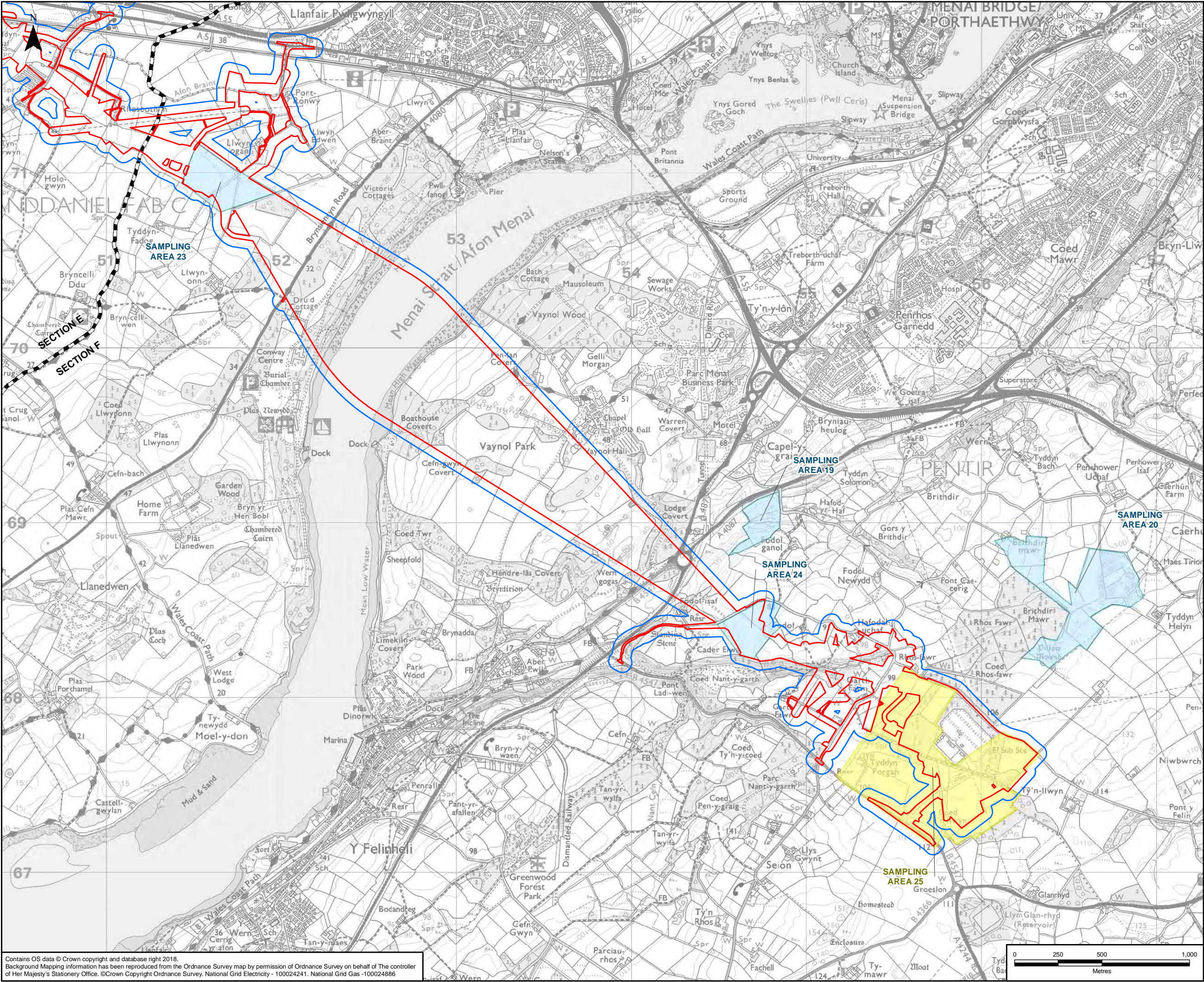
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TERRESTRIAL INVERTEBRATE SAMPLING LOCATIONS  
SECTION E

Creator: AB	Date: 19/07/2018	Checker: LS	Date: 19/07/2018	Approver: NL	Date: 19/07/2018
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**LEGEND**

- ORDER LIMITS
- 50M BUFFER OF ORDER LIMITS
- SECTION CUTLINES
- TERRESTRIAL INVERTEBRATE SAMPLING AREAS
  - SURVEYED
  - SCOPED OUT

**NOTES**

PLEASE REFER TO APPENDIX 9.3 PHASE 1 HABITAT SURVEY REPORT (DOCUMENT 5.9.2.3) FOR HABITAT CLASSIFICATION INFORMATION.

A	19/07/2018	ENVIRONMENTAL STATEMENT	AB	LS	NL
Rev	Date	Description	GIS	Chk	App

**nationalgrid**

Scheme: NORTH WALES CONNECTION PROJECT

Document Number: 5.9.2.14

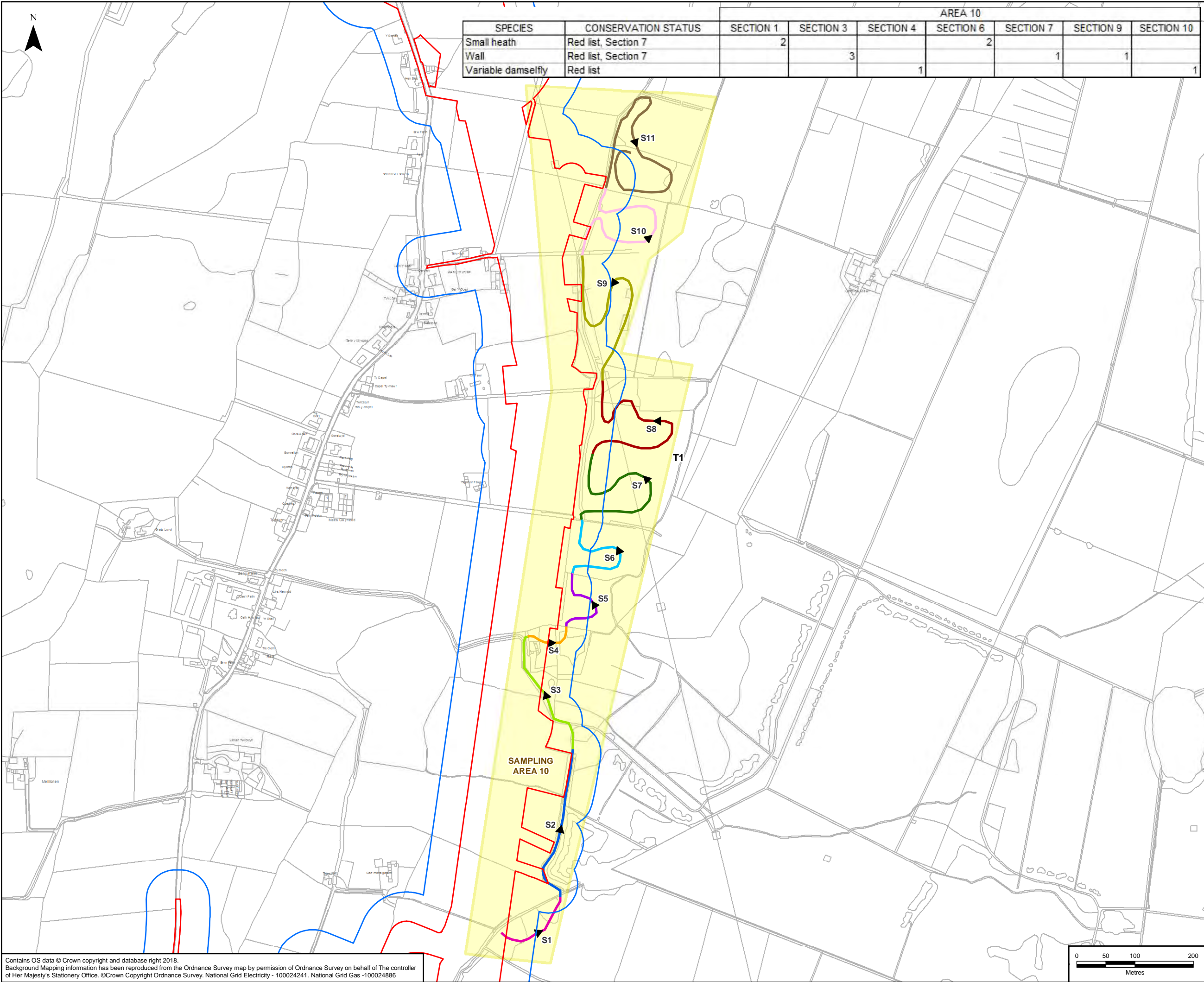
Document Title: FIGURE 2 TERRESTRIAL INVERTEBRATE SAMPLING LOCATIONS SECTION F

Creator:	Date:	Checker:	Date:	Approver:	Date:
AB	19/07/2018	LS	19/07/2018	NL	19/07/2018

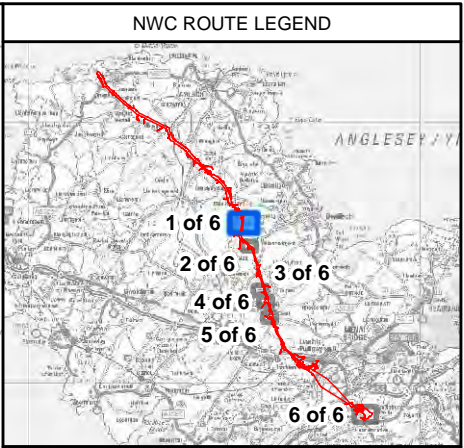
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FIGURE	1:20,000	A3	6 of 6	A

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SPECIES	CONSERVATION STATUS	AREA 10							
		SECTION 1	SECTION 3	SECTION 4	SECTION 6	SECTION 7	SECTION 9	SECTION 10	
Small heath	Red list, Section 7	2			2				
Wall	Red list, Section 7		3			1	1		
Variable damselfly	Red list			1					1



**LEGEND**

ORDER LIMITS

50M BUFFER OF ORDER LIMITS

SECTION CUTLINES

TERRESTRIAL INVERTEBRATE SAMPLING AREAS

SURVEYED

TERRESTRIAL INVERTEBRATE TRANSECT ROUTE SECTIONS

S1

S2

S3

S4

S5

S6

S7

S8

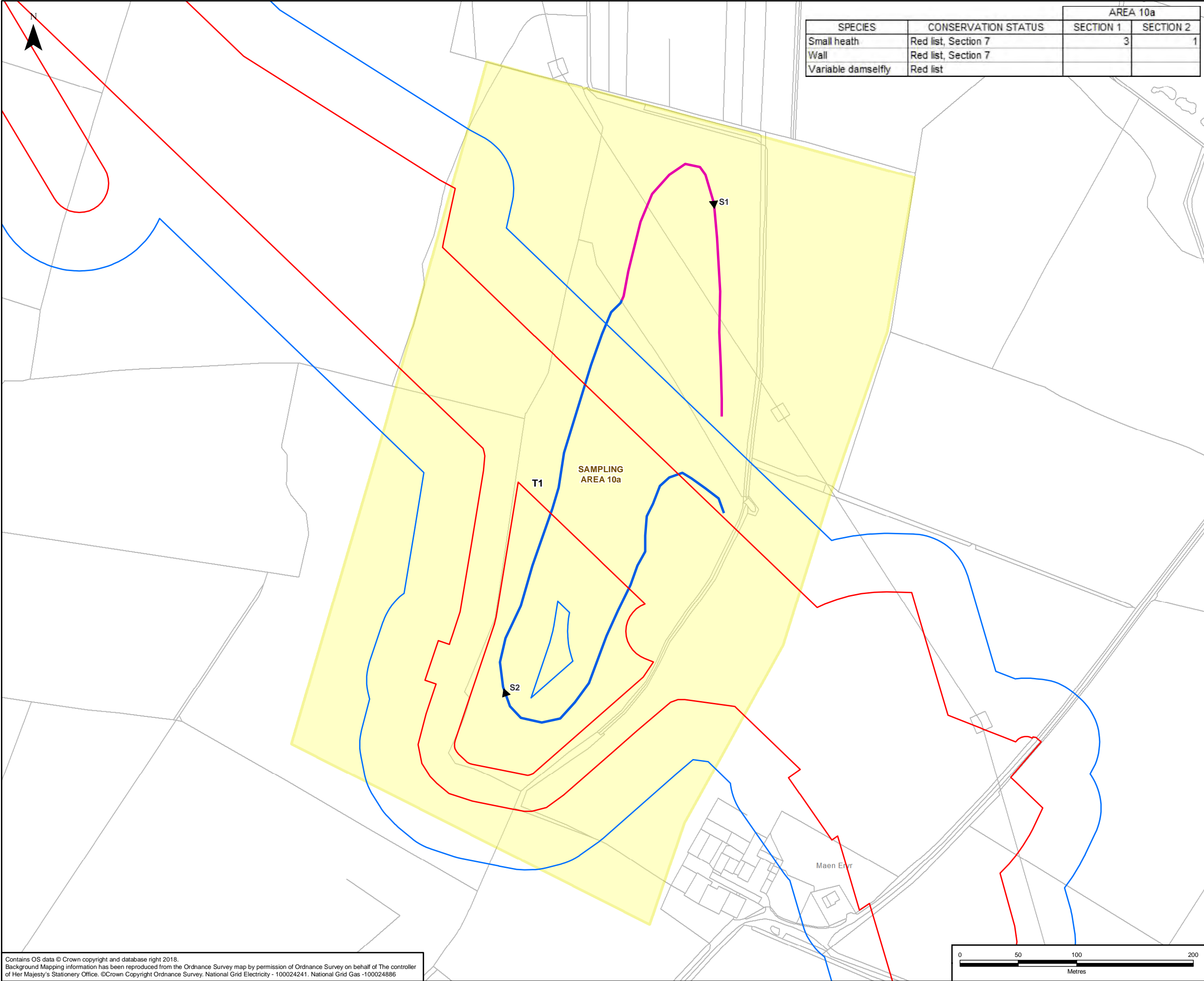
S9

S10

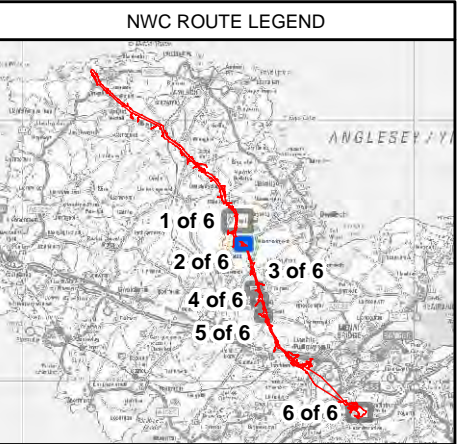
S11

A	17/07/2018	ENVIRONMENTAL STATEMENT	AB	LS	NL
Rev	Date	Description	GIS	Chk	App
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Scheme: NORTH WALES CONNECTION PROJECT					
Document Number: 5.9.2.14					
Document Title: FIGURE 3 TERRESTRIAL INVERTEBRATE AREA 10 SURVEY RESULTS SECTION C					
Creator: AB	Date: 17/07/2018	Checker: LS	Date: 17/07/2018	Approver: NL	Date: 17/07/2018
Document Type: FIGURE	Scale: 1:6,000	Format: A3	Sheets: 1 of 6	Rev: A	

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		AREA 10a	
SPECIES	CONSERVATION STATUS	SECTION 1	SECTION 2
Small heath	Red list, Section 7	3	1
Wall	Red list, Section 7		
Variable damselfly	Red list		

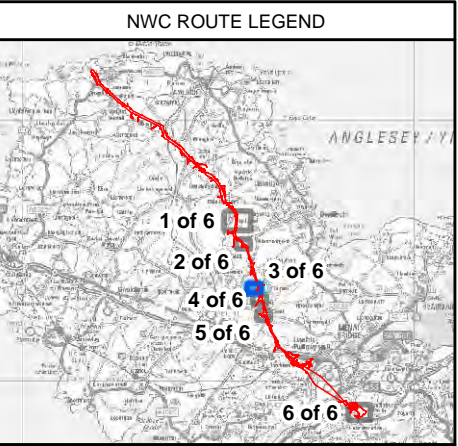
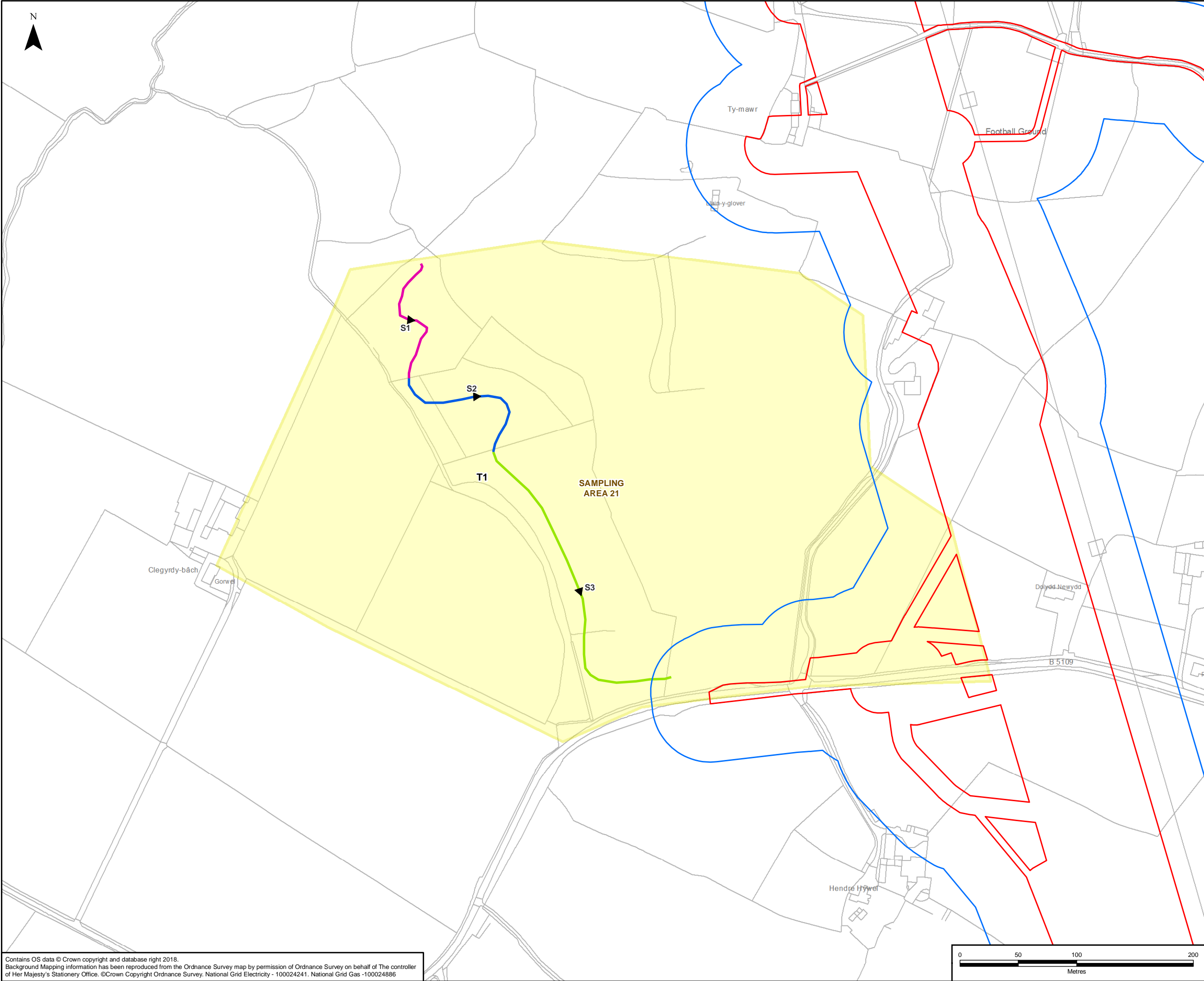


LEGEND	
	ORDER LIMITS
	50M BUFFER OF ORDER LIMITS
	SECTION CUTLINES
TERRESTRIAL INVERTEBRATE SAMPLING AREAS	
	SURVEYED
TERRESTRIAL INVERTEBRATE TRANSECT ROUTE SECTIONS	
	S1
	S2

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Document Type: FIGURE	Scale: 1:3,000	Format: A3	Sheets: 2 of 6	Rev: A	





**LEGEND**

ORDER LIMITS - OPTION A

50M BUFFER OF ORDER LIMITS - OPTION A

SECTION CUTLINES

TERRESTRIAL INVERTEBRATE SAMPLING AREAS

SURVEYED

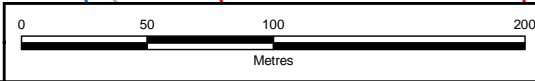
TERRESTRIAL INVERTEBRATE TRANSECT ROUTE SECTIONS

S1

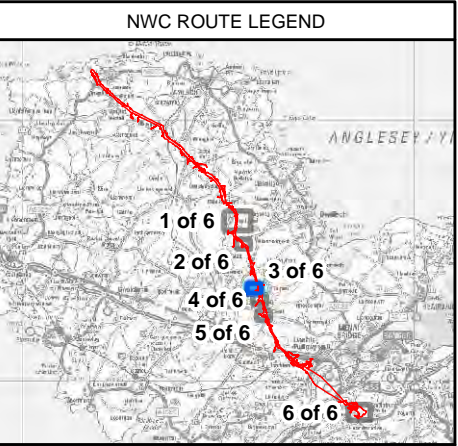
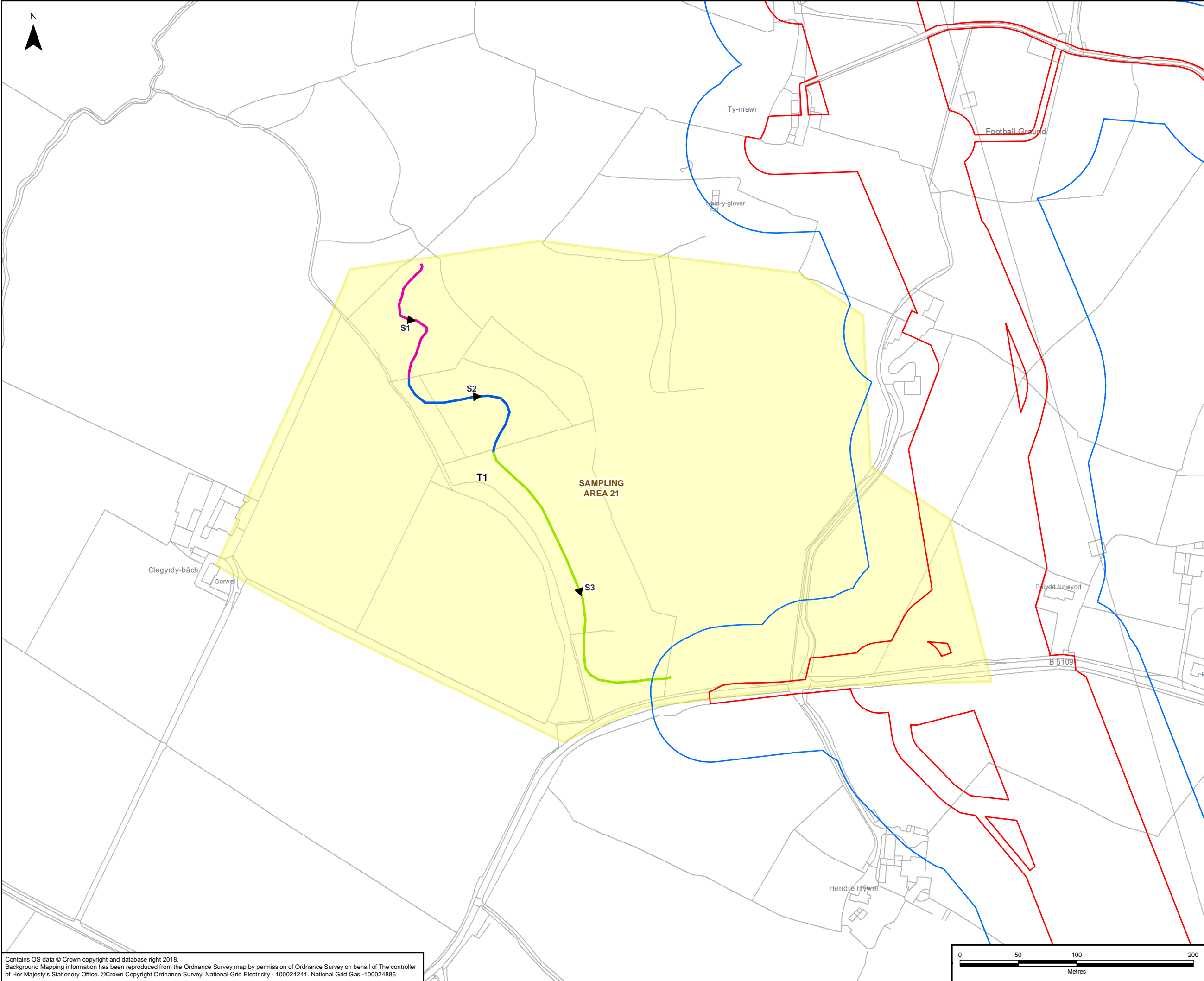
S2

S3

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A	17/07/2018	ENVIRONMENTAL STATEMENT	AB	LS	NL
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nationalgrid					
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Document Number: 5.9.2.14					
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Document Type: FIGURE	Scale: 1:3,000	Format: A3	Sheets: 3 of 6 Option A	Rev: A	



**LEGEND**

ORDER LIMITS - OPTION B

50M BUFFER OF ORDER LIMITS - OPTION B

SECTION CUTLINES

TERRESTRIAL INVERTEBRATE SAMPLING AREAS

SURVEYED

TERRESTRIAL INVERTEBRATE TRANSECT ROUTE SECTIONS

S1

S2

S3

A	17/07/2018	ENVIRONMENTAL STATEMENT	AB	LS	NL
Rev	Date	Description	GIS	Chk	App

**nationalgrid**

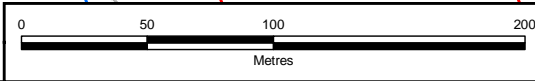
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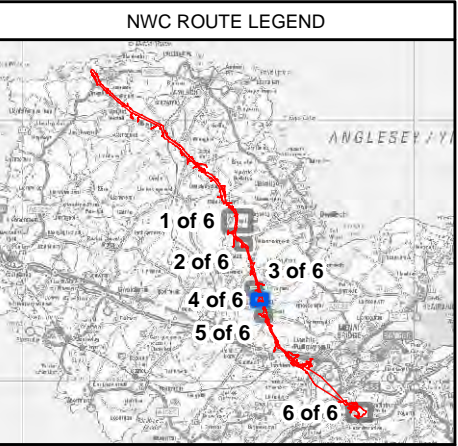
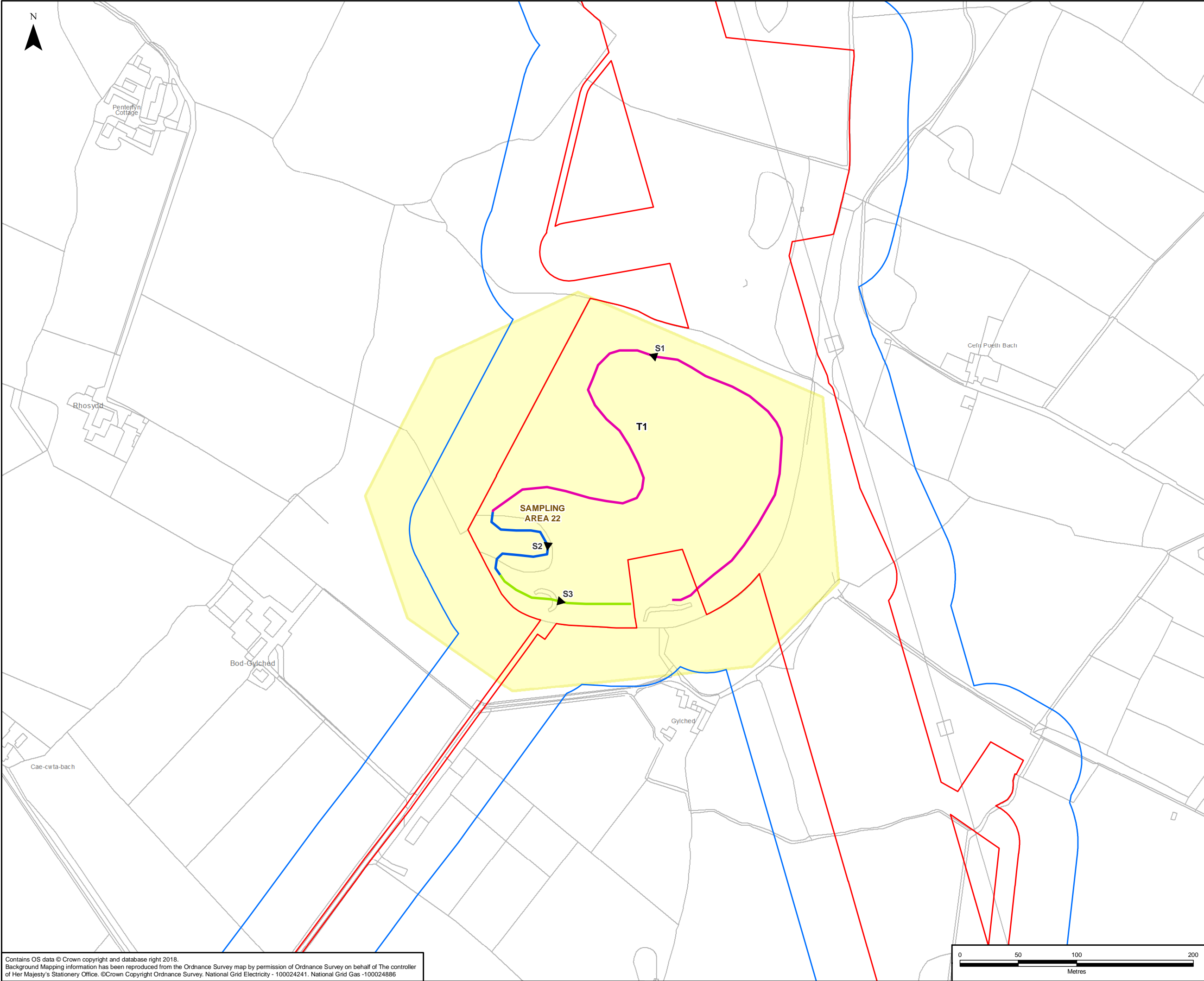
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Document Title: FIGURE 3  
TERRESTRIAL INVERTEBRATE  
AREA 21 SURVEY RESULTS  
SECTION D OPTION B

Creator: AB	Date: 17/07/2018	Checker: LS	Date: 17/07/2018	Approver: NL	Date: 17/07/2018
Document Type: FIGURE	Scale: 1:3,000	Format: A3	Sheets: 3 of 6 Option B	Rev: A	

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**LEGEND**

ORDER LIMITS

50M BUFFER OF ORDER LIMITS

SECTION CUTLINES

TERRESTRIAL INVERTEBRATE SAMPLING AREAS

SURVEYED

TERRESTRIAL INVERTEBRATE TRANSECT ROUTE SECTIONS

S1

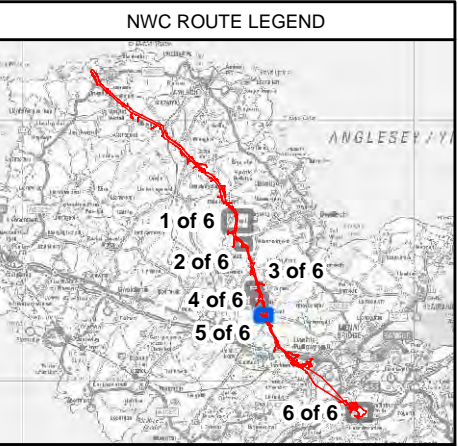
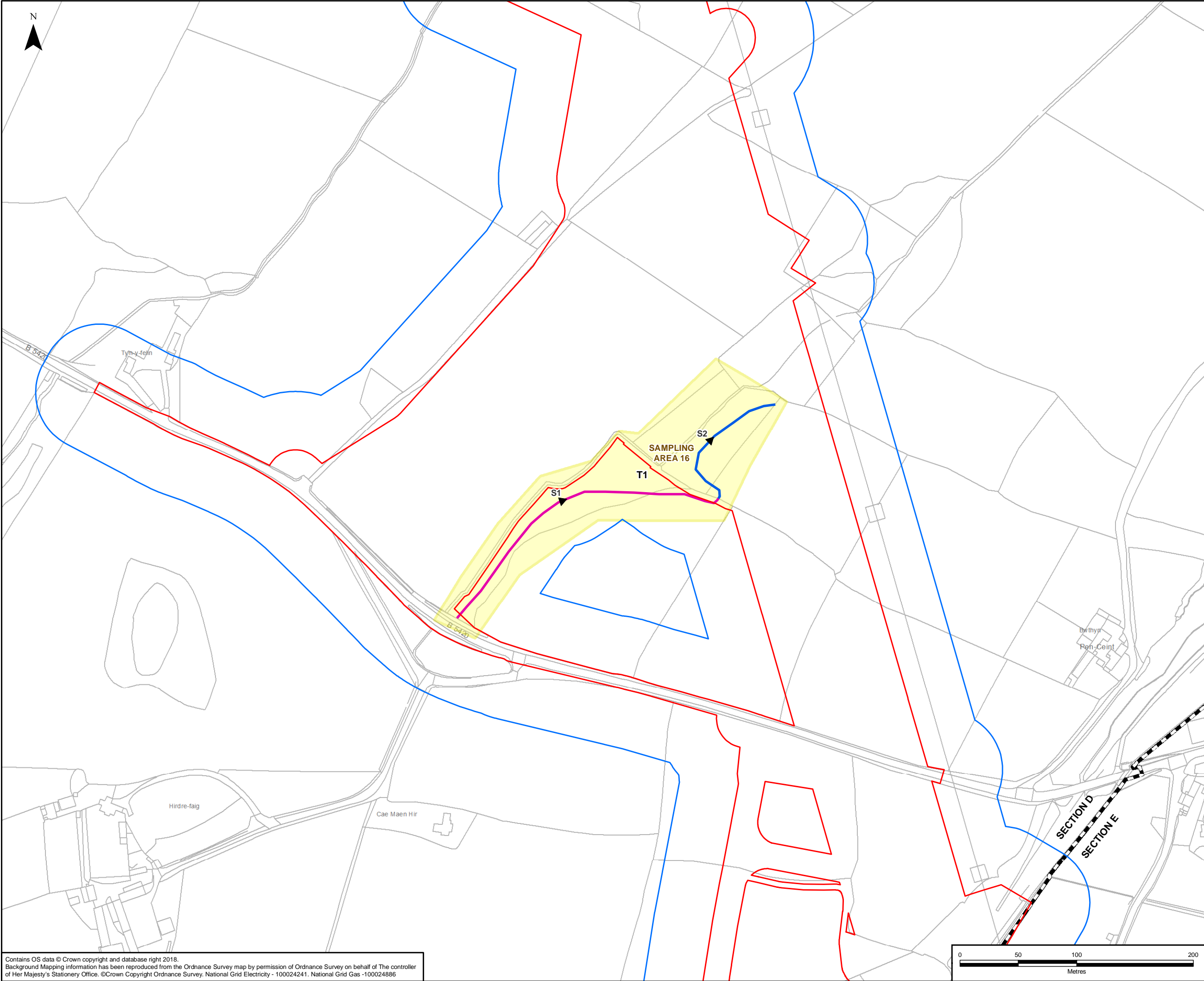
S2

S3

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Rev	Date	Description	GIS	Chk	App
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Document Number: 5.9.2.14					
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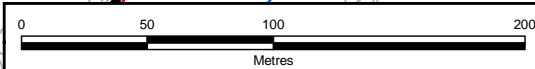




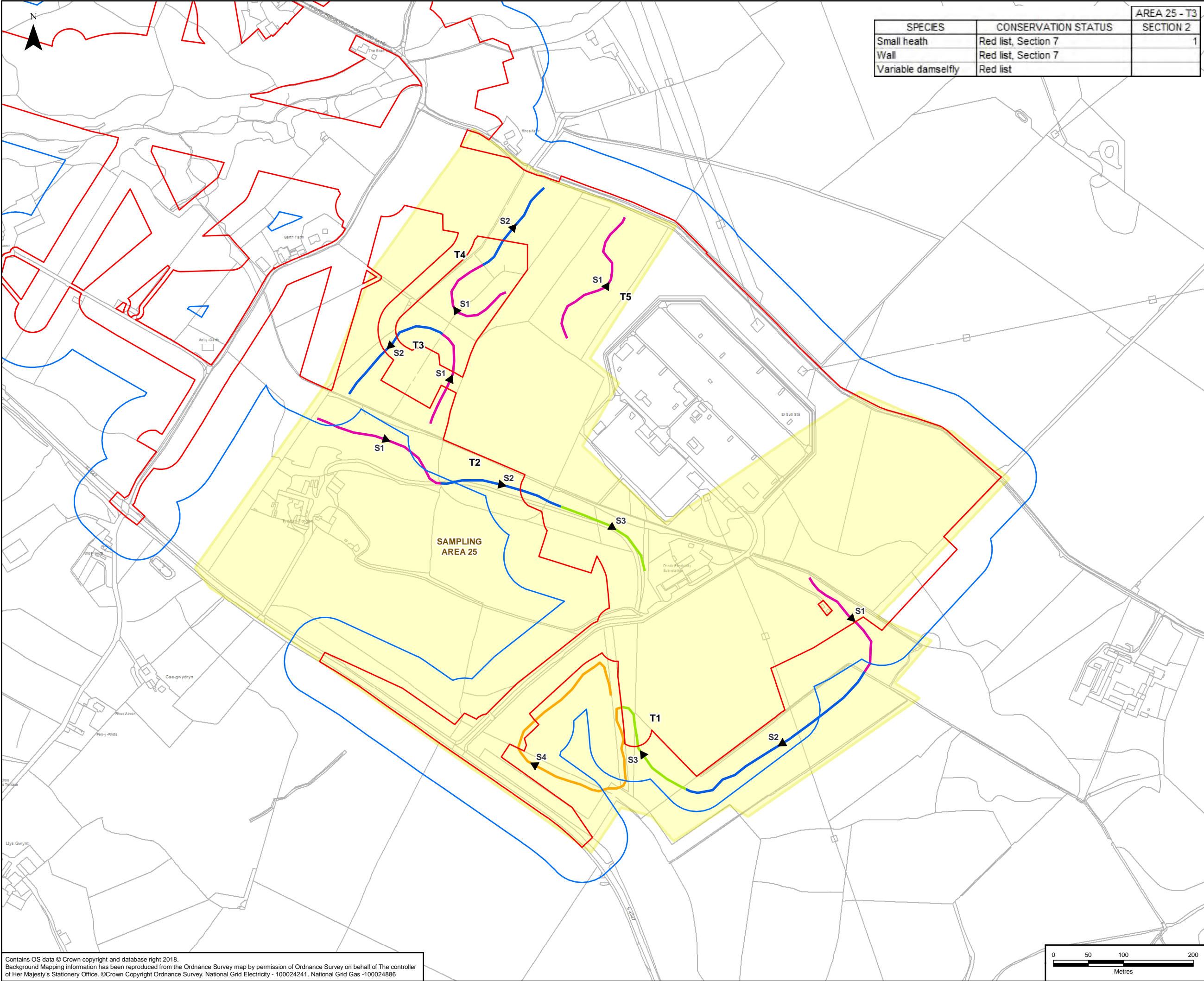
**LEGEND**

- ORDER LIMITS
- 50M BUFFER OF ORDER LIMITS
- SECTION CUTLINES
- TERRESTRIAL INVERTEBRATE SAMPLING AREAS
- SURVEYED
- TERRESTRIAL INVERTEBRATE TRANSECT ROUTE SECTIONS
- S1
- S2

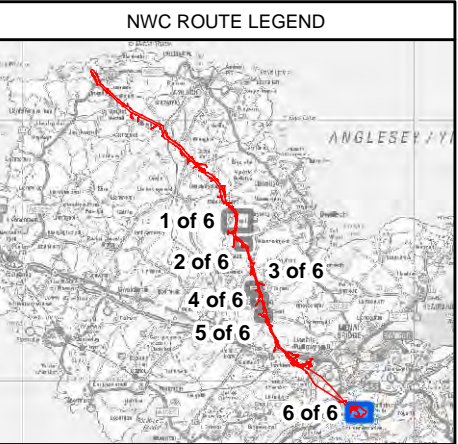
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Document Number: 5.9.2.14					
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Document Type: FIGURE	Scale: 1:3,000	Format: A3	Sheets: 5 of 6	Rev: A	



SPECIES		CONSERVATION STATUS	AREA 25 - T3
Small heath		Red list, Section 7	SECTION 2
Wall		Red list, Section 7	1
Variable damselfly		Red list	



**LEGEND**

- ORDER LIMITS
- 50M BUFFER OF ORDER LIMITS
- SECTION CUTLINES
- TERRESTRIAL INVERTEBRATE SAMPLING AREAS
- SURVEYED
- TERRESTRIAL INVERTEBRATE TRANSECT ROUTE SECTIONS
- S1
- S2
- S3
- S4

A	17/07/2018	ENVIRONMENTAL STATEMENT	AB	LS	NL
Rev	Date	Description	GIS	Chk	App



Scheme: NORTH WALES CONNECTION PROJECT					
Document Number: 5.9.2.14					
Document Title: FIGURE 3 TERRESTRIAL INVERTEBRATE AREA 25 SURVEY RESULTS SECTION F					
Creator: AB	Date: 17/07/2018	Checker: LS	Date: 17/07/2018	Approver: NL	Date: 17/07/2018
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## Appendix A: Cofnod Data Search Records

*Appendix contains confidential information. This Appendix is only available on request to those who have a legitimate need to view the Information.*

## Appendix B: Weather Conditions for Surveys

Survey Area	Date	Average temp °C	Average wind speed	Wind direction	Cloud cover	Percentage sunshine	Start time	Finish time	Comments
10	06/06/2017	14	4	SW	2	85	14:02	15:21	Sectors 1 and 2 could not be accessed due to flooding of track, after heavy rain the previous day.
	14/06/2017	20	2	SW	6	75	10:45	11:50	
	06/07/2017	20	2	SW	3	90	12:02	13:13	
	25/07/2017	20	1	W	6	35	15:15	16:10	
	01/08/2017	17	3	SW	4	95	14:21	15:25	
10a	14/06/2017	20	2	SW	2	90	12:05	12:30	
	05/07/2017	18	2	NE	4	90	15:00	15:36	
	25/07/2017	20	2	W	6	60	14:20	14:50	
	03/08/2017	17	4	SW	6	50	12:25	12:48	
16	06/06/2017	14	4	SW	3	70	12:50	13:20	
	05/07/2017	17	2	NE	4	70	11:18	11:38	
	25/07/2017	19	2	NW	6	30	13:34	13:47	
	01/08/2017	16	3	SW	4	70	11:05	11:25	
21	13/06/2017	15	3	SW	6	60	14:10	14:35	
	03/07/2017	16	2	NW	7	30	14:08	14:34	
	06/07/2017	20	2	SW	3	100	11:00	11:33	
	25/07/2017	19	2	NW	6	40	13:00	13:25	
	01/08/2017	16	3	SW	5	65	10:30	10:55	
22	07/06/2017	14	4	W	3	60	10:50	11:30	



Survey Area	Date	Average temp °C	Average wind speed	Wind direction	Cloud cover	Percentage sunshine	Start time	Finish time	Comments
	02/08/2017	18	4	SW	2	95	14:36	15:04	
25	07/06/2017	14	4	SW	4	65	13:07	14:30	
	05/07/2017	16	2	NE	4	70	12:10	14:02	
	25/07/2017	17	2	NW	1	90	10:35	12:06	
									Only transects T2-T5 completed as an isolated shower stopped T1 being completed
	01/08/2017	17	3	SW	3	60	12:02	13:10	
	03/08/2017	18	4	SW	7	40	14:20	14:38	T1 completed



## Appendix C: Transect Results

### Survey area 10 results

Species	Number of Sightings (Section No (S))				
	06/06/2017	14/06/2017	06/07/2017	25/07/2017	01/08/2017
Red admiral	2 (S10)	1 (S4)	1 (S9) 2 (S10) 1 (S11)	1 (S8)	3 (S1) 1 (S4) 2 (S11)
Speckled wood	2 (S3) 2 (S4) 2 (S5) 1 (S10)	1 (S1) 1 (S3) 3 (S4) 2 (S6) 1 (S10) 1 (S11)	1 (S3) 1 (S7)	1 (S3) 2 (S4)	3 (S3) 3 (S4)
Large white	1 (S4) 1 (S5) 1 (S9)				1 (S1) 1 (S4) 1 (S6)
Green-veined white	1 (S4) 1 (S7) 1 (S8) 1 (S10) 3 (S11)	1 (S2) 1 (S3) 1 (S10)	1 (S1) 1 (S2) 1 (S3) 1 (S6) 1 (S7) 1 (S8) 2 (S9)	2 (S1) 1 (S2) 1 (S4) 1 (S5) 3 (S6) 9 (S7) 6 (S8) 5 (S9) 3 (S10) 9 (S11)	3 (S1) 1 (S5) 2 (S6) 1 (S7) 8 (S9) 3 (S10)

Species	Number of Sightings (Section No (S))				
	06/06/2017	14/06/2017	06/07/2017	25/07/2017	01/08/2017
Meadow brown	1 (S8) 1 (S9)	1 (S4) 2 (S5) 2 (S8) 2 (S10) 2 (S11)	4 (S1) 2 (S3) 3 (S4) 2 (S5) 3 (S6) 1 (S7) 1 (S8) 8 (S9) 10 (S11) 15 (S11)	4 (S3) 1 (S8)	1 (S8) 1 (S10)
Common blue	1 (S8)	1 (S9)			
Small copper	2 (S8)	3 (S7)			
Small heath	2 (S6)	2 (S1)			
Wall	2 (S3)	1 (S9)			1 (S3) 1 (S7)
Orange-tip		1 (S3) 1 (S5) 1 (S7)			
Ringlet		1 (S11)	5 (S1) 4 (S2) 3 (S3) 1 (S4) 8 (S5) 3 (S6) 9 (S7) 1 (S8) 4 (S9) 5 (S10) 3 (S11)		
Small skipper			2 (S1) 1 (S7)	1 (S2)	2 (S7)
Small white			2 (S7)	1 (S8)	1 (S2) 1 (S4)

Species	Number of Sightings (Section No (S))				
	06/06/2017	14/06/2017	06/07/2017	25/07/2017	01/08/2017
Small tortoiseshell			1 (S10) 1 (S11)	1 (S2) 1 (S10) 1 (S11)	1 (S1)
Gatekeeper			1 (S11)	1 (S1) 1 (S2) 1 (S3) 1 (S5) 1 (S6) 1 (S7) 2 (S10) 1 (S11)	6 (S1) 2 (S5) 1 (S6) 3 (S9) 1 (S10)
Peacock					1 (S1) 1 (S3) 2 (S7) 2 (S9) 1 (S10) 4 (S11)
Azure damselfly	10 (S4) 1 (S5)	1 (S2)			
Large red damselfly	5 (S4) 1 (S6) 1 (S7) 1 (S9) 1 (S10) 1 (S11)	2 (S2) 1 (S9)	1 (S2)		
Blue-tailed damselfly	3 (S4) 2 (S10) 1 (S11)	2 (S2)	5 (S2)		2 (S2)
Variable damselfly	1 (S4) 1 (S10)				
Four-spotted chaser	1 (S7) 1 (S8) 3 (S10) 1 (S11)	1 (S2)			

Species	Number of Sightings (Section No (S))				
	06/06/2017	14/06/2017	06/07/2017	25/07/2017	01/08/2017
Common blue damselfly	2 (S10) 1 (S11)				
Broad bodied chaser	3 (S11)		1 (S2) 1 (S8) 1 (S9)		
Golden-ringed dragonfly	1 (S11)		2 (S1) 1 (S2) 2 (S9)	1 (S3)	
Common darter				1 (S1) 2 (S2) 4 (S5) 2 (S7)	3 (S1) 5 (S2) 1 (S3) 7 (S5) 10 (S6) 5 (S7) 8 (S8) 13 (S9) 1 (S10) 1 (S11)
Black darter				1 (S2)	
Southern hawk				1 (S3)	1 (S3)
Hawker sp.					1 (S5)
Common hawk					1 (S6)

### Survey area 10a results

Species	Number of Sightings (Section No (S))			
	14/06/2017	05/07/2017	25/07/2017	03/08/2017
Meadow brown	1 (S1)	8 (S1) 3 (S2)		
Small heath	3 (S1) 1 (S2)			
Ringlet		41 (S1) 13 (S2)	3 (S1)	

Species	Number of Sightings (Section No (S))			
	14/06/2017	05/07/2017	25/07/2017	03/08/2017
Green-veined white		2 (S1) 2 (S2)	9 (S1) 5 (S2)	
Small tortoiseshell		1 (S1)		
Small skipper		1 (S1)	4 (S1)	
Large white			1 (S1)	
Gatekeeper			20 (S1) 2 (S2)	10 (S1)
Red admiral			1 (S2)	
Azure damselfly	1 (S2)			
Golden-ringed dragonfly		1 (S1)		
Common darter		1 (S1) 1 (S2)	1 (S2)	
Four-spotted chaser		1 (S2)		
Black darter			1 (S1)	

### Survey area 16 results

Species	Number of Sightings (Section No (S))			
	06/06/2017	05/07/2017	25/07/2017	01/08/2017
Speckled wood	3 (S1)	22 (S1) 1 (S2)	1 (S1)	1 (S2)
Green-veined white	2 (S1)	10 (S1)	13 (S1) 9 (S2)	10 (S1) 5 (S2)
Holly blue	2 (S1)			
Small copper	1 (S2)			2 (S1)

Species	Number of Sightings (Section No (S))			
	06/06/2017	05/07/2017	25/07/2017	01/08/2017
Small skipper		1 (S1)	1 (S2)	1 (S1)
Ringlet		14 (S1) 16 (S2)	3 (S1)	
Peacock			1 (S1)	
Large white			2 (S1)	1 (S1)
Meadow brown			6 (S1) 2 (S2)	5 (S1) 2 (S2)
Gatekeeper			3 (S1)	1 (S1) 5 (S2)
Blue-tailed damselfly	11 (S1)			
Azure damselfly	38 (S1) 1 (S2)	2 (S1)		
Large red damselfly	2 (S1)			
Broad-bodied chaser	3 (S1) 1 (S2)			
Four-spotted chaser	1 (S1)			
Hawker sp.	1 (S2)			
Common darter		2 (S1)		
Golden-ringed dragonfly		1 (S1)		
Migrant hawk				1 (S1)

## Survey area 21 results

Species	Number of Sightings (Section No (S))				
	13/06/2017	03/07/2017	06/07/2017	25/07/2017	01/08/2017
Green-veined white	1 (S1) 1 (S3)	1 (S2)	1 (S1) 2 (S2) 1 (S3)	7 (S2) 12 (S3)	6 (S1) 9 (S2) 9 (S3)
Meadow brown		1 (S1) 8 (S2) 3 (S3)	1 (S2) 2 (S3)		1 (S2)
Speckled wood		1 (S2) 2 (S3)	1 (S2) 2 (S3)		2 (S3)
Ringlet		5 (S2) 7 (S3)	17 (S2) 17 (S3)	1 (S2)	
Small skipper		2 (S2) 1 (S3)	2 (S2) 2 (S3)	2 (S1)	
Large skipper		1 (S3)	2 (S3)		
Red admiral			1 (S1)		
Peacock				1 (S2)	1 (S2)
Common blue				1 (S2)	2 (S1)
Gatekeeper				1 (S2) 1 (S3)	1 (S2)
Small white					1 (S2)
Azure damselfly	3 (S3)				
Golden-ringed dragonfly			1 (S1) 2 (S2) 2 (S3)		
Common darter			1 (S2)		1 (S3)

## Survey area 22 results

Species	Number of Sightings (Section No (S))	
	07/06/2017	02/08/2017
Red admiral	1 (S2)	
Speckled wood	4 (S2) 1 (S3)	4 (S1) 4 (S2) 1 (S3)
Large white	2 (S2)	1 (S1)
Green-veined white		2 (S1) 2 (S2)
Peacock		4 (S2)
Meadow brown		1 (S1) 2 (S2)
Gatekeeper		1 (S2)
Comma		1 (S2)
Common blue damselfly	4 (S2)	
Blue-tailed damselfly	1 (S2)	
Common darter		1 (S1) 4 (S2)
Migrant hawk		1 (S1) 1 (S2)



## Survey area 25 results

Species	Number of Sightings (Section No (S))																			
	07/06/2017					05/07/2017					25/07/2017					01/08/2017				03/08/2017
	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	T2	T3	T4	T5	T1
Red admiral							2 (S2)					1 (S1) 5 (S2) 7 (S3)				6 (S3)				1 (S3)
Speckled wood		1 (S2)					1 (S2)		1 (S1)			1 (S2) 1 (S3)				2 (S2)			2 (S1)	1 (S4)
Ringlet						1 (S1) 1 (S4)	9 (S1) 2 (S2) 3 (S3)	2 (S1) 2 (S2)	18 (S1) 10 (S2)	15 (S1)									4 (S 1)	
Meadow brown						2 (S1) 2 (S4)	4 (S3)	1 (S 1)	2 (S1) 1 (S2)	2 (S1)	1 (S2)	1 (S3)	1 (S1)	2 (S1)	2 (S1)	2 (S3)				1 (S2) 1 (S4)
Small skipper							3 (S3)			1 (S1)	1 (S2) 2 (S3) 1 (S4)	1 (S3)	1 (S1) 1 (S2)				3 (S1) 2 (S2)	1 (S1)		
Green-veined white		1 (S1) 2 (S3)				1 (S1)	1 (S1) 1 (S2)	1 (S2)		1 (S1)	5 (S1) 3 (S2) 4 (S3) 3 (S4)	20 (S1) 2 (S2) 5 (S3)	8 (S1) 5 (S2)	7 (S1) 4	1 (S1)	4 (S1) 1 (S3)	5 (S1) 2 (S2)	2 (S1) 3 (S2)		2 (S1) 1 (S2) 9 (S4)
Small tortoise-shell							1 (S3)					2 (S3)				1 (S3)				
Small white											1 (S1) 1 (S2)	1 (S3)	1 (S1)					1 (S2)		
Large white	1 (S4)	2 (S3)	1 (S1)									1 (S1) 3 (S3)					1 (S2)			
Peacock												1 (S2) 5 (S3)				9 (S3)		1 (S1)	1 (S1)	
Common blue		1 (S3)			2 (S1)							1 (S3)								
Gate-keeper												1 (S3)								

Species	Number of Sightings (Section No (S))																			
	07/06/2017					05/07/2017					25/07/2017					01/08/2017				03/08/2017
	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	T2	T3	T4	T5	T1
Small heath													1 (S2)							
Painted lady																2 (S3)				
Azure damselfly						1 (S1) 1 (S2)														
Common blue damselfly			2 (S2)																	
Blue-tailed damselfly											2 (S3)									
Large red damselfly										1 (S1)										
Golden-ringed dragonfly	1 (S2)	1 (S3)				1 (S2)	1 (S1)					1 (S2)								
Common darter											1 (S3)	2 (S3)		1 (S1) 1 (S2)		1 (S3)				