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Environmental Impact Assessment Scoping Report

Mid Wales Connection Project

May 2014

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Mid Wales Connection Project

Connecting Wind Farms through Mid Wales and Shropshire

EIA Scoping Report

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May 2014

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1 INTRODUCTION

1.1 Project Overview

1.1.1 National Grid is seeking to connect new onshore wind generation in Mid Wales by constructing a marshalling substation, in Mid Wales, and a new 400 kilovolt (kV) connection from that marshalling substation to a point on the existing National Electricity Transmission System (NETS).

1.1.2 Following widespread consultation, and subsequent feedback, and taking into account the environmental, technical grounds and public consultation, National Grid has developed a draft route and identified a substation site to take forward to the next stage of project development and consultation.

The Draft Route and Substation Site

1.1.3 The substation site occupies a low lying and secluded bowl within the upland plateau at the head of a tributary of the River Rhiw. Centred on the property known as Bryngwyn, it lies 1km north from the Carno to Llanfair Caereinion Lane along a stone track.

1.1.4 From the substation site, the draft route, with an overall total length of approximately 54km, heads north-east down a small tributary valley of the Afon Rhiw, descending into the Banwy Valley where it crosses the A458 and Afon Einion to the south-east of Moel Bentyrch. After crossing the road the draft route crosses open farmland and the Afon Banwy, swinging to a more easterly direction north of Bryn-glas Hall.

1.1.5 From the Afon Banwy near Bryn-glas Hall, the draft route continues in a north-easterly direction passing between small woodlands and dispersed properties and following the lower lying land. South of Tynrhos it swings east, joins the Yr Hafesb Valley and follows the A495 past Meifod. In the narrow section of the Yr Hafesb Valley, the draft route crosses the A495 and passes between the two areas of the Tan-y-Ffridd Caravan Park.

1.1.6 From Waen-fach the draft route continues in a north-easterly direction running along the Vyrnwy Valley floor avoiding the larger settlements and the caravan parks on the valley sides, and the dispersed properties on the valley floor.

1.1.7 After crossing the A483 between Llanymynech and Llandysilio/Four Crosses the draft route swings back to a more north-easterly route, crossing the River Vyrnwy and the B4398 before traversing the low lying farmland around the River Morda.

1.1.8 After crossing Maesbury Road near Bromwich Park, the draft route continues in a north-easterly direction through the farmland before passing between the edge of Aston Hall and Oswestry Golf Club. The draft route then crosses the A5 and B5009 and swings slightly to the east crossing the Shrewsbury to Chester railway line before passing between small woodland blocks and large farms to join the existing 400 kV overhead line close to Lower Frankton.

1.1.9 The draft route and substation site (the proposed development) is described in more detail in Section 2 and shown in Figures 1.1 to 1.5.

Other Works

1.1.10 Although the exact nature and extent of the required works is currently unknown, it is anticipated that works would be required at the existing Shrewsbury Substation site, located approximately 1.5km to the east of Shrewsbury, near Uffington, as shown in Figure 1.6.

1.2 The Environmental Impact Assessment

1.2.1 With regard to the Environmental Impact Assessment (EIA), the draft route for the 400 kV connection, the proposed substation site and the anticipated works required at the

Shrewsbury Substation will be taken forward for further investigation, site survey and assessment, with the findings for the project presented within the Environmental Statement (ES), as part of the application for a Development Consent Order (DCO).

1.2.2 The further investigation, site survey and assessment will take account of the different installation techniques that are proposed for specific sections for the draft route, namely the underground section through the Meifod valley with overhead line elsewhere. The assessment will also consider the use of both steel lattice pylons (or towers) and the new T-Pylon for the overhead sections.

1.2.3 For the purposes of this Scoping Report the substation has been included and will be subject to further investigation, site survey and assessment in line with the proposed scope for the 400 kV connection.

1.2.4 This report forms the scoping stage in accordance with The Infrastructure Planning (Environmental Impact Assessment) Regulations, 2009, as amended 2011 and 2012, and the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (as amended), and focuses on the proposed National Grid infrastructure required for the Mid Wales Connection Project.

1.2.5 Figures 1.1 to 1.6 outline the site locations for the proposed infrastructure and a more detailed description of the proposed infrastructure is provided in Section 2.

1.2.6 This Scoping Report, prepared by MWH UK Ltd, on behalf of National Grid Electricity Transmission plc (National Grid), forms part of National Grid's project development.

1.3 Background Information

1.3.1 The Welsh Assembly Government published its policy statement "A Low Carbon Revolution – the Welsh Assembly Government Energy Policy Statement March 2010", which sets a target of 2 gigawatt (GW) installed onshore wind capacity for 2015/2017. The policy states that this will be achieved by optimising the use of strategic areas set out in Technical Advice Note (TAN) 8 on Planning for Renewable Energy. TAN 8 identifies areas where, for efficiency and environmental reasons amongst others, large scale (over 25 megawatt (MW)) onshore wind developments should be concentrated. A number of these 'Strategic Search Areas' (SSA B, C and D) are in Mid Wales.

1.3.2 There is currently no National Grid electricity transmission infrastructure near the proposed locations of the new Mid Wales wind farms. The nearest parts of the transmission system are in North Wales, the West Midlands and South Wales.

1.3.3 National Grid's role, as required by the Electricity Act 1989 (as amended) and by the terms of its transmission licence, is to facilitate the process undertaken by generation companies to decide which are the most cost-effective ways to satisfy consumer demand for electricity. As such, National Grid must respond to applications to connect new generation to its transmission system.

1.3.4 Scottish Power Energy Networks[1] (SPEN) has contracts with a number of wind farm developers seeking connection in Mid Wales for new generation projects with a total requirement for 666 MW export capacity. SPEN has advised that there is limited capacity on the existing distribution infrastructure to accommodate new generation without reinforcement works. They have therefore applied to National Grid for a new connection to the transmission system.

1.3.5 Consequently, a 'Do Nothing' option is not possible (see also para 1.4.3).

[1] SPEN is the business within the Scottish Power group which plans, operates, develops and maintains the distribution system in Mid Wales on behalf of SP Manweb plc, the owner of the system and the holder of the distribution licence.

1.4 The National Transmission System

1.4.1 National Grid owns the high voltage electricity transmission system in England and Wales and operates the electricity transmission system across Great Britain. The Company is responsible for operating the high voltage network, carrying power between generating stations and the local electricity supply networks of the regional Distribution Network Operators (DNOs).

1.4.2 The high voltage electricity transmission system in England and Wales, which operates at 275,000 volts (275 kV) and 400,000 volts (400 kV), comprises approximately 7,000 route kilometres (km) of overhead lines (OHL), over 600km of underground cable and over 320 substations. At substations, generation is connected to the transmission system, and the primary transmission voltage of 275 kV or 400 kV is transferred to lower voltages to companies with direct connections, and to the DNOs who take supplies and distribute electricity at lower voltages to factories, offices and homes.

1.4.3 National Grid has a statutory obligation to offer to connect any new generating stations applying to connect to the transmission system, and under the terms of its licence, National Grid is obliged to make an offer of connection in response to each valid application made.

1.4.4 In addition to the above, as holder of the transmission licence for England and Wales National Grid has an absolute statutory duty, under Section 9 (2) of the Electricity Act 1989 to:

- *"develop and maintain an efficient, co-ordinated and economical system of electricity transmission; and,*
- *to facilitate competition in the supply and generation of electricity."*

1.5 Previous Studies

1.5.1 The Project Need Case (March 2011, updated July 2012) sets out why the Mid Wales Connection Project and the work National Grid is proposing to undertake is needed.

1.5.2 The Strategic Options Report (March 2011, updated July 2012) details the different options considered when identifying where the new connection would be made to the national transmission network and the process National Grid went through in identifying its preferred option.

1.5.3 The Route Corridor and Substation Siting Study (March 2011) details the different options considered when identifying potential locations for the substation siting areas and route corridor options. In each case, it sets out the process National Grid went through in identifying the options taken forward for further public consultation.

1.5.4 The Stage One Consultation Feedback Report (July 2012) provides a full account of the first stage of the pre-application consultation process, a summary of the consultation representations received, National Grid's response to those representations, and how they would be taken into account by National Grid in developing the proposed development.

1.5.5 The Selection of Preferred Connection Report (July 2012) outlines the identification of a preferred substation siting area and associated 400 kV connection which is required to connect proposed power generators in Mid Wales to the national electricity transmission network. It demonstrates how statutory duties, policy considerations, technical and environmental issues and consultation feedback have shaped and influenced the identification of a preferred connection.

1.5.6 The Draft Route Report (September 2013) outlines the substation options considered and assessed at Cefn Coch, in order to identify a substation site to be taken forward to detailed design stage. That report also considers the routeing considerations (for both the incoming and outgoing connections) associated with each of the substation sites

considered. The report explains how the draft route has been developed, together with the initial technology choice. It demonstrates how development of the draft route has been shaped and influenced by statutory duties, policy considerations, environmental and socio-economic issues, technical considerations, and consultation feedback.

1.5.7 The documents above are available to download from the Mid Wales Connection Consultation website[2]. These documents are also available for viewing at a number of council offices and civic centres throughout Powys and Shropshire. A full list of the locations is available on the website or by contacting National Grid.

1.6 Legislative Framework

The National Infrastructure Directorate

1.6.1 The introduction of the Planning Act 2008 instigated a new consenting regime for major infrastructure projects in England and Wales, known as nationally significant infrastructure projects (NSIPs). The Planning Act 2008 describes three main features of the new procedures for NSIPs, including:

- The designation of National Policy Statements (NPSs), which will set out national policy for specified descriptions of development;
- The creation of the Infrastructure Planning Commission (IPC) which will be the determining authority for NSIPs; and
- The creation of Development Consent Orders , which will be made by the National Infrastructure Directorate within the Planning Inspectorate (PINS) to authorise Nationally Significant Infrastructure Projects (NSIPs), rationalising the current variety of consents required for NSIPs.

1.6.2 Following the 2010 General Election and the publication of the Decentralisation and Localism Bill in December 2010, the Government established its intention to replace the IPC with a Major Infrastructure Planning Unit (MIPU) that would be part of the Planning Inspectorate. The Unit would carry out broadly the same functions as the IPC, but final decisions would be made by Ministers based on the recommendations of the Unit. The IPC was formally abolished in April 2012 following The Localism Act 2011 coming into force, and MIPU was renamed the National Infrastructure Directorate within the Planning Inspectorate (PINS).

1.6.3 PINS operates within the statutory framework prescribed in the Planning Act 2008 and relevant secondary legislation including the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009, as amended (the "EIA Regulations"). The EIA Regulations state that PINS may not grant development consent unless it has first taken account of the environmental information.

National Grid Responsibilities

1.6.4 National Grid has a set of amenity responsibilities as set out in Section 38 and Schedule 9 of the Electricity Act 1989 which requires National Grid to:

"…have regard to the desirability of preserving natural beauty, of conserving flora, fauna, and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and shall do what [it] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects".

[2] http://www.midwalesconnection.com/

The Need for an Environmental Impact Assessment (EIA)

1.6.5 The EIA Regulations implement the European EIA Directive (Council Directive 2011/92/EU, which consolidates Council Directive 85/337/EEC as amended by Council Directives 97/11/EC and 2003/35/EC)[3] and apply to all NSIPs which require development consent under the Planning Act 2008.

1.6.6 The EIA Regulations mainly apply to large scale developments and where there is obvious potential for environmental effect. The EIA Regulations identify two classes of development where EIA must be carried out:

- Schedule 1 – projects for which EIA is mandatory;
- Schedule 2 – projects for which EIA is required if it is likely to have a significant effect on the environment, by virtue of its size, location and characteristics.

1.6.7 The Mid Wales Connection Project as currently proposed includes lengths of OHL connection from the proposed substation to the existing transmission system. That element of the project is, for present purposes, assumed to fall within Schedule 1 of the EIA Regulations, specifically Schedule 1 (20): '*Construction of overhead electrical power lines with a voltage of 220 kV or more and a length of more than 15km*' and, as such, is classed as EIA development requiring an ES. However, National Grid intends that this ES covers all elements of the Project.

1.6.8 On 09 May 2014, National Grid notified PINS and Powys County Council that it intends to provide an ES for the connection from the proposed substation at Cefn Coch into the existing transmission system near Lower Frankton and proposed works at the existing substation at Shrewsbury.

Habitats Regulations Assessment

1.6.9 The UK is bound by the terms of the EC Habitats Directive, EC Birds Directive and the Ramsar Convention. The aim of the Habitats Directive is to conserve natural habitats and wild species across Europe by establishing a network of sites known as Natura 2000 sites.

1.6.10 Under Article 6 (3) of the Habitats Directive, an 'Appropriate Assessment' is required where a plan or project is likely to have a significant effect upon a European site, either individually or in combination with other projects.

1.6.11 As part of the earlier consultations, Natural Resources Wales (NRW) (as the former Countryside Council for Wales (CCW)) and Natural England have stated that there could be effects on qualifying interests of European wildlife sites within the area. Accordingly, as part of the process of assessment of ecological impacts, a separate document would be prepared as part of the Habitat Regulations Assessment (HRA) under the Conservation of Habitats and Species Regulations 2010 (the Habitats Regulations) and in consultation with NRW and/or Natural England, depending on where the principal impacts are likely to occur. The HRA would assess potential impacts of the scheme on the relevant Natura 2000 sites and the need for an Appropriate Assessment would be assessed during the EIA in consultation with the relevant statutory conservation agencies.

The Purpose of Scoping in the EIA Process

1.6.12 Regulation 8 (1) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (as amended) and Regulation 10(1) of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (as

[3] 2014/52/EU amendments to Council Directive 2011/92/EU were published in the Official Journal of the European Union (OJEU) in April 2014. Each Member State has until 16th May 2017 to transpose these into their own national regulations. As such, the UK Government and the devolved administrations have 3 years to make changes to the existing UK EIA Regulations.

amended) gives provision for the applicant to obtain in writing from PINS and the Local Planning Authority respectively. The purpose of this document is to provide PINS and Powys County Council with the opportunity to comment on the scope of work proposed for the EIA and the contents of the ES.

1.6.13 Although it is not a mandatory requirement it is common practice for an applicant to provide a scoping report as part of the formal request for a scoping opinion if an ES is being submitted. It is a document that provides a clear idea of the issues to be scoped into the ES (or indeed scoped out) and assists in development of a robust EIA.

1.6.14 Scoping forms one of the first stages of the EIA process. It refers to the activity of identifying those environmental aspects that may be significantly affected by the proposed development. In doing so, the potential significance of impacts associated with each environmental aspect becomes more clearly defined resulting in the identification of a number of priority issues to be addressed in the EIA.

1.7 The Purpose of this Scoping Report

1.7.1 As part of the EIA, a scoping study has been undertaken in order to identify the potential impacts and issues relating to the project, including the substation, overhead lines and underground cabling elements of the Mid Wales Connection Project.

1.7.2 This document is the report of the scoping study. It summarises the assessment work already undertaken and ongoing, outlines the proposals, describes the baseline conditions where they are known, identifies the issues and concerns, and sets out the assessment approach. Its purpose is to ensure that all significant issues are identified and addressed by the EIA and that sufficient and proportionate information is provided on potential environmental effects to allow determination of the development consent order application.

1.7.3 This report is submitted to PINS and Powys County Council in support of a request for a formal scoping opinions on the proposed content of the EIA.

1.7.4 Further details of the scope of assessment, including proposed methodologies, can be found in Sections 5 and technical Sections 6 to 20 inclusive.

1.8 Content and Structure of the Scoping Report

1.8.1 The content and structure of this scoping report follows PINS Advice Note 7[4], and Regulation 8(3) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (as amended) and Regulation 10(2) of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (as amended), which advise that the following information should be provided, as a minimum:

- A plan sufficient to identify the land;
- A brief description of the nature and purpose of the development (Section 2) and of its possible effects on the environment (Sections 6 to 20 inclusive); and
- Such other information or representations as the person making the request may wish to provide or make.

1.8.2 In addition, this scoping report contains the recommended additional information as set out on page 7 of Advice Note 7.

1.8.3 The structure of this Scoping Report is as follows:

- **Section 2** describes the site and provides an interpretation of the site settings and surroundings. It also provides a description of the proposed development;

[4] PINS Advice Note 7: Environmental Impact Assessment: Screening, Scoping and Preliminary Environmental Information (version 4, July 2013).

- **Section 3** sets out the planning policy context for the development;
- **Section 4** summarises consultations held to date and those planned during the EIA process;
- **Section 5** determines the general scope of the assessment and methodology to be adopted in the EIA. The general assessment methodology sets out the approach to be taken for predicting and assessing impacts, the significance criteria to be used (unless set out within specific topics in Sections 6 to 20 inclusive), and the methodology for the assessment of cumulative impacts and alternatives. It also provides an outline for the proposed structure for the ES;
- **Sections 6 to 20** presents the key topics covered as part of the scoping study. For each topic the following is provided:
  - Baseline conditions (results of desk top and baseline studies and review of existing studies where relevant);
  - Methodology for assessment and surveys specific for the topic assessment;
  - Potential impacts of the development; and
  - Potential and scope for mitigation measures.

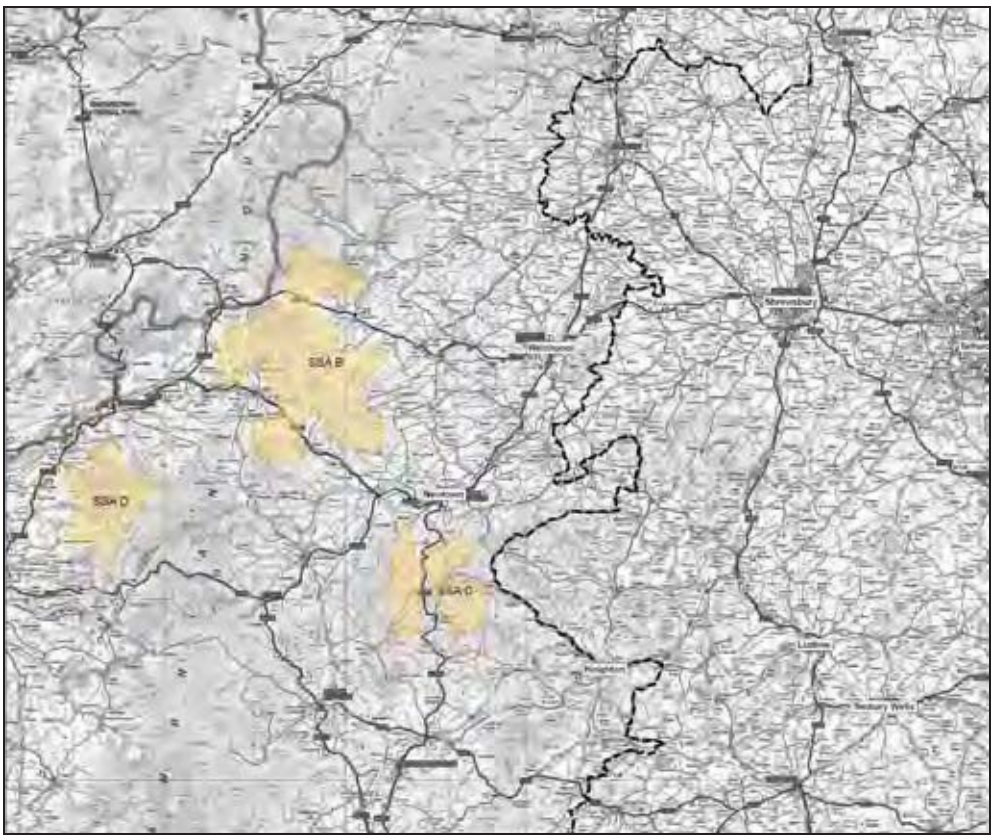
2 PROJECT DESCRIPTION

2.1 Need for the Connection

2.1.1 The need for the project is outlined in the document 'Connection of On-shore Wind Farms in Mid Wales – Project Need Case'[5], updated in July 2012

2.1.2 The Welsh Government has identified potential onshore wind development sites (known as Strategic Search Areas – SSA B, C and D) as part of its commitment to delivering renewable energy. These SSAs are documented in the Welsh Government Technical Advice Note (TAN) 8 and illustrated on Figure 2.1 below:

Figure 2.1 Locations of TAN 8 Strategic Search Areas



2.1.3 As a result, SSPEN, the Distribution Network Operator (DNO) of the existing lower voltage electricity distribution infrastructure for the northern half of Wales, has contracts with a number of wind farm developers seeking connection in Mid Wales for new generation projects with a total requirement for 666 MW export capacity. SPEN has informed National Grid that there is limited capacity on the existing distribution infrastructure to accommodate new generation without reinforcement works, and have applied to National Grid for a new connection to the national electricity transmission system.

2.1.4 In the absence of existing electricity transmission infrastructure and limited existing distribution infrastructure capacity in the Mid Wales region, both National Grid and SPEN need to construct new infrastructure with sufficient capacity to connect known and possible future generation projects.

[5] 'Connection of On-shore Wind Farms in Mid Wales – Project Need Case' (National Grid (March 2011)), available via the National Grid project website http://www.midwalesconnection.com within the documents and maps section.

2.1.5 In order to meet the Need Case, National Grid needs to develop a significant new substation, which would act as a marshalling point for the power output from the wind farms and transform the voltage from 132 kV to 400 kV for onward transmission. The installation of a 400 kV double circuit transmission route from this marshalling substation to the NETS would achieve a secure connection capable of carrying the anticipated combined renewable generation from the projects identified above. The Marshalling Substation and the 400 kV connection would also have sufficient capacity to accommodate further generation from the Welsh Assembly Governments' TAN 8 Strategic Search Areas (SSA) B, C, and D in the future.

2.2 Important Considerations

2.2.1 An important consideration in the development of the project has been the need to balance the location of the Marshalling Substation with the length of the new 400 kV connection, and the number and length of 132 kV overhead line connections feeding into the substation.

2.2.2 The further a new 400 kV connection extends into Mid Wales from the existing electricity transmission system the greater would be the distance over which associated impacts could occur. Countering this apparent driver to minimise route length is the associated impact of the 132 kV overhead lines that would connect between the individual wind farms, SPEN's network and the Marshalling Substation. As these connections would involve multiple 132 kV overhead lines, the impact of this element of the Mid Wales Connection project could be as great, if not greater, than that associated with the larger single 400 kV connection.

2.2.3 This consideration was principal to the study to identify the route options in Mid Wales and Shropshire, and reported in the Route Corridor and Substation Siting Report (Spring 2011), and further refined in the subsequent selection of the preferred route corridor and substation siting area (Summer 2012) and, more recently, the selection of the draft route and preferred substation site (Summer 2013).

2.3 Location

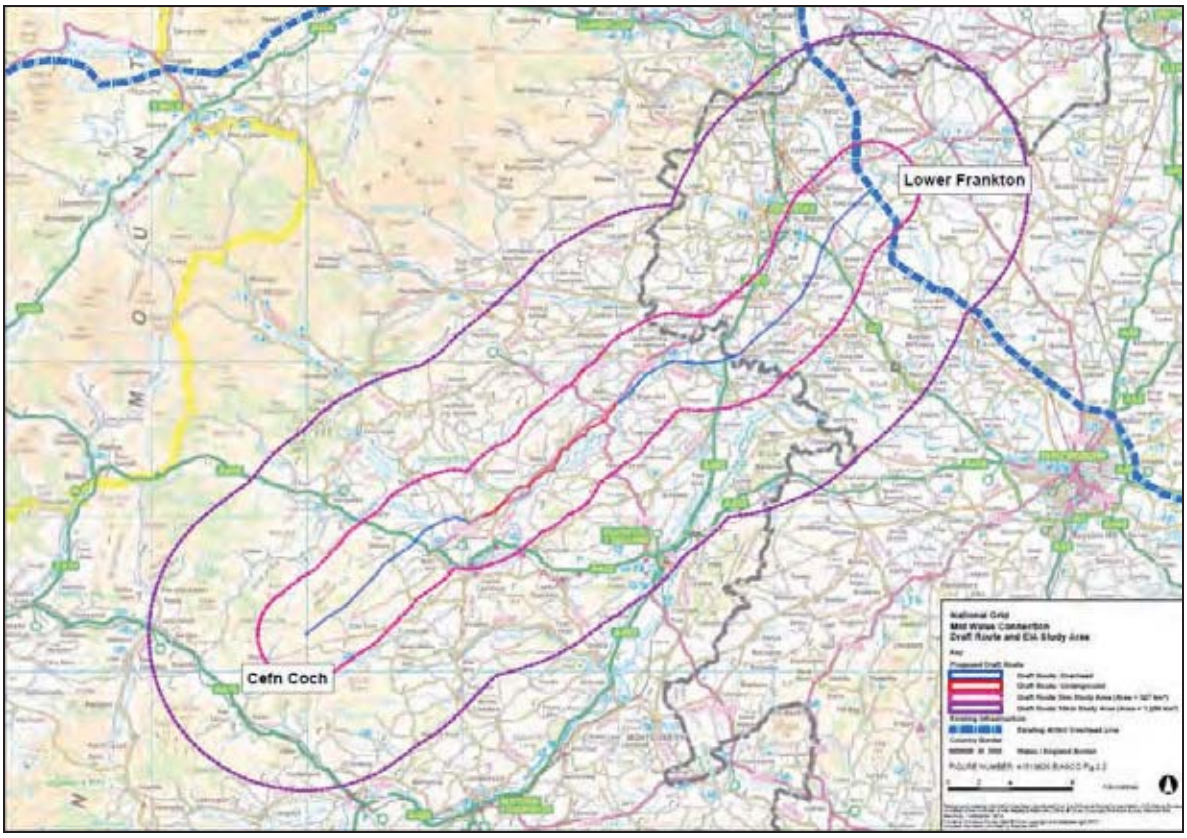
2.3.1 Following the selection of the draft route and substation site[6], which took into account the consultation and feedback on the Preferred Route Corridor[7], the study area for the EIA will be approximately 327km^2 centred around the draft route, as illustrated in Figure 2.2.

2.3.2 In general, the study area will comprise an approximate 3km wide study area around the draft route (the corridor of which is approximately 100m wide), although this would be widened, e.g. to approximately 10km, or narrowed where considered appropriate to take account of specific features, would take account of associated infrastructure such as access roads, and would vary spatially from topic to topic (see Section 5.3: Spatial Scope).

2.3.3 A separate study area will be applied to the proposed works at the existing Shrewsbury Substation.

[6] Mid Wales Connection Project Draft Route Report (September 2013)
[7] Mid Wales Connection Project Selection of Preferred Connection (July 2012)

Figure 2.2: Draft Route and EIA Study Area (excluding Shrewsbury Substation Study Area)



2.4 The Proposed Development

2.4.1 The proposed development comprises the 400 kV connection draft route, as a combination of overhead line and underground cabling, the substation, sealing end compounds where the connection changes from overhead line to underground cable (and vice versa) and the tee-in to the existing ZZK overhead line and proposed works at the existing substation at Shrewsbury. All 'permanent' infrastructure required for the development would have a design life of a minimum of 40 years regardless of the timeframe for which the DCO is valid, beyond which it may be re-engineered to extend its design life, if required, or decommissioned (see Section 2.6).

2.4.2 It should be noted that the project description given below represents the latest proposals which are subject to ongoing review, back-check and feedback from stakeholders and consultees.

The Proposed Substation Site

2.4.3 The proposed substation site occupies a remote rural situation, within and near the edge of TAN 8 SSAB and adjacent to the proposed Tirgwynt Wind Farm. It occupies a low lying and secluded bowl within the upland plateau at the head of a tributary of the River Rhiw. Centred on the property known as Bryngwyn, it lies 1km north from the Carno to Llanfair Caereinion Lane along a stone track.

2.4.4 The site comprises some large open fields which slope broadly eastwards. The fields are semi-improved grazed pastures and there is a small copse of deciduous trees next to the farmhouse. The nearest residential property is Gwaenydd which lies c.1km lower down the valley to the north-east, and a number of public rights of way converge on the site and connect into the wider footpath network.

2.4.5 National Grid's proposed development comprises a 400 kV substation with up to five132/400 kV Supergrid Transformers (SGT, connecting to the 400 kV interconnected transmission system, and an adjacent 132 kV substation into which the 132 kV wind generator circuits connect.

2.4.6 The proposed combined substation would occupy an area of approximately 6ha. It would comprise a securely fenced 400 kV compound, of approximately 240m long x 150m wide and maximum height of approximately 12.5m, incorporating up to five SGTs (each approximately 10.5m high) and other equipment, and a securely fenced 132 kV compound, of approximately 170m x 90m and maximum height of approximately 8m. The compounds would be protected by a 2.4m – 4m high security fence. An additional temporary working area would need to be established around the substation.

The Draft Route

2.4.7 The following paragraphs provide a description of the draft route, divided into five sections for ease of describing the route and to help focus the assessment. The sections have been established to assist with the consultation of the draft route and will be carried through within the EIA.

Cefn Coch to Afon Banwy

2.4.8 From the substation site, the draft route heads in a north-easterly direction down a small tributary valley of the Afon Rhiw through a remote and sparsely populated area comprising rough upland grazing and marshy grassland. It continues down this valley eventually descending into the Banwy Valley where it crosses the A458 and Afon Einion approximately 1.5km to the south-east of Moel Bentyrch. After crossing the road the draft route crosses open farmland and the Afon Banwy before swinging around to a more easterly direction to the north of Bryn-glas Hall.

2.4.9 The connection in this section as currently proposed would be constructed as an overhead line.

Meifod Valley

2.4.10 From the Afon Banwy near Bryn-glas Hall, the draft route continues in a north-easterly direction passing between a number of small woodlands and dispersed properties and following the lower lying land. South of Tynrhos it swings in an easterly direction and joins the Yr Hafesb Valley. In the narrow section of the Yr Hafesb Valley, the draft route crosses the access road and passes between the two areas of the Tan-y-Ffridd Caravean Park. From the Yr Hafesb Valley the draft route follows the A495 past the village of Meifod, until the valley opens out near Waen-fach.

2.4.11 The connection in this section as currently proposed would be constructed as underground cabling with sealing end compounds (SECs) in the vicinity of Ffridd Mathrafal, in the west, and Waen-fach in the east.

2.4.12 Each SEC would require a total footprint of approximately 70m x 40m, with the actual site area requirements to be established once the final site has been selected, topographic assessment undertaken and an engineering specification developed. Potential SEC locations will also need to accommodate temporary areas and the equipment necessary to test and commission the underground circuits. A temporary power source is also required to generate the test set up or alternatively a connection with the local electricity supplier has to be agreed.

2.4.13 The western SEC area straddles the A495, and is close to the B4382. The land in this area slopes to the north / northwest down to the low lying Yr Hafesb watercourse. The area generally comprises arable land and grazed pasture bounded by low hedgerows. Nearby properties include Oak Leigh, a small chapel, a group of buildings on the A495, Craig-wen and Pencaedu. An underground cable connection would pass between the two caravan park areas which are situated to the north.

2.4.14 The eastern SEC area is located close to the A495, north-east of the A490/A495 junction and close to a small tributary valley of the River Vyrnwy. It generally comprises grazed pasture bounded by hedgerows which slopes gently southwards toward to the River Vyrnwy. Vegetation associated with the river would help screen the SEC. The nearest property is Fferm, located to the south-west.

Waen-fach to A483

2.4.15 From Waen-fach the draft route continues in a north-easterly direction running along the Vyrnwy Valley floor avoiding the larger settlements on the valleys sides, the dispersed properties on the valley floor and caravan parks.

2.4.16 The connection in this section as currently proposed would be constructed as an overhead line.

A483 to Woolston

2.4.17 After crossing the A483 between Llanymynech and Llandysilio/Four Crosses the draft route swings back to a more north-easterly route, crossing the River Vyrnwy and the B4398 before traversing the low lying farmland around the River Morda.

2.4.18 The connection in this section would as currently proposed be constructed as an overhead line.

Woolston to Lower Frankton

2.4.19 After crossing Maesbury Road near Bromwich Park, the draft route continues in a north-easterly direction through the farmland before passing between the edge of Aston Hall and Oswestry Golf Club. The draft route then crosses the A5 and B5009 and swings slightly to the east crossing the Shrewsbury to Chester railway line before passing between some small woodland blocks and large farms to join the existing 400 kV overhead line (the ZZK Route) close to Lower Frankton.

2.4.20 The connection in this section would as currently proposed be constructed as an overhead line and includes two tee-in compounds next to the existing 400 kV overhead line.

2.4.21 A tee-in will be required to connect into the existing ZZK overhead line. The proposed design of the tee-in is still evolving and is subject to ongoing consultation. The final design will be included within the DCO and will be the subject of the EIA.

2.4.22 The tee-in connection would be constructed to allow one of the circuits from the Mid Wales Connection to be connected as an overhead line with the other circuit using a short section of underground cable to cross under the existing overhead line and then connect onto the ZZK circuit at high level from a lattice pylon and overhead conductor arrangement. This configuration would involve the construction of two cable sealing end compounds (each approximately 41m x 43m) either side of the existing ZZK Route; one located adjacent to a new pylon to be constructed along the line of the ZZK Route and one adjacent to the terminal structure of the proposed Mid Wales Connection Project.

2.4.23 The tee-in area will centre on one of two currently proposed locations along the existing ZZK route: existing pylon location ZZK059 or ZZK061 pylon, facilitating a tee-in connection angle of approximately 90° passing either side of the small woodland block at Berghill. The site comprises agricultural land used for arable and grazing, with the fields surrounded by managed hedgerow field boundaries containing some hedgerow trees and gaps.

2.4.24 Temporary enabling works would also be required to the ZZK Route to facilitate the construction of the tee-in whilst keeping the overhead line operational. These are likely to involve the construction of at least two temporary pylons located to the north east of the existing ZZK Route and the re-stringing of the line.

Shrewsbury Substation

2.4.25 It is anticipated that works would be required at the Shrewsbury Substation site, located approximately 1.5km to the east of Shrewsbury, near Uffington. However, until the project is further refined as part of the EIA, the exact nature and extent of those works has not yet been defined.

General Requirements

2.4.26 In areas proposed for overhead line, construction access is anticipated to utilise existing road access where practicable and include the use of temporary trackways, comprising metal plates, hardcore or tarmac. Although it is unlikely that a haul road would be needed for the majority of the overhead line construction, it is possible a section of haul road may be required in areas where the existing road network is unsuitable, e.g. near Cefn Coch. Use of the rail network for the delivery of materials is an unlikely alternative delivery option, as is the need for aerial access. The Montgomery Canal is a European designated habitat site for much of its length and unnavigable in part, and so is not an alternative transport option. Also, in areas proposed for underground cabling, construction access would be via a temporary haul road running between the cable trenches to allow for construction and associated vehicles, and utilising existing road accesses where practicable.

2.4.27 Temporary site compounds would be needed during the construction phase. For a connection route of this length, several compounds would be usual, distributed along the route. The exact location of these compounds would be determined and assessed as part of the EIA but it is possible that they would be established at locations of principal activity, such as the site of the substation.

2.4.28 Temporary working areas would be needed throughout the construction process, and would likely be required for nearly three years. Dependent on the programme requirements, some sections of the construction may be reinstated earlier than the final end of construction.

2.4.29 For a 400 kV overhead line connection, a pylon would need to be constructed approximately every 300-400m, i.e. approximately three pylons per km. The overhead line sections of the draft route are approximately 41km long, in total, so approximately 112 pylons would be required (48 pylons from the substation site to Afon Banwy (western section), and 64 pylons from Waen-fach to Lower Frankton (eastern section)). The connection is likely to be a combination of steel lattice pylons for the western section and the new T-Pylon for the eastern section. Each steel lattice pylon would be approximately 50m tall, would occupy a footprint (base dimensions) of approximately 10.4m x 10.4m (maximum) and be a mix of suspension pylons (where the line is straight, tension pylons (where the line changes direction) and terminal pylons (where the changes to underground cable and connects to a sealing end compound). Each T-Pylon would be approximately 39m tall with a base footprint of approximately 2m - 2.3m diameter, representing the area taken by the solid support of the pylon fixed to its foundation.

2.4.30 For the approximate 13km length of 400 kV underground connection, insulated cables would be used. Underground cables, because of the insulation and surrounding environment, tend to retain the heat produced in the copper conductor. This heat then has to be dissipated to the surrounding environment. To compensate for this, underground cables are generally bigger to reduce their electrical resistance and heat produced. How the heat produced is dissipated is dependent on the cable installation method.

2.4.31 For direct buried cables each cable needs to be well-spaced from others for good heat dissipation. To match overhead line thermal performance for a 400 kV double circuit as many as 18 separate cables in six separate trenches can be needed resulting in a permanent cable swathe in the order of 50m wide. For the Mid Wales Connection Project, it is expected that six separate cables would be required, in two trenches each

with a cable swathe in the order of 20m wide. Additional working and access space would lead to a total swathe in the order of 40m wide during construction.

2.4.32 In addition underground joint bays, which are concrete lined and wider than the trenches themselves, would be required every 500m to 800m. For the Mid Wales Connection Project it is anticipated that cable lengths would be in order of 700m.

2.5 Programme

2.5.1 It is anticipated that, assuming approval in January 2017, construction works would commence as soon as possible afterward and would likely continue for nearly three years. Dependent on the programme requirements, some sections of the construction may be reinstated earlier than the final end of construction. Further details of the likely construction programme, including pre-commencement and reinstatement works, will be included within the ES.

2.5.2 All 'permanent' infrastructure required for the development would have a design life of a minimum of 40 years.

2.6 Decommissioning

2.6.1 The EIA will address the decommissioning of the scheme should it no longer be required for operational purposes.

2.6.2 Decommissioning for assets that are no longer required for operational purposes could comprise the removal of above ground infrastructure and reinstatement to agricultural use. The below ground infrastructure, cables etc. would be decommissioned and left in situ.

3 PLANNING POLICY CONTEXT

3.1 Introduction

3.1.1 The Environmental Statement (ES) will summarise relevant energy and climate change policy, minerals and waste policy, national planning policy and local planning policy, within a Planning Policy chapter. It will include an assessment of the extent to which the connection and substation elements conform to policy.

3.1.2 Relevant legislative and policy requirements for each individual topic area will be also be addressed in the ES.

3.1.3 Authorisation for any overhead line elements of the connection would be sought under the Planning Act 2008, via the National Infrastructure Directorate within the Planning Inspectorate. Consent for the proposed substation is expected to be sought from Powys County Council. The planning context is an important factor for the determining authority (be it the LPA or the Secretary of State) in considering applications for consent, and this chapter summarises the policy position.

3.2 Existing Planning Policy

3.2.1 The general planning policy context within which the draft route and substation site are set, including the existing and future land use allocations along and adjacent to the route is contained within a number of documents including:

- Meeting the Energy Challenge – A White Paper on Energy, May 2007;
- The Climate Change Act 2008;
- The UK Low Carbon Transition Plan – National Strategy for Climate Change and Energy, July 2009;
- One Wales – One Planet, 2009;
- The UK Renewable Energy Roadmap, 2011;
- All Islands Approach, 2011;
- Energy Wales, 2012;
- National Policy Statements EN-1 (Overarching Energy National Policy Statement, July 2011) and EN-5 (National Policy Statement for Electrical Networks Infrastructure, July 2011);
- National Planning Policy Framework, March 2012;
- Technical Guidance to the National Planning Policy Framework, March 2012;
- Draft Planning (Wales) Bill (December 2013);
- Wales Spatial Plan 2008;
- Planning Policy Wales, Edition 5, 2012;
- Technical Advice Notes (TANs) to supplement the policy set out in the Planning Policy Wales, in particular:
  - TAN 5: Nature Conservation and Planning, 2009;
  - TAN 8: Renewable Energy, 2005;
  - TAN 11: Noise, 1997;
  - TAN 12: Design, 2009;
  - TAN 13: Tourism, 1997;

- TAN 15: Development and Flood Risk, 2004;
- TAN 20: Planning and the Welsh Language, 2013;

- Emerging Shropshire Local Development Framework (LDF), including the Core Strategy Development Plan Document (DPD), adopted February 2011, and Site Allocations and Management of Development (SAMDev) DPD;
- Powys Unitary Development Plan, adopted March 2010.

3.3 Methodology

3.3.1 The ES will review the above listed documents, as a minimum, including any new and updated publications, as well as additionally identified relevant planning policy documents. The section will provide an overview of the relevant national and local policy and assess the extent to which the connection, including associated infrastructure, conforms to it; completely, with mitigation or not at all. The objective will be to demonstrate that relevant policy guidelines, at national to local level, have been taken into account within the proposals.

3.3.2 Legislative and policy requirements for each individual topic area will also be addressed in the Planning Policy chapter of the ES.

4 CONSULTATION

4.1 Approach to Consultation and Stakeholder Engagement

4.1.1 National Grid is fully committed to the principles of public consultation, and the consultation process for this project has been informed by the requirements of the Planning Act 2008. The Consultation Strategy is described fully in the report titled 'Mid Wales Wind Farms Connection Project Consultation Strategy', which is available on the project website http://www.midwalesconnection.com.

4.1.2 National Grid is committed to ensuring the consultation process and associated communications are made as accessible to as many parts of the community as possible. In line with this, and in line with the Welsh Language Act, consultation materials will be produced in English and Welsh, including the project website, newsletters and exhibition panels. The NTS of the ES will be produced in both languages, and National Grid will consult, e.g. with the Welsh Language Authority, on which other documents need to be translated. Furthermore, National Grid would proactively target hard to reach groups in line with information provided by local authorities.

4.1.3 A summary of the consultation phases and principal activities is given below.

- Pre-consultation engagement (Winter/Spring 2010/2011) – Early engagement (ahead of any formal development consent application or other pre-application consultation) with Powys County Council and Shropshire Council around the development of the draft Consultation Strategy. In addition, advance briefings with meetings with Powys and Mid Wales Members of Parliament (MPs) and Assembly Members (AMs) to discuss National Grid's role in connecting the new wind farms and provide a broad overview of the work and National Grid's approach to consultation.
- Phase One: Connection Options, Route Corridor and Substation Siting Area Consultation (March-June 2011) – Publication of Consultation Strategy and findings of the Route Corridor and Substation Siting Study. This phase included a series of workshops and public exhibitions held throughout the study area, and launch of communication channels, including Freephone number, Freepost address, e-mail feedback, project newsletter, website.

4.1.4 The Pre-consultation engagement and Phase One Consultation together are known as the Stage One Consultation. This included a two week extension to the original close of consultation date as advertised. This extensive consultation was undertaken to obtain views about the Project as a whole, the potential route corridor options and the two substation siting areas, and was undertaken by National Grid and jointly with Scottish Power Energy Networks in areas affected by the 132 kV and the 400 kV proposals.

- Phase Two: Feedback on Phase One Consultation and announcement of Preferred Route Corridor and Preferred Substation Siting Area[8] – Publication of the report demonstrating how feedback from earlier consultations has shaped and influenced the Preferred Route Corridor and substation siting. Consultation on the Preferred Route Corridor option and substation site to develop a preferred route alignment and site for the substation. Consultation with local planning authorities and principal statutory/non-statutory stakeholders on how the next stage of detailed alignment should be undertaken.
- Phase Three: Route Alignment and Substation Site Consultation (September 2013). Feedback on Stage Two Consultation and announcement of the Draft Route and Substation Site[9].

[8] Mid Wales Connection Project Selection of Preferred Connection (July 2012)
[9] Mid Wales Connection Project Draft Route Report (September 2013)

- Phase Four: Pre-application consultation (Spring/Summer 2014) – Preparation and final submission of the Statement of Community Consultation. Final round of consultation including the outcome of the EIA process.

4.1.5 National Grid's Early Engagement, Phase One and Phase Two consultation activities have produced responses from statutory and non-statutory consultees. A list of organisations who responded to this consultation is presented in Appendix 4.1. The responses received to the Early Engagement, Phase One and Phase Two consultations relevant to EIA Scoping are summarised in Appendix 4.2 and detailed in the National Grid document: Stage One Consultation Feedback Report[10].

4.1.6 Throughout the development of the scheme consultations would be undertaken with principal consultees (both statutory and non-statutory) through correspondence and meetings. The aim of these consultations will be to:

- to gather information;
- to agree the scope of field survey work required, where necessary;
- to discuss the concerns of interested parties; and
- to identify the important environmental constraints associated with the project.

4.1.7 The organisations which are proposed to be consulted with are included within each of the technical sections (Section 6 to 20). In summary, consultations are proposed to be undertaken with, although not limited to, the following statutory and non-statutory bodies:

- The Planning Inspectorate;
- Welsh Government;
- Powys County Council (various departments);
- Shropshire Council (various departments);
- Department for Environment, Food and Rural Affairs (DEFRA);
- Natural Resources Wales (NRW) (various departments);
- Environment Agency;
- Natural England;
- Forestry Commission;
- Powysland Internal Drainage Board;
- Campaign for the Protection of Rural Wales (CPRW);
- Campaign to Protect Rural England (CPRE);
- Design Commission for Wales;
- Institute of Rural Health;
- Utilities infrastructure (electricity, gas, water, telecommunications, etc. including Scottish & Southern Energy (SSE) Renewables, Scottish Power Energy Networks (SPEN) and RWE npower renewables) and Severn Trent Water;
- Water Services Regulation Authority (OFWAT);
- North and Mid Wales Trunk Road Agency;

[10] 'Connecting Wind Farms through Mid Wales and Shropshire – Stage One Consultation Feedback Report' (National Grid (July 2012), available via the National Grid project website http://www.midwalesconnection.com within the documents and maps section.

- Highways Agency;
- Canal & River Trust (formerly British Waterways);
- Inland Waterways Association;
- Montgomery Waterway Restoration Trust;
- Network Rail;
- Welshpool & Llanfair Light Railway Preservation Co. Limited;
- Ministry of Defence (MOD);
- Civil Aviation Authority (CAA);
- NATS Ltd including for NERL Safeguarding;
- The Air Ambulance service (for The Children's Air Ambulance), Wales Air Ambulance, Midlands Air Ambulance (for Shropshire);
- Local airfields including Sleap and Shawbury, (e.g. via MOD), Briedden, Knockin and Rednal;
- Mid and West Wales Fire and Rescue Service;
- Shropshire Fire and Rescue Service;
- Coal Authority;
- Tourism bodies including Wales Tourism Alliance;
- The Countryside Agency;
- Potential developers, as relevant;
- Farmers Union of Wales;
- National Farmers' Union (NFU) West Midlands;
- Country Land and Business Association (CLA);
- Relevant local businesses;
- Red Ridge Centre;
- Jodrell Bank Observatory, University of Manchester/e-MERLIN National Facility;
- Woodland Trust;
- National Trust;
- Ramblers Association;
- Relevant recreation clubs, e.g. for cycling and gliding / microlights;
- Angling groups, e.g. Prince Albert Angling Society;
- Horse riding groups, including Shrewsbury and District Riding Club, Nesscliffe Hills and District Bridleway Association, Shropshire Riding Carriage Driving Groups;
- Montgomeryshire Wildlife Trust;
- Shropshire Wildlife Trust;
- Royal Society for the Protection of Birds (RSPB) Cymru / RSPB
- Cadw;
- English Heritage;
- Clwyd-Powys Archaeological Trust (CPAT);

- Shropshire Sites and Monuments Record (SMR) (Shropshire Historic Environment Record (HER));
- Powis Castle Estate;
- Biodiversity Information Service for Powys and Brecon Beacons National Park (BIS);
- Natural Shropshire - Shropshire Biodiversity Partnership;
- Powys/Radnorshire Badger Group (PBG);
- Shropshire Badger Group (SBG);
- British Trust for Ornithology (BTO);
- Parish / Community Councils; and
- Other relevant bodies as required and as identified during the EIA.

4.1.8 It should be noted that responses and information received to date from many of the above consultees, where pertinent to the scoping process, have been taken on board within this report.

4.1.9 Comments on the draft versions of this EIA Scoping Report have also been received and incorporated, where possible, as part of pre-application consultation with statutory consultees and principal non-statutory bodies. In particular, comments have been received from:

- Shropshire Council (Archaeology);
- English Heritage;
- CPAT;
- Shropshire Wildlife Trust;
- Natural Resources Wales;
- Environment Agency;
- Natural England; and
- Cadw.

5 GENERAL ASSESSMENT SCOPE AND METHODOLOGY

5.1 Determination of Scope

5.1.1 The establishment of the scope of the EIA is an important step in the assessment process and this section outlines the temporal scope (covering the construction, commissioning, operational and decommissioning stages), the spatial scope (the physical area over which changes to the environment are likely to occur) and the technical scope (the environmental topics addressed in the assessment). The temporal and spatial scope will vary between different topics.

5.2 Temporal Scope

5.2.1 The main construction phase is anticipated to commence once approval is obtained (currently estimated to be January 2017) and continue for a period of nearly three years. For the purposes of this assessment, it has been assumed that commissioning and commencement of operation would be from the summer of 2020.

5.2.2 With regard to landscape, the assessment of impacts extends to 15 years after opening to take account of growth in planting where this is provided by the project.

5.2.3 Operation is anticipated to last potentially for 40 years or more, in line with the design life of the electricity transmission infrastructure, with decommissioning occurring only once the infrastructure is no longer required.

5.3 Spatial Scope

5.3.1 The spatial scope of the assessment is defined as the physical area over which changes to the environment are likely to occur as a result of the development, i.e. the study area. The study area will vary spatially and from topic to topic, and will be applied to the draft route and associated permanent infrastructure, and to the existing Shrewsbury Substation. For example, potential impacts of noise or visual intrusion may be experienced at different distances from the source of impact, whilst potential impacts on archaeology and cultural heritage would generally be confined to those areas physically disturbed by construction works. See also Section 2.3 and Figure 2.2.

5.3.2 The spatial scope is a function of:

- The physical extent of the proposed works taking into account temporary and permanent land requirements; and
- The nature of the baseline environment and the manner in which potential impacts are propagated.

5.3.3 In addition, the spatial scope takes account of local government administrative boundaries, which provide the planning policy context for the proposed development.

5.3.4 Each technical chapter of the ES will define the spatial scope that has been used within the EIA, justifying the study areas and any flexibility needed, stating where it was necessary and appropriate to go beyond.

5.4 Technical Scope

5.4.1 The range of environmental topics that will be addressed as part of this scoping exercise is referred to as the technical scope.

5.4.2 Schedule 4 of both applicable EIA Regulations identifies aspects of the environment which should be considered, namely population (human beings), fauna, flora, soil, water, air, climatic factors, material assets (including architectural and archaeological heritage), landscape and the interactions between these factors. This list has been refined and

adapted with reference to good EIA practice. The refined list takes full account of the matters identified in Schedule 4 of the EIA Regulations and covers:

- Landscape, townscape and visual amenity;
- Archaeology and Cultural Heritage;
- Geology, soils and contaminated land;
- Agriculture and land use;
- Air quality;
- Electro and magnetic effects;
- Water quality and resources, including flooding risk and land drainage;
- Ecology and biodiversity;
- Traffic and transport;
- Socio-economics and community effects;
- Noise and other emissions (e.g. waste);
- Climate Change and natural resources;
- Sustainability; and
- Welsh Language.

5.4.3 As part of the scoping exercise, and with the aim of delivering an appropriate EIA, consideration will be given to those aspects of the environment which should be included in the scope of the assessment (scoped in) and those that should be excluded, either wholly or partially, on the grounds that they would not give rise to, or experience, significant environmental effects (scoped out).

5.4.4 Sections 6 to 20 discuss the rationale for scoping aspects in or out of the full assessment. For each topic, details are presented relating to the baseline context / existing environment within the study area, important issues and concerns with regard to potential impacts and their effects, proposed assessment methodology, and, where appropriate, assumed mitigation.

5.5 General Assessment Methodology

5.5.1 The generic methodology for the assessment is provided in this section and more detail on the methodology for specific topic assessments is provided in Sections 6 to 20.

5.6 Baseline Context

5.6.1 Information and data would be collected to determine the baseline situation, i.e. the situation that would prevail in the absence of the construction and operation of the Development. Baseline information has already been gathered from a variety of sources including published data, desk studies, consultation and field surveys. Where relevant, specific reference to studies is provided in the scoping section for each topic, in Sections 6 to 20.

5.6.2 All data collection, whether by desk study or field survey, will be undertaken by suitably qualified and experienced environmental professionals, who are members of their appropriate professional institutions.

5.7 Predicting and Assessing Impacts

5.7.1 A number of criteria will be used to determine whether or not the likely effects of the proposed development are ‘significant’ and will be assessed quantitatively, where

possible. The significance of effects would be assessed using one or more of the following criteria:

- International, national and local standards;
- Relationship with planning policy;
- The known or likely presence of an environmental receptor or resource;
- The value of those resources, reflecting for instance their designated status as well as their qualitative character such as rarity, extent and condition;
- The number, vulnerability or sensitivity of affected resources or the receiving environment;
- The extent, nature, duration and reversibility of physical changes resulting from the construction and/or operation of the development;
- The ability of the resource or receptor to absorb change;
- Inter-relationship between effects;
- The results of consultations; and
- The effectiveness of mitigation measures.

5.7.2 The effects that are considered to be significant, prior to mitigation, will be identified in the ES. The significance of effects will reflect judgements as to the importance or sensitivity of the affected receptor(s) and the nature and magnitude of the predicted changes. For example, a large adverse impact on a feature or site of low importance will be of lesser significance than the same impact on a feature or site of high importance.

5.7.3 In assessing the magnitude and significance of impacts, a precautionary approach will be adopted and conservative assumptions made where appropriate.

5.7.4 As required by the EIA Regulations, impacts will be assessed in relation to the aspects of the environment that are likely to be significantly affected by the development which fall into two categories: environmental resources and environmental receptors.

5.7.5 Environmental resources are defined as those elements of the environment that are essential to, or of value to, the functioning of natural or human systems. These include areas or elements of ecological, landscape or heritage value, soil, air, watercourses and water bodies, dwellings, places of employment and community facilities.

5.7.6 Environmental receptors are defined as people (as users of dwellings, places of recreation) and human systems (for example, the employment market).

5.7.7 In general, and unless otherwise stated within specific topics included within Sections 6 to 20, the following terms will be used to assess the significance of effects, where they are predicted to occur:

- **Major beneficial or adverse** – where the development would cause a significant improvement or deterioration to the existing environment;
- **Moderate beneficial or adverse**– where the development would cause a noticeable improvement or deterioration to the existing environment;
- **Minor beneficial or adverse** – where the development would cause a barely perceptible improvement or deterioration to the existing environment; and
- **No change / Negligible** – no discernible improvement or deterioration to the existing environment.

5.7.8 The prediction and assessment of impacts and their effects on the environment, and the identification of appropriate mitigation measures, will be undertaken by suitably qualified

and experienced environmental professionals, who are members of their appropriate professional institutions.

5.8 Construction Environmental Management

5.8.1 The ES would provide details of the construction programme, including construction activities, methods and anticipated duration of the works. An outline Construction Environmental Management Plan (CEMP) would be appended to the ES which would deal with the specific mitigation measures required to reduce the construction related impacts arising from construction traffic, noise, dust and water generation. Each topic, where relevant, would include an assessment of construction impacts, and would include, but not be limited to, issues relating to peat, drainage, pollution control and materials management. The assumptions about mitigation that would be contained within the CEMP would be included in the ES assessment.

5.9 Cumulative Impacts and In-Combination Effects

5.9.1 The following section sets out the general approach to the assessment of cumulative effects. This general approach may be refined accordingly, if necessary, to suit the each technical chapter.

5.9.2 For the cumulative impact assessment, two types of impact will be considered:

- Combined effects of individual impacts, for example noise, dust or traffic, on a single receptor or resource of the proposed development, including all associated infrastructure; and
- Combined effects with other development schemes which, on an individual basis may be insignificant, but cumulatively with the proposed development, including all associated infrastructure, may have a significant effect.

5.9.3 It is anticipated that the assessment of cumulative and combined effects will be undertaken in two stages.

Stage 1

5.9.4 As the Mid Wales Connection Project is required to facilitate the construction of a number of planned wind farms within and outside SSA B and SSA C, (i.e. those with contractual agreements with SPEN), those planned wind farms (the Project Need Case wind farms) in proximity to the proposed substation and the distribution network infrastructure being developed by SPEN to connect to the proposed substation would form part of an assessment of the effects of the overall 'Mid Wales Project'. The Nant-y-Moch Wind farm, as proposed by SSE, would not form part of this assessment due to the distance from the Mid Wales Project unless it was relevant to a particular topic.

5.9.5 Other wind farms which form part of the Stage 1 assessment would be identified following discussion with the relevant stakeholders during the commencement of the assessment and periodically reviewed. This would include existing and consented wind farms, both within and outwith the SSAs.

5.9.6 Other consented non-wind related developments will also be considered as part of the Stage 1 assessment.

Stage 2

5.9.7 Other wind farms, both within and outwith the SSAs, which are at or beyond the submitted application stage but which have not yet been determined would be considered as part of the cumulative impacts assessment (Stage 2).

5.9.8 Other non-wind related developments which are at or beyond the submitted application stage but which have not yet been determined, would also be included within the cumulative impacts assessment (Stage 2). Similarly, developments ahead of the Mid

Wales Connection Project in the planning process but that have not yet received consent would be included.

5.9.9 Developments at pre-planning stage would not be included within the cumulative impacts assessment unless they are in the public domain as part of a Public Consultation exercise, at the Scoping stage, or identified through discussions with Powys County Council and Shropshire Council as potentially significant.

5.9.10 Consideration will also be given to other projects registered on the National Infrastructure Planning website for Wales[11] and for the West Midlands in England[12], and to areas allocated or reserved for future development within the local planning context.

Stage 3

5.9.11 In addition, a review of the planning applications in the area has revealed plans for:

- A number of large free-range egg production units;
- The erection of a number of individual/small scale wind turbines;
- The erection of several overhead electricity lines (11 kV and LV) - at land near Llanoddian Hall, Llanfair Caereinion, Welshpool, Powys and at Land at Pantycrasty Barns Carno, Caersws; and
- The Newtown Bypass, comprising a southern bypass of the town, south of Mochdre Industrial Estate and passing beneath the main Cambrian railway line east of Dyffryn Industrial Estate, plus associated access improvements.

5.9.12 NB: the above list is not exhaustive and proposed relevantdevelopment within the area will be fully considered during the EIA.

5.9.13 The approach to the assessment of cumulative impacts and in-combination effects as part of the Landscape & Visual Assessment is set out in Section 6.5. For the remaining technical chapters, it is anticipated the general approach given above will be followed.

5.10 Assessment of Alternatives

5.10.1 Schedule 4 of the EIA Regulations requires the ES includes an outline of the main alternatives studied by the applicant and provides an indication of the main reasons for the applicant's choice, taking into account the environmental effects.

5.10.2 In accordance with the EIA Regulations and statutory guidance, the following types of alternative assessment should be considered and described in the ES:

- **Do Nothing Scenario** – this scenario is <u>not</u> an option due to National Grid's obligations under the Electricity Act 1989 (as amended) to respond to applications by generation companies, in this case SPEN, to connect new generation to its transmission, as detailed in Section 1;
- **Alternative Sites** – examination of alternative locations for the proposed development, in this case alternative routeing options and alignments within the preferred corridor, alternative locations for the marshalling substation, and alternative locations for other required infrastructure such as sealing end compounds; and
- **Alternative Designs/Technologies** – e.g. alternative pylon designs in locations which are particularly sensitive, alternative locations for pylons within the preferred corridor, undergrounding, etc., plus the installation of an alternative voltage connection, i.e. a 132 kV connection as opposed to a 400 kV connection.

[11] http://infrastructure.planningportal.gov.uk/projects/wales/

[12] http://infrastructure.planningportal.gov.uk/projects/west-midlands/

5.10.3 An extensive optioneering process has been undertaken to get to this scoping stage; the findings of which are contained in the Project Need Case (March 2011, updated July 2012), the Strategic Options Report (March 2011, updated July 2012), the Route Corridor and Substation Siting Study (March 2011), the Stage One Consultation Feedback Report (July, 2012), the Selection of Preferred Connection Report (July 2012) and the Draft Route Report (September 2013). These studies are available on the National Grid project website http://www.midwalesconnection.com within the documents and maps section.

5.10.4 A summary of these studies and justification for the discounting of alternatives will be included within the ES.

5.11 Proposed Structure of the Environmental Statement

5.11.1 The ES would comprise the following set of documents:

- **ES Non Technical Summary (NTS)** – comprising a summary of the principal issues and findings of the EIA;
- **ES Volume 1: Main Text** – comprising the full text of the EIA with the proposed chapter headings as follows:
  - Introduction – including general background information, the legislative requirements of the EIA, description of the site and surroundings, details of the applicant making the planning submission and the environmental assessment team;
  - Approach to EIA – detailing the methodologies employed as part of the EIA and any issued agreed to be scoped out;
  - The Proposed Development;
  - Alternatives and Design Evolution;
  - Planning Policy;
  - Landscape Character;
  - Visual Amenity;
  - Archaeology and Cultural Heritage (historic environment);
  - Ecology (including biodiversity);
  - Water Quality and Resources, including Flood Risk;
  - Geology, Soils and Contaminated Land;
  - Agriculture and Land Use;
  - Construction Emissions (Air Quality, Noise and Vibration, Other);
  - Operational Noise;
  - Electrical and Magnetic Fields;
  - Traffic and Transport;
  - Socio-economics, including Tourism, and
  - Welsh Language Statement summary

  NB: Each technical chapter will typically follow the structure given below, although each may be adapted as necessary:

  - Introduction;
  - Legislation and Policy Context (to be contained in the Land Use and Planning Policy chapter);

- Assessment Methodology, including a definition of the study areas (spatial scope) used including justifications for any variations, as well as an indication of assumptions and Technical Difficulties;
- Baseline Overview; and
- Predicted Impacts and Mitigation, including cumulative impacts and in-combination effects.

- **ES Volume 2: Figures** – comprising the figures, in A3 format, visually presenting the data and findings of the EIA; and
- **ES Volume 3: Technical Appendices** – this would provide supplementary details of the environmental studies conducted during the EIA including relevant data tables, figures and photographs where applicable.

5.11.2 Ecological information of a sensitive or confidential nature may need to be provided in a separate annex or appendix to facilitate restricted distribution.

6 LANDSCAPE AND VISUAL

6.1 Introduction

6.1.1 Landscape and visual impact assessment (LVIA) is one of the components of the environmental impact assessment (EIA) process and is necessary to comply with the EIA Regulations, the Overarching NPS for Energy (EN-1), the NPS for Electricity Networks Infrastructure (EN–5) and local plan policies.

6.1.2 This section of the Scoping Report sets out the approach to the Landscape and Visual Impact Assessment (LVIA) for the proposed development which will be undertaken and provided as part of the Environmental Statement (ES). In accordance with the EIA Regulations this will identify the potential effects which may arise during the construction, operation and decommissioning phases.

6.1.3 This section also sets out the approach to the Cumulative Landscape and Visual Impact Assessment (CLVIA) and residential visual amenity assessment for the proposed development which will be undertaken and provided as part of the ES.

Components of LVIA

6.1.4 The LVIA will address both possible effects on the landscape in its own right and effects on views and visual amenity, including residential visual amenity:

- landscape effects including direct effects upon the fabric of the landscape (such as the addition, removal or alteration of structures, woodlands, trees or hedgerows), which may change the character and perceived quality of the area, or more general effects on landscape character and designated landscapes arising from the introduction of new man-made features;
- visual effects relate to specific changes in the composition of views and the effects of those changes on visual receptors (e.g. residents, business users, users of recreational open space, views to and from valued landscapes) and on the general visual amenity experienced by people[13];
- cumulative assessment is the assessment of the additional landscape and visual effects, which may occur where the proposed development is seen in conjunction with other proposed developments in the area such as the contracted wind farms and SPENs proposed 132 kV overhead lines; and
- residential visual amenity assessment is a subset of residential amenity assessment which also includes aspects such as noise, light, vibration, etc. In making judgements about residential amenity, it is important to recognise that a significant adverse change to an outlook from a property does not in itself result in material harm to living conditions.

Inter-relationship between LVIA and other EIA Topics

6.1.5 Landscape has complementary links with other EIA topics, but has a particularly close relationship with the historic environment, ecology and socio-economic topics. The relationship between landscape and historic landscape matters is close. The first is concerned with the landscape as it is today. The second is concerned with how the landscape came to be as it is and deals with historic dimensions such as ‘time depth’ and historical layering. In recognition of this, the survey for the baseline landscape and visual assessment will ensure that important above ground archaeological remains and cultural heritage sites and features, such as hillforts, as are recorded and judgements made as to their contribution to the landscape. Use will be made of historic landscape information and

[13] GLVIA defines visual amenity as the overall pleasantness of views enjoyed by people with respect to their surroundings.

there will be liaison with the specialists undertaking the archaeology and cultural heritage assessment.

6.1.6 Similarly, whilst information on habitats, particularly woodlands, trees and hedgerows will be fully covered in the ecology section, changes to these habitats may have significant implications for landscape and visual interests. Information will therefore be shared and exchanged with the specialists undertaking the ecological assessment. Where tree removal is likely to affect the landscape or views, this will be assessed and illustrated within the relevant visualisations.

6.1.7 With respect to socio-economic interests, the landscape and visual assessment is concerned with the contribution of tourism and recreational features to the wider landscape and how both the setting of such features and views to and from them may be affected. This should then help inform the socio-economic assessment in terms of the area's tourism and recreation offer. Information will therefore be shared and exchanged with the specialists undertaking the socio-economic assessment.

6.1.8 Inter-relationships with other EIA topics may also arise with other EIA topics. These will be addressed on a case-by-case basis.

Consultations

6.1.9 A summary account of the consultations carried out throughout the development of the project will be provided within the ES. The landscape and visual assessment will respond to all relevant comments received. Advice has and will continue to be sought from NRW and PCC to inform the LVIA and CLVIA, including agreement on viewpoint locations and visualisation production and further refinement of the field based landscape and visual sensitivity appraisal.

Work Undertaken to Date

6.1.10 A large quantity of baseline data has already been acquired through desk and field surveys, which have been ongoing since September 2009, including the following:

- identification of the local landscape character for a number of route corridor options, including verification of published assessments and LANDMAP data;
- desk based assessment of landscape sensitivity to a 400 kV overhead line across the wider Mid Wales Connection Project study area;
- desk based Zone of Theoretical Visibility (ZTV) of the proposed 400 kV overhead line for each of the broad route corridors and various route options;
- field based landscape and visual appraisal of the sensitivity of the landscape to a 400 kV overhead line, along each of the broad route corridors, including considerations for overhead line routeing;
- field based visibility overview of the preferred route corridor and its surroundings, including identification of important visual receptors;
- an assessment of different technology options for the connection and their influence on routeing. This included an assessment of the advantages and disadvantages in landscape and visual terms of undergrounding parts of the connection in accordance with the NPS EN-5; and
- review of alternative pylon designs along the draft route.

6.1.11 In addition to assisting with the preferred route identification and appraisal process, and the on-going design of the proposed development, the above work has helped identify the study area for the EIA and the main landscape and visual issues to be considered. Much of it has already been consulted on and is available to view on National Grid's corporate website.

6.2 Assessment Methodology Overview

Guidance & Best Practice

6.2.1 The assessment will be carried out in accordance with Guidelines for Landscape and Visual Assessment Impact Assessment (GLVIA) published by the Landscape Institute and IEMA (Third Edition). GLVIA is the established good practice guidance for landscape and visual impact assessment.

6.2.2 The third edition was published in April 2013 and takes account of changes since 2002 when the second edition was published. Since then the UK has both signed and ratified the European Landscape Convention, which places new obligations on Government in dealing with landscape matters. Although the principles advocated in the third edition are broadly similar to the second edition, there is recognition that the previous guidance overemphasised the use of matrices and single word descriptions when arriving at judgements of significance. The third edition advocates a step by step process of evaluation, supported by clear, well-reasoned narrative text to allow the identification of significant effects to be as transparent as possible. For the purposes of the landscape and visual assessment methodology set out in this section of this Scoping Report, any reference to GLVIA is a reference to the 2013 third edition.

6.2.3 In addition to the GLVIA, the following guidance and sources of information will be taken into account together with relevant update and/or other relevant material or information provided by consultees and stakeholders throughout the project's development:

- Cadw and English Heritage, Register of Historic Parks and Gardens;
- Cadw and the Countryside Council for Wales, Register of Historic Landscapes in Wales;
- Countryside Agency and Scottish Natural Heritage, Landscape Character Assessment: Guidance for England and Scotland, 2002;
- Countryside Agency with support from English Heritage, Character of England Landscape, Wildlife and Cultural Features Map, 2005;
- Countryside Council for Wales, Landscape Character Map for Wales, 2010;
- Landscape Institute, Photography and Photomontage in Landscape and Visual Impact Assessment: Advice Note 01/11, 2011;
- Landscape Institute/Institute of Environmental Management and Assessment, Guidelines for Landscape and Visual Impact Assessment 3rd Edition, 2013;
- National Grid, The Approach to the Design and Routeing of New Electricity Transmission Lines, 2011;
- National Grid Company, The Horlock Rules, NGC Substations and the Environment: Guidelines on Siting and Design;
- Natural Resources Wales, LANDMAP;
- Natural Resources Wales, LANDMAP Guidance Note 1: LANDMAP and Special Landscape Areas, 2013;
- Natural Resources Wales, LANDMAP Guidance Note 3: Using LANDMAP for Landscape and Visual Impact Assessment of Onshore Wind Turbines, 2013;
- Natural Resources Wales, LANDMAP Guidance Note 4: 'LANDMAP and the Cultural Landscape, 2013;
- Natural Resources Wales, LANDMAP Methodology: 'Guidance for Wales: Historic Landscape', 2013;

- Natural Resources Wales, LANDMAP Methodology: 'Guidance for Wales: Visual and Sensory', 2013;
- Parish of Kinnerley, Design Statement and Landscape Character Assessment, 2005;
- Powys County Council, Powys Landscape Character Assessment, 2008;
- Powys County Council, TAN 8 Annex D Study of Strategic Search Areas B (Carno North) and C (Newtown South), 2006;
- Scottish Natural Heritage and Countryside Agency, Topic Paper 6. Techniques and Criteria for Judging Capacity and Sensitivity, 2002;
- Scottish Natural Heritage, Assessing the Cumulative Impact of Onshore Wind Energy Projects, March 2012;
- Scottish Natural Heritage, Visual Representation of Wind Farms Good Practice Guidance, March 2006 (Under Review);
- Shropshire County Council, Historic Landscape Character Assessment, 2007;
- Shropshire County Council, The Shropshire Landscape Typology, 2006 and as updated;
- Shropshire Hills Area of Outstanding Natural Beauty Management Plan, 2009-2014;
- Snowdonia National Park, Snowdonia National Park Management Plan, 2012-2015;
- The Holford Rules: Guidelines for the Routeing of New High Voltage Overhead Transmission Lines with NGC 1992 and SHETL 2003 Notes; and
- Welsh Assembly Government, Technical Advice Note (TAN) 8: Planning for Renewable Energy, 2005.

Landscape and Visual Study Area

6.2.4 The study area for the assessment is defined as the area containing all of the likely significant landscape and visual effects of the proposed development.

6.2.5 Due to the height of pylons, the extent of the study area is primarily dependent on the visibility or of the proposed sections of overhead line. Visibility depends on a number of factors including: distance from the viewer; the extent to which topography, vegetation, buildings or other structures partially or completely block the view; the design of the pylons (particularly their solidarity); whether the pylons are backclothed or skylined; and the colour of the pylons compared to their background.

6.2.6 The proposed study area for the landscape and visual assessment has been informed in part by field assessment of the extents of visibility of existing 400 kV overhead lines by work being undertaken on other National Grid projects, and through extensive site appraisal work during the preceding routeing stages.

6.2.7 The work has determined that a pylon approximately 50m high may be visible up to 10km, particularly if it is skylined. However, in practice the main landscape and visual effects are likely to occur within 3–5km of the line and this is where attention will be focussed whilst being alert to potentially significant effects at a greater distance (including any potential effects beyond 10km). The study area for the assessment of the landscape and visual effects of the overhead line[14] sections of the proposed development will therefore extend to a maximum of approximately 10km from the edge of the draft route, although it is anticipated that the majority of likely significant effects will be within 3-5km.

[14] For the purposes of this scoping report any reference to overhead lines should be taken to mean all temporary and permanent works associated with the substation and any above ground cable related infrastructure, for example sealing end compounds and link pillars.

6.2.8 In the absence of specific guidance on the assessment of underground cables, it is assumed that their likely effects will arise along the route of the underground cable and across areas of land required to install the cables or along construction access routes. The installation of cables may require the felling of trees, removal of hedgerows or changes to other landscape features along their length and these may be visible from the surrounding area. Based on the local landform and an understanding of the potential visibility gained through ongoing field survey work, the study area for the assessment of landscape and visual effects will extend to a maximum of approximately 2km from the edge of the draft route. It should be noted that the landscape and visual effects of installing underground cables are likely to be short- term and reversible as disturbed land can usually be reinstated to match their surroundings within a year (restoration of semi-natural areas may take longer).

6.2.9 For the residential visual amenity assessment, a study area extending approximately 300m from the edge of the draft route has been consulted on with NRW and Powys CC. Beyond this distance the pylons may give rise to significant adverse visual effects but are unlikely to cause a change in outlook which would materially harm residential amenity or living conditions.

Baseline Context

6.2.10 This will comprise a description and appraisal of the existing landscape and visual conditions of the EIA study area (as defined above). It is the baseline against which the landscape and visual changes arising from the proposed development will be described and assessed. For the purposes of LVIA it will include the consented Tirgwynt Wind Farm which is currently under construction.

6.2.11 The assessment will be undertaken through a combination of desk-study and field observation to identify and record the character of the landscape, and the elements, features and aesthetic and perceptual factors which contribute to it, and will include:

- a review of relevant local planning policy and designated features;
- identification and clear description of the existing landscape;
- a description of the pressures for change being exerted on the landscape;
- a field based assessment of the landscape sensitivity and value of the landscape along and to either side of the draft route (the width of the area to be assessed will depend on the landform and other characteristics of the local landscape) to a 400 kV overhead line, based on criteria relating to landscape susceptibility and value; and
- an understanding of the areas from which the proposed development may be visible: the different groups of people (visual receptors) who may be affected, including an estimate of their relative numbers; the places that will be affected; and the nature of the views and visual amenity currently experienced at those locations. Aspects of particular importance in this respect will be views from settlements, historic landscapes and features, important routes, tourist/ visitor attractions and promoted viewpoints.

Overview of the Existing Landscape

6.2.12 The proposed development runs from the open upland plateau west of Cefn Coch in a north-easterly direction across the English border to the existing National Grid 400 kV overhead transmission line near Lower Frankton east of Oswestry. This is a distance of approximately 54km (33 miles).

6.2.13 The landscape through which the proposed development passes displays differing landscape characteristics. At the southern end of the proposed development near Cefn Coch, is a high undulating moorland plateau lying around 400m AOD (Above Ordnance Datum). Descending the north-eastern edge of this plateau, the proposed development

runs through the Montgomeryshire Hills, a series of rolling ridges and valleys, which are aligned in a south-west to north-east orientation and mark the transition between the upland landscapes of Wales and the gentler lowland landscapes of the English Midlands. Lying between 200-300m AOD, the ridges and steep slopes of these hills form a series of sinuous skylines which are often well-wooded.

6.2.14 The Montgomeryshire Hills are drained by the upper reaches of the Rivers Severn and Vyrnwy and their tributaries, the Cain, Banwy, and Tanat. The Severn and Vyrnwy flow broadly eastwards towards a confluence near Crewgreen on the English border. Both rivers have carved broad valleys, with gently undulating valley floors, lying between 75-200m AOD.

6.2.15 Overlooking the Severn and Vyrnwy confluence is the distinctive profile and quarried scarp face of Breidden Hill, which rises abruptly out of the Severn Valley near Welshpool to around 400m AOD. Its summit affords panoramic views over the Shropshire Plain and Montgomeryshire Hills. On the opposite (west) side of the Severn Valley, Llanymynech Hill (approximately 225m AOD) has been quarried since pre-Roman times and is a local Heritage Area.

6.2.16 East of the border, the landscape in England becomes flatter, lower lying (around 60-130m AOD) and larger in scale. The lowest land is associated with the River Severn floodplain, whilst away from the rivers a series of low sandstone ridges around the northern end of the proposed development are the location for some large designed parkland landscapes.

6.2.17 With the exception of the moorland plateau at the southern end of the proposed development, the area includes many dispersed small villages, hamlets and individual properties.

6.2.18 The regional transport and communications pattern principally comprises the A458, A495, A490, A483 and A5, the Shrewsbury to Oswestry rail line and the Montgomery/Shropshire Union Canal, all of which follow the main valleys. These roads are supplemented at a local level by many secondary 'B' roads and a dense network of minor roads, lanes and access tracks.

6.2.19 Nationally designated landscapes within the wider area include Snowdonia National Park, the Shropshire Hills Area of Outstanding Natural Beauty (AONB); national trails including Offa's Dyke, Glyndŵr's Way and Sustrans Cycle Route 81 and Open Access Land designated under the Countryside and Rights of Way Act (CroW), 2000.

6.2.20 The Vale of Montgomery Registered Historic Landscape and some of the designed parks and gardens in the area are included within Part 2 of the Register of Landscapes, Parks and Gardens of Historic Interest in Wales. Although not formally designated, these are considered by many cultural heritage specialists to be of national value. They will be considered fully within the cultural heritage assessment, but will also be included as valued receptors within the LVIA.

Designated Landscapes

6.2.21 Designated landscape features include Snowdonia National Park which is located to the north-west of the study area. At its closest point, it lies approximately 14km from the draft route and the Shropshire Hills Area of Outstanding Natural Beauty (AONB) which is located to the east of the study area on the English/Welsh border. At its closest point, it lies approximately 17km from the draft route.

Other Designated & Undesignated Features (which have a Landscape Aspect)

6.2.22 Other designated and undesignated features which add to the character and value of the landscape or are evidence that the landscape is valued for recreational activity where experience of the landscape is important include: Open Access Areas identified under CroW; the Vale of Montgomery Registered Historic Landscape; Bryngwyn and Pradoe

Registered Historic Parks and Gardens; some ancient sites which are Scheduled Ancient Monuments; national and regional trails such as Offa's Dyke Path, Glyndŵr's Way and Sustrans National Cycle Route 81.

Locally Valued Landscapes

6.2.23 Locally valued landscapes include important views (e.g. Breidden Hill and Llanymynech Hill); landscapes experienced from important tourist and recreation routes (e.g. Moel Bentyrch from the A458 west of Llanfair Caereinion, the Montgomery/Shropshire Union Canal); designed landscapes (Tedsmore, Aston Hall, Woodhouse and Halston Hall); landscapes valued for their cultural associations or distinctiveness (for example, the Meifod Valley); and notable landscape features and characteristics of the landscape especially trees and woodlands.

Landscape Character (including pressures for change)

6.2.24 The landscape through which the draft route passes displays differing landscape characteristics, ranging from exposed uplands in the south, through the rolling farmland of the Montgomeryshire Hills, and on to the large scale low lying floodplains of the rivers Severn and Vyrnwy. The range of different landscape will be based on a review of existing assessments including LANDMAP, the Powys Landscape Character Assessment, the Shropshire Landscape Typology and any local assessments such as that produced by the Parish of Kinnerley.

6.2.25 The proposed development lies within or close to four of the former Countryside Council for Wales (now Natural Resources Wales) regional landscape character areas identified in the Draft Landscape Character Map. The high land around Cefn Coch forms part of the Cambrian Mountains (Area 21). This merges north and eastwards into the Montgomeryshire Hills and Vales (Area 17). The lower lying ground to the east comprises the Severn Valley (Area 19), with the Shropshire Hills (Area 18) covering the Welsh part of the Shropshire Hills, including Long Mountain, the Breidden Hills and Moel y Golfa.

6.2.26 In England, the proposed development lies within or close to, three of the former Countryside Agency (now Natural England) national landscape character areas. The proposed development is located within the low lying Shropshire and Staffordshire Plain (Area 61), with the Oswestry Uplands (Area 63) lying to the west and the Shropshire Hills (Area 65) to the south.

6.2.27 When considering the baseline character of the landscape it is also important to understand what the landscape may be like in the absence of the proposed development. This means projecting forward any trends for change and how they may affect the landscape over time, accepting that this involves a degree of speculation and uncertainty. Current pressures for change being exerted on the landscape of the areaare primarily being experienced in the Welsh part of the study area with the pressure for wind farm development, particularly in and around TAN 8 SSA B. Should the indicative generating capacity for the TAN 8 areas be reached or exceeded, then this will have a significant effect on the character of the Powys' landscapes. There are a number of existing wind farms in the area, which serve as focal points in the landscape and other wind farms have either been consented or are in the planning system. The effect of multiple wind farms would be to potentially change the character of the landscape such that wind farms become its defining characteristic. To ensure that the LVIA deals with the worst case scenario, although this potential change will be noted, the proposed development will be assessed against the existing baseline landscape. The only proposed wind farm to be included in the baseline landscape will be the consented Tirgwynt Wind Farm as it is currently under construction.

Landscape Sensitivity

6.2.28 An initial landscape sensitivity appraisal which was undertaken prior to the identification of broad route corridors confirmed that much of the landscape is of medium-high to high

sensitivity to 400 kV overhead line proposed development. The areas of high sensitivity are typically the small scale landscapes of the Montgomeryshire and Shropshire Hills, whilst the areas of medium-high relative sensitivity are associated with the floodplains of the large river valleys. The expansive, low lying landscapes of the Shropshire Plain tend to be of medium sensitivity.

6.2.29 A Field Based Landscape and Visual Sensitivity Appraisal of the landscape to a 400 kV Overhead Line was produced as part of the route corridor development and appraisal (see Appendix 6.1). This concluded that the landscape through the Vyrnwy Valley past Meifod is of very high sensitivity to the proposed development. Areas of high sensitivity included the section of route corridor as it exits the substation and descends the edge of the moorland plateau near Cefn Coch and the crossing of the Banwy Valley near Four Crosses. The remainder of the route corridor was considered to be of medium-high or medium sensitivity, with the Wales/England border broadly marking the transition between the two.

Visual Amenity and Potential Visual Receptors

6.2.30 Visual receptors are the people who are potentially affected by changes to the view or visual amenity. They include residents, people who work in the area and people taking part in recreational activities, both residents, people working in the area and visitors. They also include people who are moving through the area and are likely to experience transient and therefore potentially sequential views.

6.2.31 In accordance with GLVIA, the baseline for assessing visual effects will establish the area in which the proposed development may be visible, the viewpoints from which people may experience views of the proposed development and the nature and approximate numbers or relative number of the different groups of people who will be affected by the changes in views or visual amenity.

6.2.32 A Visibility Overview Map for the proposed development was prepared during development of the draft route. A copy of this is included in Appendix 6.2. Taking the realistic worst-case scenario, the assessment of visibility was based on a 400 kV overhead line connection supported by approximately 50m high pylons. The survey looked at residential properties, 'A' and 'B' class roads, national and regional trails, recreational waterways and other recreational receptors, including parks and gardens, promoted viewpoints and static caravan parks. It identified whether these receptors had an open or filtered view of the proposed route corridor and therefore whether they were likely to have a view of a 400 kV overhead line within the route corridor. It also identified areas of the proposed route corridor where there was unlikely to be a view. The outcome of this survey will be used to inform the detailed alignment and assessment process. It will also be used at the stakeholder workshops to help identify and agree viewpoints for the LVIA.

6.2.33 The extent and pattern of visibility across the study area is typically a reflection of the landform and vegetation cover. The baseline assessment will therefore examine and describe the topography of the study area, the extent to which the landscapes of the study area are open or enclosed and the distribution of woodland and tree cover, taking the winter months as the worst case scenario.

6.2.34 More detailed information on how it is proposed to map visibility and how it will continue to be used to inform the design proposed development is provided later in this section.

Potential Visual Receptors

6.2.35 The study area includes a mixture of towns, villages, hamlets and individual properties as well as transport routes, tourist, leisure and recreational facilities.

6.2.36 Based on the visibility work undertaken to date, including ongoing discussion with stakeholders, the following are some of the visual receptors likely to be affected by the proposed development. This list is not exhaustive and will be refined and where

necessary expanded throughout the design of the proposed development and in response to the input from stakeholder workshops.

- in addition to the smaller villages, hamlets and individual residential properties dispersed throughout the area, larger villages that could experience adverse visual effects include Pontrobert, Pentre/Meifod, Llansantffraid, Llanymynech, Four Crosses, Maesbrook, Woolston, Maesbury Marsh, West Felton, Lower Frankton and Welsh Frankton;
- the proposed development could affect transient views from sections of the road and rail network, including westerly views of Moel Bentyrch from the A458, a popular tourist route;
- the proposed development could affect views from Offa's Dyke Path, Glyndŵr's Way, Sustrans National Cycle Route 81, Open Access Areas and Registered Common Land;
- the proposed development could affect views from the Montgomery / Shropshire Union Canal. It crosses a navigable section of the Canal between Four Crosses and Llanymynech and runs broadly parallel to a non-navigable section between Maesbury Marsh and Lower Frankton;
- the proposed development could significantly affect views from other recreational receptors, including the caravan parks in the Banwy Valley near Llanfair Caereinion and Vyrnwy Valley near Llansantffraid, and designed parks and gardens including Bryngwyn, Pradoe, Tedsmore, Aston Hall, Halston Hall and Woodhouse; and
- the proposed development could significantly affect views to and from popular viewpoints including Moel Bentyrch, Llanymynech Hill (and Heritage Trail) and to a lesser extent Breidden Hill.

Aspects of the Proposed Development Likely to Give Rise to Landscape and Visual Effects and Approach to Mitigation

6.2.37 This section will describe the aspects of the proposed development which could give rise to significant landscape and visual effects during the different stages of its life cycle. It will also include a description of the mitigation measures that have been incorporated into the development of the scheme thus far with the aim of avoiding, reducing and offsetting (or compensating) for significant adverse landscape and visual effects.

6.2.38 Potential landscape and visual effects during the construction phase may include:

- effects of tree felling and hedgerow removal required as a result of the proposed development. The combined landscape and visual effects of the removal of woodland may be significant;
- position and scale of areas of topsoil stripping, excavation/trenching, cut and fill, borrow, disposal and other working areas associated with construction areas;
- construction effects relating to the location and nature of access arrangements, on-site laydown areas and contractor's compounds;
- location of site access and haul routes (which may differ from permanent access proposals), movement of traffic and machinery; and
- cumulative effects of constructing the project when combined with the construction of other major developments in the area including the proposed wind farms and their 132 kV grid connections.

6.2.39 For the operational stage likely effects may include:

- effects of the proposed development on the landscape and on views. Linear developments such as overhead lines raise particular concerns about the totality of

disturbance and change resulting from the proposals on the combinations of landscape elements, features and characteristics that underpin overall landscape character and sense of place and the experience of the landscape for example perceptions of remoteness or tranquillity:

- effects of undergrounding or diverting any lower voltage overhead lines;
- planting restrictions over areas of underground cabling;
- removal and or wayleave maintenance of trees and vegetation;
- effects of mitigation measures, particularly new planting; and
- cumulative effects of the proposed development, particularly with respect to other overhead lines, the wind farms, transmission masts and small scale wind energy development, including single turbines.

6.2.40 The decommissioning stage may also give rise to landscape and visual effects arising from the dismantling of the overhead line section of the proposed development and other above ground infrastructure, ground reinstatement and the movement of materials and plant around the site, including temporary access arrangements.

6.2.41 The information provided in the ES will cross-reference back to the description of the proposed development set out in the introductory sections and will focus on features and aspects relevant to the assessment of landscape and visual effects.

Mitigation of Landscape and Visual Effects

6.2.42 Where there is scope for carrying out works which will help prevent, reduce and where possible offset any significant landscape and visual effects arising from the proposed development these will be considered. In practice, such mitigation measures are typically considered to fall into three categories:

- primary or 'embedded' mitigation measures which have been developed through the iterative design process and have become integrated mainstream components of the project's design;
- standard construction practices for avoiding and minimising environmental effects, which may include replanting of hedgerows removed to facilitate construction; and
- secondary mitigation measures which are designed to address any significant adverse effects remaining after primary measures and standard construction practices have been incorporated into the scheme. These are usually identified once the assessment has been completed.

Primary Mitigation

6.2.43 The primary mitigation measures and construction practices are an integral part of the overall design strategy of any development, not just 'add-on' measures to ameliorate significant environmental effects. In terms of the proposed development, National Grid has adopted a positive and pro-active approach whereby mitigation has been assessed and considered at all stages of the routeing process.

6.2.44 Sensitive routeing of the proposed overhead line and careful siting of the proposed substation in accordance with the Holford Rules and Horlock Rules as well as the proposal for a substantial section of underground cable in accordance with NPS EN-5 has been and will continue to be an integral part of the iterative design process. National Grid's aim has been to ensure that the proposed development takes account of environmental considerations and opportunities and achieves the optimum environmental fit as part of an environmentally integrated design. In addition to avoiding specific landscape and visual constraints, the proposed development has been developed to reduce likely significant effects where avoidance has not been possible. Such measures typically include minimising the need to remove areas of established broadleaved

woodland and optimising the opportunities for backclothing to help reduce the visibility of the proposed development, particularly the pylons. A high degree of landscape and visual embedded mitigation will therefore be in place at the time of the assessment.

6.2.45 During the ongoing design process, opportunities for mitigation through sensitive alignment and careful siting and design of pylons continue to be explored. The intention is to maximise use of screening landform and vegetation and where relevant identify any opportunities for new planting to help lessen any identified significant effects.

6.2.46 With respect to the proposed substation, sealing end compounds and above ground infrastructure associated with the cabled section of the proposed route, embedded mitigation in the form of landform modelling and native tree and shrub planting will be an integral part of the design. This will over time help to lessen the visual effects of these aspects of the proposed development.

Standard Construction Practices

6.2.47 These include measures such as vegetation protection around working areas in accordance with B5837 Trees in Relation to Construction (2012).

Secondary Mitigation Measures

6.2.48 Secondary mitigation measures are those that are considered following assessment of landscape and visual effects of the proposed development as the means of addressing effects identified during the EIA process as likely to be significant. The ongoing EIA is an iterative process and effects may be identified where specific mitigation is considered necessary. Any secondary mitigation measures will be clearly identified in the ES and the residual effects, taking into account this mitigation, will be assessed and clearly set out. Such measures typically include planting proposals in response to identified significant visual effects.

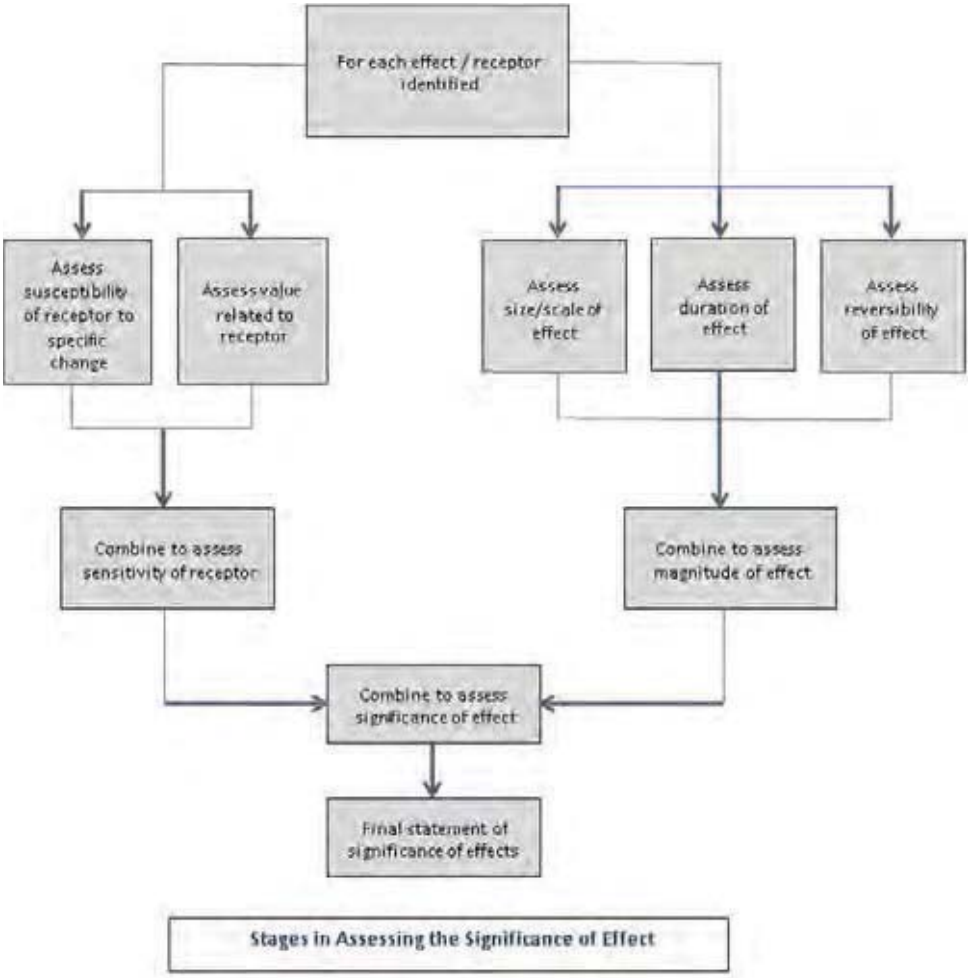
6.2.49 Residual effects are those effects which will potentially remain even with the secondary and other mitigation measures in place.

Identification & Assessment of the Effects of the Proposed Overhead Line

6.2.50 Once the baseline conditions are understood and the important aspects of the proposed development have been determined the LVIA will systematically assess the effects of the proposed development on:

- landscape character and valued landscapes;
- views and visual amenity from specific viewpoints; and
- residential visual amenity of individual and small groups of properties.

6.2.51 The assessment process will progress through a series of iterative steps which will identify and evaluate both the sensitivity of the receptor and the magnitude of the change likely to occur, as illustrated in the following flow chart, which is taken from GLVIA.



(Source GLVIA Figure 3.5)

Judgements of Significance

6.2.52 At each stage of the process the required judgements will be determined by a combination of quantitative and qualitative assessment based on professional opinion supported by a clearly explained rationale. The judgement will be made by experienced chartered landscape architects.

6.2.53 The level of landscape or visual effects is defined in terms of the relationship between the sensitivity of the landscape or visual receptor and the magnitude of effect. Effects which are considered to be moderate or major are considered more likely to be significant within the terms of the EIA Regulations. Any effect judged to be minor or negligible is considered less likely to be significant or not significant, particularly if reversible, of short duration, over a restricted area or to elements/aspects that contribute less to the landscape community value.

6.2.54 Whilst the predicted changes can be adverse or beneficial, the appearance of the proposed development and the nature of the landscape in which it is located means that its effects are likely to be perceived as adverse. Even with mitigation and any additional enhancement measures in place, the overhead line is likely to be perceived as a potentially discordant man-made feature in what is essentially a rural landscape.

6.2.55 The landscape and visual assessment will consider a range of issues relevant to a specific series of landscape and visual receptors and representative viewpoints. This will allow conclusions to be drawn about the more general effects of the proposed overhead line (both on its own and in combination with other proposed developments) on the

landscape and visual resource of the study area, including a consideration of the potential for sequential effects.

6.2.56 The remainder of this section sets out in more detail the methodology for assessing the landscape and visual effects of the proposed development.

6.3 Assessing Landscape Effects

6.3.1 Landscape effects result from physical changes to the fabric of the landscape arising from the proposed development, such as the addition, removal or alteration of landscape elements and aesthetic or perceptual characteristics that make a particular landscape distinctive.

6.3.2 Landscape character assessment considers the effects on the individual components (both physical and aesthetic or perceptual) of the landscape as well as on its overall character.

6.3.3 Effects on the landscape can result from:

- direct physical changes to landscape elements or features (such as removal of trees to facilitate construction);
- changes to how the landscape is experienced particularly those arising from the introduction of man-made elements into a landscape perceived as unspoilt, tranquil or remote;
- changes to the overall character, quality and condition of the landscape resulting from changes to its particular combination of elements, and aesthetic and perceptual aspects;
- changes to valued landscapes including those that are statutorily designated landscapes or landscapes of recognised value for example Historic Landscapes and Historic Parks and Gardens on the registers compiled by Cadw/NRW and ICOMOS and regionally/nationally promoted tourism/recreation sites and routes.

6.3.4 By considering the nature or sensitivity of the landscape, the nature and degree of change predicted and the variation in these factors along the length of the proposed route, the landscape assessment will identify these effects and their implications for the integrity and character of the landscape as a whole,

Assessing the Sensitivity of Landscape Receptors

6.3.5 Landscape sensitivity is determined by combining an assessment of the susceptibility of the landscape to change arising from the proposed development with a judgement about the value attached to the landscape.

6.3.6 Susceptibility to change means the ability of the landscape or its individual components to accommodate the proposed development without undue negative consequences for the maintenance of the baseline situation.

6.3.7 Many factors contribute to the susceptibility of the landscape to the development of a 400 kV connection. Each landscape has its own important characteristics or combinations of elements and features which define its character and help to give an area its particular characteristics or sense of place and each of these characteristics can have different susceptibilities to the type of change likely to arise.

6.3.8 The relative value or importance attached to an area of landscape is similarly a reflection of many factors. In a policy context the usual basis for recognising highly valued landscapes is through the application of local or national designations. GLVIA recognises that although an area of landscape may not be designated, this does not mean it has no value. Similarly the European Landscape Convection promotes the need to consider all landscapes, with less emphasis on the special and more recognition that ordinary landscapes also have their value. In non-designated landscapes the aim is to identify the

value of the landscape at a specific scale, identify the receptors to which it is important, and the reasons why the landscape is important to them.

6.3.9 A range of factors can assist the identification of valued landscapes. These can be based on existing evidence such as landscape character assessments, planning policies, landscape strategies and guidelines or data derived from new survey and analysis. LANDMAP is the formally adopted landscape assessment in Wales and for the Welsh part of the study area, the five overall evaluations provided for each aspect area will be examined to see where there are concentrations of more highly valued landscapes. For the English part of the study area we will discuss with stakeholders the most appropriate way to assess the value of the landscape with a view to ensuring an approach which is consistent with LANDMAP.

6.3.10 As noted in GLVIA, value can apply to landscape as a whole or to the individual elements, features and aesthetic or perceptual dimensions which contribute to the overall character of the landscape. Landscapes may be valued at the community, local, regional, national or international level and to some degree will reflect the landscape designations which apply. Table 6.1 sets out some of the criteria which may be applied:

Table 6.1: Importance of Landscape Receptors

Level of Importance	Typical Examples
International	Internationally valued landscapes recognised as World Heritage Sites
National	Nationally valued landscape such as National Parks, AONBs, landscapes of equivalent value such as Registered Historic Landscapes (Wales only), Registered Historic Parks and Gardens (Grade I and II*), LANDMAP areas evaluated as outstanding
Local	Locally valued landscapes such as those covered by a local landscape designation or landscapes assessed as being of equivalent value such as Registered Historic Parks and Gardens (Grade I and II*)
Community	Landscapes that are not locally or nationally designated, or judged to be of equivalent value but are nevertheless highly valued by the local community

6.3.11 The relationship between the value attached to the landscape and its susceptibility to change is complex. GLVIA (para. 5.4.6) notes that valued landscapes do not, automatically or by definition, have high susceptibility to all types of change. It is possible for an internationally, nationally or locally important landscape to have relatively low susceptibility to change resulting from the particular type of development, by virtue of both the characteristics of the landscape and the nature of the proposal. The particular type of change or development proposed may not compromise the specific basis for the value attached to the landscape. Nevertheless, whilst value does not necessarily equate with suitability or lack of suitability for the proposed development, it does help inform wider judgments of sensitivity and significance of effect and will therefore be included in the assessment process as described below.

6.3.12 In order to take into account the specific local context, a Field-Based Landscape and Visual Sensitivity Appraisal of the proposed route corridor to a 400 kV overhead line on pylons approximately 50m high was undertaken, representing a 'typical' scenario, and issued as part of the consultation process (see copy in Appendix 6.1). This identified a number of criteria linked to guidance provided the Holford Rules which were used to assess the susceptibility of the landscape to the changes likely to arise from the introduction of a 400 kV overhead line. These criteria were applied to the draft route corridors being considered and provided an overall judgement of the relative sensitivity of

the landscape along them using five-tiers of categorisation, high, medium-high, medium, medium-low, and low.

6.3.13 The appraisal has since been reviewed with NRW and PCC (April 2014) and an updated version of the methodology is being prepared. This also reflects the latest guidance on sensitivity appraisals provided in GLVIA, which includes the requirement to consider the relative value of the landscape. The field based landscape and sensitivity appraisal will be revisited and refined in the light of this updated methodology and the output used as the baseline for the landscape assessment and to inform the identification of mitigation measures.

Making Judgments

6.3.14 Landscape characteristics and values do not readily lend themselves to scoring, and different criteria may carry different weights in different types of landscape and with different types and scales of development. Instead, professional judgement supported by reasoned explanation will be used to categorise the landscape into one of five tiers of sensitivity as defined in Table 6.2.

Table 6.2: Categories of Landscape Sensitivity to 400 kV Overhead Line

Sensitivity	Typical Criteria
High	Landscapes, which taking into account their character and general visibility are highly vulnerable to any changes likely to arise from the proposed development. The proposed development conflicts directly with landscape character.
Medium - High	Landscapes, which taking into account their character and general visibility are vulnerable to any changes likely to arise from the proposed development of an overhead line. Few aspects of the proposed development relate to landscape character.
Medium	Landscapes, which taking into account their character and general visibility can potentially absorb some of the change likely to arise from the proposed development. Some aspects of the proposed development relate to landscape character.
Medium - Low	Landscapes, which taking into account their character and general visibility can reasonably accommodate more of the change likely to arise from the proposed development. Overhead line proposed developments only raise some conflict with landscape character.
Low	Landscapes, which taking into account their character and general visibility can accommodate more of the change likely to arise from the proposed development. The proposed development raises few conflicts with landscape character.

Assessing the Magnitude of Landscape Effects

6.3.15 Magnitude of effect relates to the likely nature and scale of changes to landscape elements, features and characteristics arising from the proposed development and the consequential effects on overall landscape character. The nature of change predicted for a linear development can vary from a major or fundamental alteration to some aspect of the landscape through to a localised alteration which has a detectable but relatively insignificant effect on the character of the landscape.

6.3.16 Each effect on landscape receptors will be evaluated against the baseline landscape in terms of its size or scale, the geographical extent of the area influenced and its duration and reversibility as explained in GLVIA (para. 5.49).

6.3.17 The magnitude of likely change will be determined by considering the predicted deviation from baseline conditions and the scale of the effect arising from the proposed development. In the case of landscape and visual effects, this can only be assessed qualitatively, but as explained by GLVIA (para. 5.49) it is typically based on a consideration of the following:

Size or Scale

- the extent of existing landscape elements that will be lost, the proportion of the total extents that this represents and the contribution of that element to the character of the landscape – in some cases this may be quantified;
- the degree to which aesthetic or perceptual aspects of the landscape are altered either by removal of existing components of the landscape or by addition of new ones – for example, removal of hedges may change a small-scale intimate landscape into a large-scale, open one, or introduction of new buildings or tall structures may alter open skylines; and
- whether the effects change the important characteristics of the landscape, which are critical to its distinctive character.

Geographic Extent

6.3.18 This is distinct from consideration of size or scale and varies depending on the project. GLVIA (para. 5.50) notes that effects are typically felt at the following scales:

- at the site level, within the development site itself;
- at the level of the immediate setting of the site;
- at the scale of the landscape type or character area within which the proposal lies; and
- on a larger scale, influencing several landscape types or character areas.

Duration and Reversibility

6.3.19 The duration of effect will be recorded separately and will not influence the assessment of magnitude. For example it may be possible for construction activities to result in a high magnitude of effect on the landscape albeit that such effects may be temporary.

6.3.20 In referring to duration of effects the following terminology applies:

- Short term – zero to five years;
- Medium term – five to fifteen years; and
- Long term – over fifteen years.

6.3.21 Based on the above considerations, the potential magnitude of landscape effects resulting from the proposed overhead line will be evaluated using the criteria presented in Table 6.3. This is adapted from a table in GLVIA 2nd edition (2002, p145) as the current GLVIA does not provide a comparable table.

Table 6.3: Categories of Magnitude of Effect

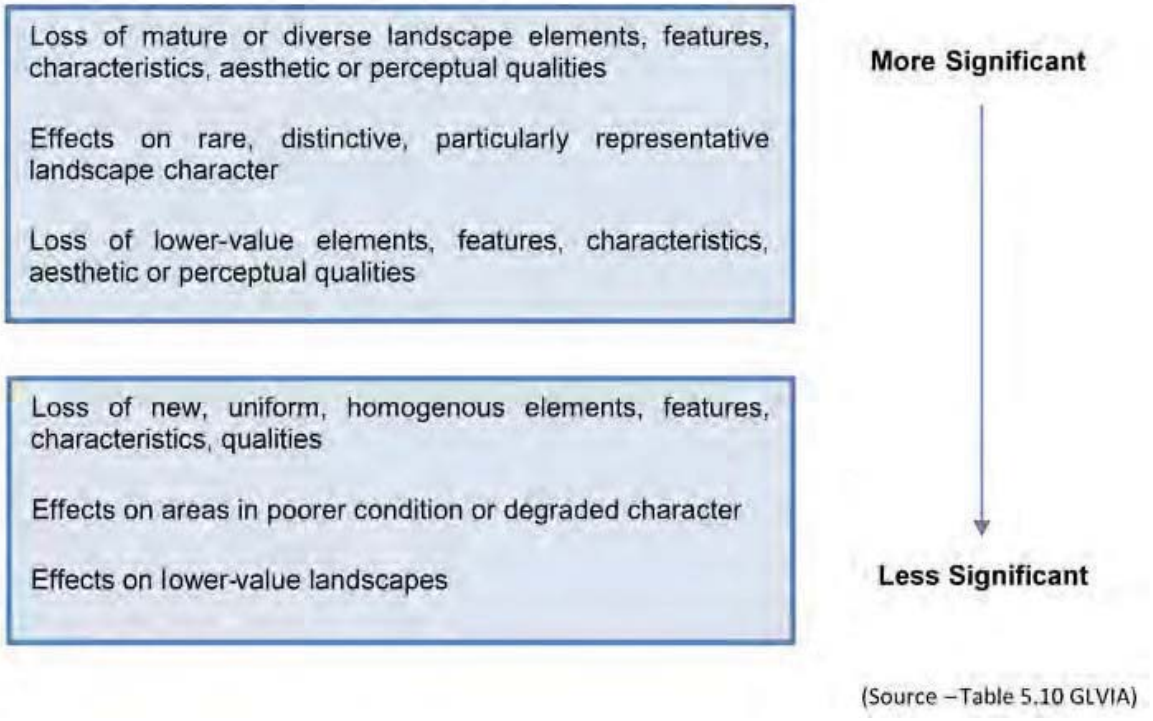
Magnitude of Landscape Effect	Typical Criteria
High	Total loss or major alteration to features/elements/characteristics of the baseline landscape or its overall character and how this is perceived and/or introduction of features considered to be totally uncharacteristic when set within the attributes of the receiving landscape. In a designated landscape, the proposed development is likely to affect the integrity of the designation or the reasons for why it is designated.
Medium	Partial loss or alteration to features/elements/characteristics of the baseline landscape or its overall character and how this is perceived and/or introduction of features that may be prominent but may not necessarily be considered to be substantially uncharacteristic when set within the attributes of the receiving landscape.
Low	Minor loss or alteration to features/elements/characteristics of the baseline landscape or its overall character and how this is perceived and/or introduction of features that may not be uncharacteristic when set within the attributes of the receiving landscape.
Negligible	Very minor loss or alteration to features/elements/characteristics of the baseline landscape or its overall character and how this is perceived and/or introduction of elements that are not uncharacteristic with the surrounding landscape – approximating the 'no change' situation.

Assessing the Significance of Landscape Effects

6.3.22 Having identified the magnitude of effects, the significance of these effects will be evaluated by combining the judgement on the sensitivity of the landscape with the judgement of the magnitude of effect to allow a final judgement to be made about whether each effect would potentially be significant in terms of the EIA Regulations.

6.3.23 There is no specific definition in any guidance as to what constitutes a significant landscape or visual effect in a broad planning context and what weight should be attached to it. GLVIA requires the assessment of significance to be clearly defined and for any judgements to be as transparent as possible and provides a gradation of significance as illustrated in Table 6.4: Scale of Significance of Landscape Effects.

Table 6.4: Scale of Significance of Landscape Effects.



6.3.24 The final overall judgement of the likely landscape effects will be summarised in a series of four categories of significance – major, moderate, minor, negligible. In addition, a final statement summarising the most significant effects that are likely to influence the outcome of the decision making process will be provided.

6.3.25 A landscape will not necessarily be significantly adversely affected if the proposed change can be accommodated (e.g. if it can be comfortably set into the landform and pattern of the landscape), and/or if mitigation consistent with its character can be effectively applied to help assimilate the new project into the landscape. Conversely, effects may be more significant in a landscape where the scheme cannot be readily accommodated or where mitigation and integration are more difficult. In general, more significance is likely to be placed on large scale, long term or permanent changes, particularly in combination with a highly sensitive landscape, than small short term temporary ones small changes or changes involving features already present within the view.

Approach to Mitigation & Assessment of Residual Effects

6.3.26 As noted previously where potential landscape effects are judged to be significant, proposals for offsetting or compensating for them will be identified and a judgement of the likely remaining residual (remaining) significant effects made.

6.4 Assessment of Visual Effects

6.4.1 Visual effects assessment is the assessment of effects on views and visual amenity as experienced by people (visual receptors). This may include people living or working in the area, people passing through on various forms of transport, people visiting promoted landscapes or attractions and people engaged in different types of recreation.

6.4.2 The assessment will consider the likely significant effects of the proposed development from a series of specific viewpoints with the aim of identifying changes in the content or character of views and overall visual amenity as a result of loss of existing landscape features, elements or characteristics and/or introduction of new man-made structures. The assessment will be undertaken iteratively with the micro-routeing of the proposed development to ensure that visual intrusion is minimised.

Mapping Visibility

6.4.3 The first stage in the assessment process is to establish the areas from which the proposed development may be seen and the extent and nature of existing views from those areas.

6.4.4 This involves defining the zone of visual influence, which is the area from which it is estimated that the proposed development will be visible. This was undertaken initially through analysis of landform, followed by extensive field survey to identify features which might screen views and to identify potential visual receptors. The output of this work was a field based visibility overview of the preferred route corridor and its surroundings, including identification of principal visual receptors.

6.4.5 A computer generated ZTV has been produced to help identify areas from where the proposed development may be visible. Included in Appendix 6.3 the ZTV provides a realistic worst-case scenario for the visibility of the proposed development. This is because although it takes account of buildings and woodlands, the ZTV gives no indication of the likely effect of distance. This inevitably reduces actual visibility. The ZTV also makes no allowance for weather conditions such as rain, mist or haze, background or foreground, which have an influence on the actual visibility of an overhead line.

6.4.6 Despite this the ZTV included in Appendix 6.3 was used throughout the design and assessment process as a working tool to help compare the visibility of the various route and substation siting options and to help mitigate its potential effects.

6.4.7 The assessment of effect on views will also be informed by analysis of landform, desk top studies of Ordnance Survey (OS) plans and Google Earth, and further field survey both to identify features which may screen potential views and to identify potential visual receptors. Field survey work for the visual assessment will be carried out at the same time as the landscape assessment. No access to properties will be sought and the assessment will therefore be based on the predicted view from publicly accessible locations.

Visual Receptors

6.4.8 To make judgements about the significance of effects on visual receptors it is necessary to identify the people who will be affected by the changes to their view or visual amenity. These are referred to as ‘visual receptors’. Each visual receptor likely to be affected at a particular place has then to be assessed in terms of both their susceptibility to changes in their view and also the nature of the view and the value attached to it. Where possible an estimate is also made of the relative numbers of people likely to be affected in each case. The assessment of significance is determined by combining the sensitivity of each visual receptor with the magnitude of the change predicted to arise.

Selection of Viewpoints

6.4.9 A draft list of viewpoints has been identified and is in the process of being agreed with NRW and PCC as part of the scoping stage stakeholder consultations. The draft list is provided as a schedule and shown on plans contained within Appendix 6.4. For each viewpoint record is made of the viewpoint location, general direction and angle of view, optimum viewing distance and reasons for its selection.

6.4.10 Viewpoints have been deliberately selected to give a sample of:

- a balance of viewpoints from either side of the proposed development;
- a proportion close to the proposed development (where pylons are in the foreground and middle ground of the view);
- a similar proportion further away from the proposed development (where pylons are in the middle ground or background of the view);

- a proportion looking along the line (where a number of pylons may be seen 'stacking' behind each other) as well as across to the line where only one pylon may be visible;
- views from residential areas;
- views from important recreational resources and landscapes of particularly noteworthy visual and/or recreational amenity including landscapes with statutory landscape designations;
- important historic or cultural sites where people are likely to appreciate the wider landscape setting of the site[15];
- cultural landscape associations; and
- locations where cumulative views may be experienced.

6.4.11 Locations where a greater number of viewers may be present, such as main roads, holiday parks, and edges of settlements have also influenced the selection for viewpoint locations.

6.4.12 The selection of viewpoints is therefore not a representative sample of all potential visual receptors, but is deliberately biased to be representative of the most sensitive visual receptors – namely residential areas and valued landscapes/sites/routes.

Assessing the Sensitivity of Visual Receptors

6.4.13 In addition to identifying locations from where the proposed development will be seen, the viewpoints also identify the different groups of people who will potentially be affected at that particular location. The sensitivity of these different groups will then be determined by combining an assessment of their susceptibility to changes in their view with a judgement on the value attached to their particular views to give an overall judgement on the sensitivity of the viewpoint graded on a four point scale of very high, high, medium and low.

6.4.14 People generally have different susceptibilities to changes in their view depending on the activity they are engaged in and the extent to which their attention may be focused on the view at a particular location. Certain activities or locations may be specifically associated with the enjoyment and appreciation of the landscape, for example footpaths, tourist or scenic routes and views to and from valued landscapes. GLVIA indicates that the most susceptible receptors may include:

- residents in individual properties or settlements (but see below);
- communities where views contribute to the visual amenity or landscape setting enjoyed by residents in the area;
- people engaged in outdoor informal recreation whose attention or interest is likely to be focused on the landscape or on particular views; and
- visitors to historic assets where views of the surrounding landscape make an important contribution to the experience;

6.4.15 Travellers on road, rail or other transport routes tend to fall into a moderate category of susceptibility unless the route is promoted as being particularly scenic or a tourist route in which case their susceptibility is considered high.

6.4.16 Visual receptors likely to be less susceptible to change include:

[15] Note that the effects on the historic setting of these sites will be covered in the archaeology and cultural heritage section of the ES.

- people engaged in outdoor recreation or sport which does not involve or depend upon appreciation of views in the landscape; and
- people at work whose attention is not be focused on their surroundings.

Value Attached to Views

6.4.17 A judgement will be made about the importance of the view at each viewpoint. This will take account of the value placed on that view for example, in relation to landscape designations or cultural heritage assets, locally valued landscapes (referred to in guidebooks, on tourist maps and by facilities such as car parks or viewpoints provided for its enjoyment). Views which are likely to be more highly valued include those to or from designated or recognised heritage and recreational sites, views to and from the edge of settlements or locations which represent the views of many receptors. Views which are not to or from any recognised designation and which would not be experienced by many receptors are typically considered less important.

6.4.18 The value or importance of the view will be assigned according to the following scale:

- National;
- Regional;
- Local; and
- Community.

6.4.19 An example of a nationally important view might be an important view to or from a nationally designated landscape or heritage site such as Offa's Dyke. A regionally important view might be one to or from a tourist attraction considered to be a regionally important feature, such as views from a country park. A view of local importance might be one from an area of locally designated landscape, which is valued in published documents at a borough/district scale or a view representing the views of many (such as the view from the edge of a settlement or a particular footpath). Views which are not to or from any recognised designation and which do not represent the views of many might still be considered important at the community scale.

Visibility of Objects in the Landscape

6.4.20 The visibility of an object in the landscape depends on a range of factors. These include: the distance from the viewer to the object; the extent of screening provided by intervening landform, structures or trees, the degree of solidity of the object and its general mass or bulk; the colour of the object and how well it blends in with its surroundings and the extent to which the object sits above or below the horizon. In addition the degree of 'landscape fit' also affects its visibility.

6.4.21 The distance from the viewer to the object is an important consideration with respect to visibility. The apparent height of an object diminishes with distance although the scale of comparison between objects remains the same. For traditional pylons the open steelwork of the lattice pylon allows the background to be seen through the structure and the effect of the presence of the structure lessens as the distance from the viewer increases. In normal weather conditions pylons are not normally observed by the average viewer at distances greater than 10km which is why this is the initial cut-off for the ZTV and for the landscape and visual assessment as explained previously in this section.

6.4.22 Due to the height of the pylons, screening of the overhead line will generally only be effective when the features providing the screening are located close to the viewer. Screening features at a distance from the viewer will be less effective in containing views. Pylons of this size will be visible above the tops of woodland, trees and most buildings found in the area.

6.4.23 By permitting the background area to be viewed through the structure, open lattice steel pylons are less visible than solid structures of the same size and this will be explored

further during considerations as to where (if anywhere) along the proposed route to use the shorter but more solid T-Pylon rather than traditional lattice pylons.

6.4.24 Where the background is a varied colour or pattern, this is more effective in reducing the visual effects of pylons than where the background is a uniform colour such as occurs with conifer plantations. Similarly where the background is distinctly darker or lighter than the pylons, the visibility will be increased.

6.4.25 The degree of skylining is an important factor influencing the visibility of the proposed development. Where objects including pylons are seen against a backdrop of sky, they are more visible than those seen against a solid backdrop such as landform or vegetation. Skylining can increase the visibility of pylons. Backdropping of lattice steel pylons is more effective where the distance from the pylon to the background area is less than or equal to the distance from the viewer to the pylon.

6.4.26 The principle of intervisibility will be used in the assessment of visibility, whereby locations visible from the proposed development would also have views back to the pole once constructed. The assessment will be undertaken during the winter when the proposed development will be most visible.

Assessing the Magnitude of Visual Effects

6.4.27 The magnitude of likely change will be evaluated in terms of its size or scale, geographical extent, duration and reversibility.

6.4.28 In the case of landscape and visual effects, this can only be assessed qualitatively, but as explained by paragraph 6.39 of GLVIA it is usually based on a consideration of the following factors:

Size or Scale

- the scale of the change in the view with respect to the loss or addition of features in the view and changes in its composition, including the proportion of the view occupied by the proposed development;
- the degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of form, scale and mass, line, height, colour and texture; and
- the nature of the view of the proposed development, in terms of the relative amount of time over which it will be experienced and whether views will be full, partial or glimpses.

Geographical Extent

6.4.29 In terms of geographical extent, the distance over which visual receptors are likely to experience a significant effect varies depending on the location of the viewpoint. GLVIA (para. 6.40) notes that it is likely to reflect:

- the angle of view in relation to the main activity of the receptor;
- the distance of the view from the proposed developments; and
- The extent of the area over which the changes would be visible.

6.4.30 Based on the above considerations, the magnitude of visual effects will be assessed using the criteria presented in Table 6.5. This is adapted from a table in GLVIA 2nd edition (2002, p145) as GLVIA does not provide a comparable table.

Table 6.5: Definition of Magnitude of Visual Effects

Magnitude of Visual Effect	Typical Criteria
High	The proposed development would dominate and completely change the view and make the observer feel uncomfortable. This category is likely to include multiple structures in close proximity to the viewer (<300m from the edge of the draft route).
Medium	The proposed development is clearly visible and would form a noticeable but not defining feature of the view. This category is likely to include pylons seen against a backcloth or skylined at a fairly close distance less than 3km
Low	The proposed development would be visible but would recede into the wider view and would not appear intrusive. This category is likely to include pylons seen against a backcloth at a distance beyond 3km.
Negligible	The proposed development would be barely visible and would appear as a small feature belonging to a distant landscape or view – approximating the 'no change' situation.

6.4.31 The duration of effect will be recorded separately and will not influence the assessment of magnitude. For example it may be possible for construction activities to result in a high magnitude of effect on views albeit that such effects will be temporary.

6.4.32 The duration of effect will be recorded separately and will not influence the assessment of magnitude. For example it may be possible for construction activities to result in a high magnitude of effect on the landscape albeit that such effects may be temporary. In referring to duration of effects the following terminology applies:

- short term – zero to five years;
- medium term – five to fifteen years; and
- long term – over fifteen years.

Assessing the Significance of Visual Effects

6.4.33 The significance of visual effects will be assessed by combining the judgement on the sensitivity of the receptor with the judgement of the magnitude of effect to allow a final judgement to be made about whether each effect is likely to be significant in terms of the EIA Regulations.

6.4.34 There is no specific definition in any guidance as to what constitutes a significant landscape or visual effect and what weight should be attached to it. GLVIA requires the assessment of significance to be clearly defined and for any judgements to be as transparent as possible. In arriving at a judgement, general guidance in GLVIA (para. 6.44) will be adopted as follows:

- Significant effects are more likely to arise from changes affecting people who are particularly sensitive to changes in views, particularly occupiers of residential properties or people living in or visiting particularly tranquil or remote landscapes;
- Changes in views affecting people at recognised and popular viewpoints (including designated landscapes) or from recognised scenic or tourist routes are likely to be more significant than changes affecting other, less important viewpoints;

- Changes affecting large numbers of people are generally likely to be more significant than those affecting a relatively small group of users; and
- Large scale changes, which introduce new or discordant or intrusive features into the view are more likely to be significant than small changes or changes involving features already present within a view.

6.4.35 The final overall judgement of the predicted effects on views and visual amenity will be summarised in a series of four categories of significance – Major, Moderate, Minor, Negligible. In addition, a final statement summarising the most significant effects that are likely to influence the outcome of the decision making process will be provided.

Assessing Residential Visual Amenity Effects

6.4.36 Effects of development on private residential properties are increasingly assessed through 'residential amenity assessments' which also include consideration of other factors such as noise, light and vibration. These are separate from LVIA, although visual effects assessment is often carried out as part of a residential amenity assessment. In recognition that residents are typically particularly susceptible to changes in their views, the likely effects on all individual and groups of properties within 300m of the edge of the draft route for the overhead line will be assessed sung the methodology described for the LVIA above.

6.5 Assessing Cumulative Effects

6.5.1 The cumulative landscape and visual assessment (CLVIA) will deal with the effects of the proposed development interacting with the effects of other proposed developments in the area. This is in recognition that the combined effects of a number of similar developments concentrated in one area may be greater than the sum of the effects from the same developments if considered individually.

6.5.2 GLVIA (para. 7.3) describes cumulative effects as follows:

- cumulative landscape effects are effects on the physical fabric or character of the landscape or any special values attached to it;
- cumulative visual effects are caused by the combined visibility of two or more developments from one viewpoint. This can occur either in combination (where several developments are in the same field of view) or in succession (where the observer has to turn to see the different developments); and
- cumulative visual effects can also be sequential. These occur when the observer is moving through the landscape and are typically assessed from roads, footpaths, etc. Sequential effects may be frequently sequential (features or developments appear regularly and with short time lapses between) to occasionally sequential (long time lapses between appearances), depending on factors such as the speed of travel and the distances between viewpoints.

6.5.3 The degree of cumulative landscape or visual effect is related to the number and distance between individual proposed developments, their intervisibility, the character of the landscape and its sensitivity to particular types of proposed development and the siting and design of each proposed development. In addition to cumulative physical effects, cumulative effects on the landscape or visual amenity may have a bearing on the perception and enjoyment of landscape by, for example, conflicting with attributes such as tranquillity or remoteness.

Approach to Assessing Cumulative Landscape and Visual Effects

6.5.4 The process and procedures for identifying and judging cumulative landscape and visual effects is essentially the same as for the LVIA described above, in that the degree of effect is determined by combining an evaluation of the sensitivity of the landscape or visual receptor and the magnitude of change. The emphasis of the assessment will

always be on the main development being considered and whether it will combine with other developments to increase the degree of landscape or visual effect identified in the LVIA.

Defining the Study Area for the CLVIA

6.5.5 The initial task in defining a study area will be to identify all the major proposals (most of which will be wind farms or small scale wind energy developments applications), which could potentially interact with the proposed development to cause additional landscape and visual effects above those identified for the proposed development alone. The assessment will focus on those proposed projects which will potentially give rise to significant effects when seen alongside the proposed development being considered here.

6.5.6 To do this it will be necessary to identify the distance within which significant effects will be likely to occur for each type of development. This is because the distance between the proposed development and any projects to be included in the CLVIA will affect the magnitude of the cumulative effects which may occur and therefore judgements about their significance. This is explained further below by reference to zones of visual influence – areas where significant landscape and visual effects will be most likely to occur.

Zone of influence for the Proposed Development (Overhead Line Section)

6.5.7 For the purpose of the CLVIA, the zone of visual influence is considered to be 5km from the outer extents of the proposed development. As explained in the preceding LVIA, the tallest part of the proposed development is the pylons and whilst these may be visible at distances beyond 5km, at such distances they are unlikely to give rise to significant effects. However we will continue to be mindful of the possibility of effects beyond this distance.

Zone of Visual Influence for Wind Energy Developments

6.5.8 All wind farms within 20km of the proposed development will be included in the study area for the CLVIA as this is the maximum extent within which significant cumulative landscape and visual effects are likely to occur. At distances beyond 20km wind turbines will be seen as a minor element in the landscape. Based on professional experience of wind farm developments and the Mid Wales landscape the proposed wind farms can be categorised as follows:

- the proposed wind farms which would be most likely to contribute to significant cumulative landscape and visual effects lie within 2km of the proposed development and may appear prominent in views;
- the proposed wind farms which would be less likely to contribute to significant cumulative landscape and visual effects lie between 2km and 5 km of the propose development and may appear relatively prominent in views;
- the proposed wind farms which would be visible in clear conditions but would be unlikely to contribute to landscape and visual effects, but only in clear visibility lie between 5km and 20km of the proposed development will only appear as a minor element in a view; and
- The proposed wind farms which are likely to be insignificant in generating landscape and visual effects lie between 20km and 30km from the proposed development and are not included in the study area.

Zone of Influence for Other Developments

6.5.9 The zone of influence for other developments varies depending on the type of development being proposed and will be determined and agreed with stakeholders once they have been identified.

6.5.10 For small scale wind energy schemes (single/double turbines up to 50m high) the study area will encompass schemes located within a 2.5km radius of the outer extents of the proposed development. For proposed grid connection infrastructure where wood pole support structures will be used, the study area will encompass schemes within 2km of the outer extents of the draft route corridor.

The Study Area

6.5.11 Once the individual projects have been identified and their zones of influence identified a Cumulative Zone of Theoretical Visibility (CZTV) will be generated to identify the areas over which a number of proposed developments are likely to be seen. Theoretically, areas where the ZTVs for the individual developments overlap and which lie within the zone of influence for the relevant development will be the areas where significant cumulative landscape and visual effects will be most likely to occur.

6.5.12 A broad study area for the CLVIA will then be defined and an inventory prepared of all the projects included within the cumulative landscape and visual assessment using information from that which is publicly available at the time of the assessment or which can be obtained from the relevant developer.

Assessment of Landscape Effects in Cumulative Development Scenarios

6.5.13 The assessment of cumulative landscape effects is concerned with the combined effects of the proposed development in conjunction with other proposed developments. These effects may result from changes in the character of the landscape arising from the removal or damage to features, elements or characteristics of the baseline landscape or through the introduction of new man-made structures elements or from the removal of or damage to existing ones. Such changes may develop incrementally over time and be perceived gradually.

6.5.14 The identification and assessment of the significance of cumulative landscape effects will follow the same approach as that taken in the LVIA. The emphasis of the assessment will always be on the proposed development and whether it will combine with the other developments being considered to change the degree of landscape effect identified in the LVIA.

6.5.15 The cumulative landscape assessment will consider potential effects upon designated landscapes. This will then be followed by an assessment of cumulative effects upon the different landscapes through which the proposed route would run based on the localised character areas defined by the Field Based Landscape and Visual Sensitivity Appraisal.

6.5.16 In making judgements the assessment will consider:

- the susceptibility of the landscape to the proposed overhead line (as recorded in the LVIA);
- the value attached to the landscape, reflecting its designation status and other valued components of the landscape (as recorded in the LVIA); and
- the nature or magnitude of effects, both in terms of size and geographical
- area. This will differ from the magnitude of effects identified for the LVIA.

6.5.17 The significance of identified cumulative landscape effects will then be assessed through the application of professional judgement.

6.5.18 As noted in the LVIA, significance is not absolute and can only be defined in relation to each development and its location. GLVIA notes that there are no hard and fast rules but generally:

- ‘Major loss or irreversible negative effects over an extensive area, on elements and/or aesthetic and perceptual aspects that are defining characteristics of the

character of nationally valued landscapes are likely to be of the greatest significance;

- Reversible negative effects of short duration, over a restricted area, on elements and/or aesthetic and perceptual aspects that contribute to but are not defining characteristics of the character of landscapes of community value are likely to be of least significance and may, depending on the circumstances, be judged as not significant; and
- Where assessment of significance place landscape effects between these extremes, judgements must be made about whether or not they are significant, with full explanations of why these conclusions have been reached.' (para.5.56)

6.5.19 GLVIA also notes that:

'the most significant cumulative landscape effects are likely to be those that would give rise to changes in the landscape character of the study area of such an extent as to have major effects on its key characteristics and even, in some cases, to transform it into a different landscape type. This may be the case where the project itself tips the balance through its additional effects. The emphasis must always remain on the main project being assessed and how or whether it adds to or combines with the others being considered to create a significant cumulative effect.' para.7.28

6.5.20 The final overall judgement of the predicted effects on views and visual amenity will be summarised in a series of four categories of effect – major, moderate, minor or negligible. A final summary of significant effects will be provided.

6.5.21 Cumulative landscape effects assessed as major or moderate are considered significant under EIA Regulations. Other effects are considered not significant.

Assessment of Visual Effects in Cumulative Development Scenarios

6.5.22 The cumulative visual assessment will be agreed with NRW and PCC but is likely to be based on the viewpoints and visual receptors identified in the LVIA. If specifically requested following discussions and feedback with/from stakeholders and consultees, the cumulative assessment will consider receptors outside the 5km zone of influence identified for the proposed development. In our experience, however, beyond 5km, there may be cumulative effects but these would arise from the interaction of existing and potential wind farms alone, rather than from the proposed overhead line which would be too distant to give rise to significant visual effects.

6.5.23 The identification and assessment of the significance of cumulative visual effects followed the same approach as that taken in the LVIA. The emphasis of the assessment will be on the proposed development and whether it will combine with the other developments being considered to increase the degree of visual effect identified in the LVIA.

6.5.24 The cumulative visual assessment will initially consider potential effects on views to and from designated landscapes. This will then be followed by an assessment of cumulative visual effects based on selected viewpoints. Finally there will be an assessment of the way in which any sequential views of multiple developments may be experienced from roads and important routes identified in the LVIA.

6.5.25 For each viewpoint, the nature of the existing view and the predicted view with the other developments being considered will be combined. The aim will be to understand and describe the overall cumulative visual effects and identify the contribution that the proposed development makes to those effects.

6.5.26 The visual receptors will have been categorised in terms of their susceptibility and importance as part of the preceding LVIA and are unlikely to change although this will be checked. The magnitude of visual effects, however, will potentially alter through the addition of other developments and judgements will have to be made about this.

6.5.27 As noted in the LVIA, the significance of the effects of development on views is related to the sensitivity of the receptor, the characteristics of the development being proposed and the nature or magnitude of the change likely to be experienced.

6.5.28 GLVIA (para. 7.38) notes that typically higher levels of significance are considered to arise from:

- developments that are in close proximity to the main development being considered and are clearly visible together in views from the selected viewpoints; and
- developments that are highly inter-visible with overlapping ZTVs – even though the individual developments may be at some distance from the main development being considered, the overall combined cumulative effect at a particular viewpoint may be significant.

6.5.29 The final overall judgement of the predicted effects on views and visual amenity will be summarised in a series of four categories of significance – major, moderate, minor or negligible. A final summary of significant effects will be provided.

6.5.30 Cumulative landscape effects assessed as major or moderate will be considered significant. Other effects are considered not significant.

6.6 Techniques for Undertaking and Presenting Landscape and Visual Analysis

Selection of Viewpoints

6.6.1 The ZTV (see below) identifies land that theoretically will have a view of the proposed development. The next step in the appraisal process is to identify the viewpoints from which the proposed development is likely to be seen. Viewpoints will be used to help assess the existing visual characteristics of the study area, assess the sensitivity of the visual receptors to the proposed development, illustrate the effectiveness of mitigation measures and to illustrate the predicted appearance of the proposed development in the view. They will also be used to illustrate cumulative effects arising from the proposed development.

6.6.2 In accordance with GLVIA (para. 6.19) we will identify three types of viewpoint:

- representative viewpoints – selected to illustrate a greater number of viewpoints that cannot all be included individually. For example one house may be taken to be representative of the views from a number of houses in a settlement and certain points may be chosen to represent views from a cluster of public footpaths and bridleways;
- specific viewpoints – chosen because they represent important views and sometimes promoted viewpoints within the landscape, including local visitor attractions, viewpoints in areas of particularly noteworthy visual and/ or recreational amenity such as landscapes with statutory landscape or landscape related designations, or viewpoints with particular cultural landscape associations; and
- illustrative viewpoints - chosen to demonstrate a particular issue or effect, for example reduced perceptibility beyond a certain distance.

6.6.3 Whilst a high number of viewpoints will be initially identified we anticipate that these will be reduced down to those that best represent potential significant effects on views and viewers. Ongoing discussions with stakeholders have already identified broad areas of particular landscape and visual sensitivity, but further consultations will help identify and agree the viewpoints for the assessment, including those for wireframe and photomontage generation.

6.6.4 As noted previously, a Visibility Overview Map has been prepared for the preferred route corridor and this will continue to be refined through field survey as the design progresses and will be used to inform discussions with stakeholders.

6.6.5 Each viewpoint will be presented as a figure with a photograph and a wireline diagram (see below) at the same scale and orientation as the photograph. Supporting text will provide technical information about the photography used, including camera details, date and time of photography and weather conditions and descriptive information such as:

- the location, nature and characteristics of the chosen representative and specific viewpoints;
- type and relative numbers of people likely to be affected at each location;
- nature, composition and characteristics of the existing views experienced at the viewpoints; and
- elements, such as landform, building or vegetation which may interrupt, filter or otherwise influence the views.

Zones of Theoretical Visibility (ZTV)

6.6.6 The ZTVs which were produced for the preferred route, and are included in Appendix 6.3, identify areas that may have views of the proposed development.

Digital Data Technical Specification

6.6.7 The ZTVs will be created using ERDAS Imagine 2011, Intergraph's GIS and geospatial data system. National Grid (NG) has national coverage of Getmapping's Synthetic Aperture RADAR (SAR) generated Digital Elevation data, including the Digital Terrain Model (DTM) and Digital Surface Model (DSM) at 5m resolution. Using the DTM/DSM as a base model it is possible to layer 12.5cm aerial photography (also a product of Getmapping) and 1:50,000 OS mapping over the height information into a 2D view to provide a complete perspective of the area of interest.

ZTV Methodology

6.6.8 For the creation of a ZTV it is necessary to use the RADAR Digital Surface Model (DSM) as a base map which includes the terrain height and all above ground features such as vegetation, buildings and other natural/artificial structures to provide the user with an accurate representation of the environment. A Polyline (vector shapefile) of an existing or proposed route line is used to indicate the observer position, which is layered over the DSM. This provides the input from which seen and unseen locations are mapped across the DSM. Two separate parameters can be set, namely the distance (extent) of the ZTV from the Polyline and the height above ground level (AGL) of the observer, i.e. the height of the Polyline along its length would be derived from the height of the existing or proposed pylon. From the information provided the software then calculates and colour codes the visibility of all the pixels within the specified distance of the Polyline. As a rule green represents the seen areas and red the unseen areas. The resulting ZTV can then be added to a JPEG map composition layered over aerial photography or OS mapping depending on which option would be likely to provide the best viewing output for the required map scale.

6.6.9 The ZTV will extend to the edge of the base map but will include a minimum 10km from the proposed development. As discussed previously beyond this distance, any above ground infrastructure is unlikely to give rise to any significant effects. It will be used to help identify the parts of the study area where landscape and visual effects will need to be studied in more detail. When used in conjunction with the visibility overview map, site visits and preliminary wireline diagrams, it will also help identify a provisional list of viewpoints. These will be used as the basis for discussion with stakeholders to determine how representative they are and whether they include any particularly sensitive viewpoints.

Photographs and Visualisations

6.6.10 Photographs and visualisations will be used in the ES to communicate information about the baseline landscape and the visual effects of the proposed development:

- the location from which the photographs are taken will be carefully chosen and justified;
- prevailing weather conditions and atmospheric effects will be described using consistent Met Office terminology, noting any effects of the conditions on the photographs;
- seasonal effects on the photographs and the landscape they are illustrating will be noted; and
- technical aspects of the photography, including lens type and focal length will be recorded.

Wirelines and Photomontages

6.6.11 Wirelines are computer generated line drawings based on a DTM that illustrate the 3D shape of the landscape and any features within it. As noted in the SNH guidance, they are a valuable tool in LVIA because they allow the assessor to compare the position and scale of the proposed development within the wireline to the existing view of the landscape. Wirelines portray objective data, which means that the assessor can make clear and transparent judgements on the likely visual effects of a proposed development, whereas photomontages are more vulnerable to manipulation and misinterpretation. They can also reveal what would be visible if an existing screening element for example, buildings or trees were removed.

6.6.12 Wirelines will be generated using proprietary software using a simplified but accurately dimensioned 3D wireline model of each type of above ground infrastructure. Sufficient DTM data will be used to enable the full landform background to the overhead line to be seen and thus easily matched to a photograph or view on site.

6.6.13 A selection of viewpoints will also be provided as photomontages or a photorealistic simulation of the view before and after proposed development. Photomontages can help to illustrate to a wider audience, the assessment process by which judgements are made. Photomontages will be selected following production of wirelines and prepared in consultation with Natural Resources Wales, Natural England and the local authorities using the most up to date guidance. We will aim to make these photomontages both accessible and comprehensible to a non-specialist audience.

6.6.14 The following is a list of the most up-to-date guidance most of which had been produced for wind farms:

- Scottish Natural Heritage 'Visual Representation of Windfarms. Good Practice Guidance', 2006;
- The Landscape Institute 'Photography and Photomontage in Landscape and Visual Impact Assessment (advice note 01/11)', 2011;
- The Highland Council 'Visualisation Standards for Wind Energy Developments', 2010 www.highland.gov.uk;
- The Highland Council 'Visualisation Standards for Wind Energy Developments', May 2013 www.highland.gov.uk;
- Scottish Natural Heritage 'Visual Representation of Wind Farms. Consultation draft', May 2013 (www.snh.gov.uk).

6.6.15 There is ongoing debate about which of this guidance provides the most realistic image representation of scale and distance and the guidance may change during preparation of the EIA. As currently (April 2014) agreed with NRW and PCC however, we intend to take

and present photographs with a 50mm lens and 90° angle of view (400mm viewing distance). If requested by stakeholders, for sensitive viewpoints beyond 1km from the proposed development we will provide an additional image presented at 70mm focusing on the nearest part of the proposed development to the viewpoint.

7 ARCHAEOLOGY AND CULTURAL HERITAGE

7.1 Introduction

7.1.1 This section of the Scoping Report considers the archaeology and cultural heritage implications of the proposed development and outlines the approach to be adopted in assessing potential effects which may arise during the construction, operation and decommissioning phases as part of the EIA process. Significance of effects is considered and matters are raised for consideration as part of the EIA process. Potential mitigation and enhancement measures are also outlined.

Current status of archaeological work

7.1.2 In terms of archaeology and cultural heritage work to date, a Route Corridor and Substation Siting Study (RCSSS) (MWH 2011) has considered designated and registered cultural heritage assets, such as World Heritage Sites, Scheduled (ancient) Monuments, Registered Parks & Gardens, Registered Battlefields, Listed Buildings, Conservation Areas, Ancient Woodland, Welsh Historic Landscapes and Historic Landscape Character Areas.

7.1.3 In addition to the above, further work has been undertaken as part of the development of the proposed development, looking at, for example, historic landscapes and a comparison of the proposed connection technologies.

7.1.4 Preliminary responses from relevant consultees have been received and these have been used to refine the archaeological scope.

Objectives of Scoping

7.1.5 The principal objectives of the archaeological and cultural heritage scoping process were:

- To identify cultural heritage assets (buried archaeology, built heritage and historic landscapes) which may be affected by the proposed development;
- To identify relevant considerations in relation to those assets; and
- To outline suitable approaches to be adopted for managing archaeology and cultural heritage within the EIA process.

7.2 Baseline Environment

7.2.1 A total of 14,396 archaeology and cultural heritage assets have been identified within the area encompassing the draft route and a study area extending to 10km beyond this area. The vast majority of these assets are non-designated and therefore do not benefit from statutory protection. A breakdown is provided in Table 7.1. The true total number of assets will be less than that presented in this table, as the various datasets are not mutually exclusive, and many of the HER numbers have been assigned to the same asset or to the event of an archaeological survey. This issue will be addressed during the EIA by cross-referencing (para 7.4.20).

Table 7.1: Count of site types by draft route, the 3km and 10km study area

Description	Draft Route	3km Study Area	10Km Study Area	Total
Ancient Woodland	22	772	n/a	794
Conservation Area	0	9	11	20
Defence of Britain Project	0	6	n/a	6
Historic Environment Record (HER)	94	4598	n/a	4692
Registered Historic Landscape	0	0	3	3
Listed Building Grade I/II*	0	33	107	140
Listed Building Grade I/II*033107140Listed Building Grade II	1	459	1458	1918
National Monuments Record (NMR)	15	905	n/a	920
Portable Antiquities (PA)	1	5685	n/a	5686
Registered Park & Garden	0	2	16	18
Scheduled (Ancient) Monument	0	46	152	198
World Heritage Site	0	0	1	1
Totals	**133**	**12515**	**1748**	**14396**

7.2.2 The following sections summarise and discuss identified cultural heritage assets by the draft route, including also the substation and the sealing-end compounds, and the study areas.

Draft Route

7.2.3 In total, one Grade II Listed Building and 132 undesignated assets are located within the draft route.

7.2.4 There are two undesignated assets within the substation site. These comprise the earthwork remains of an animal shelter (PHER 6567) and a potato store (PHER 4807), both of which date to the post-medieval period.

7.2.5 There are six undesignated assets within the Cefn Coch to Afon Banwy overhead section of the draft route. These comprise an undated clearance cairn (PHER 4800), the remains of a post-medieval house (PHER 6613), post-medieval quarry (PHER 69490), the course of the Caersws-Banwy Roman road (PHER 69194), the former site of a post-medieval house (PHER 80455) and medieval ridge and furrow earthworks (PHER 4733). In addition, there are seven areas of ancient woodland.

7.2.6 There are six undesignated assets within the western sealing end compound siting area. These comprise the former site of a post-medieval toll-house (PHER 34306), a post-medieval holloway (PHER 34302), medieval ridge and furrow earthworks (PHER 34303, 34304), a post-medieval deserted small-holding (PHER 17960) and an extant chapel, dating to the 19th century. In addition, there are nine areas of ancient woodland.

7.2.7 There are five undesignated assets within the underground section of the draft route through the Meifod Valley. These comprise a natural mound (PHER 68), a Bronze Age ring ditch (PHER 3609), the remains of a post-medieval house (PHER 8413), flood defence bank (PHER 77886) and the cropmark of an undated enclosure (PHER 4610). In addition, there are three areas of ancient woodland.

7.2.8 The most important consideration during future assessment of this section, as it is proposed to be underground, is the high potential for further as yet undiscovered below-ground sites.

7.2.9 There are no known assets within the eastern sealing end compound siting area.

7.2.10 There are 28 known assets along the course of the Waen-fach to Lower Frankton section of the draft route, all of which are undesignated. These comprise palaeo-channels of Neolithic date (PHER 17807), nine cropmark sites of enclosures, ring ditches, ditches and pit-alignments of likely prehistoric or Roman date (SHER MSA13747, SHER MSA14551, SHER MSA1580), SHER MSA1530, ENMR 66027, ENMR 66030, ENMR 1399444, ENMR 1399445 and PHER 4622), Whittington Roman Temporary Camp (SHER MSA655), undesignated sections of the Saxon Offa's Dyke (ENMR 962984) and Wat's Dyke (ENMR 650342), medieval ridge and furrow (ENMR 1399329), field system and ditches (SHER MSA2918 and SHER MSA13769), water-meadows (SHER MSA18422), the former site of a leper hospital at Aston (SHER MSA4066), two crossings of the Montgomery Canal (SHER MSA651), the dismantled Oswestry & Newtown Railway (SHER MSA12621), the Shrewsbury & Chester Railway (SHER MSA18721) the dismantled Shropshire & Montgomeryshire Light Railway (SHER MSA18730), Aston Hall park (SHER MSA1422), post-medieval quarries (PHER 64615), a flood defence bank (PHER 23517), redundant field boundaries (PHER 23518 and PHER 38016) and one find-spot (PA 384777).

7.2.11 There are three known assets within the tee-in siting area. These comprise a listed barn (ELS 1178283, the cropmark of an enclosure of likely prehistoric or Roman date (SHER MSA1553) and a Neolithic stone axe (SHER MSA1791).

Waen-fach**3km Study Area**

7.2.12 In total, 46 Scheduled (Ancient) Monuments, nine Conservation Areas, 33 Listed Buildings (Grade I/II*), 459 Listed Buildings (Grade II), two Registered Park & Gardens, and 11,966 undesignated assets are located within the 3km buffer.

7.2.13 In terms of the Cefn Coch to Afon Banwy section of the draft route and substation site, the most important considerations during future assessment are two prehistoric scheduled cairns (Mynydd y Gribin kerb cairn - WSM MG327 and Gelli Gethin Round Cairn - WSM MG272) and to a lesser extent the Caersws Banwy Roman Road (MG320) scheduled Root Store at Bon-y-Maen (MG218), Y Capel Stone Circle (MG179) and the scheduled prehistoric monuments which are to be found on the north facing ridgelines of Esgair Cwmowen and Mynydd Clogau..

7.2.14 In terms of the underground section of the draft route through the Meifod Valley and the sealing end compound siting areas at either end, the most notable assets are the scheduled prehistoric hillforts, occupying mostly elevated locations on the valley sides, such as Pentre Camp (WSM MG124), Bryn y Saethau (WSM MG231), Ffridd Mathrafal (WSM MG232), Soldier's Ring (MG097), Bryngwyn Wood hillfort (MG029), and Bwlch y Cibau enclosure (MG210), and also a number of notable unscheduled prehistoric hillforts such as Long Hill (PHER 3390).

7.2.15 In addition, the draft route in this section passes immediately adjacent to the medieval defensive earthwork, Mathrafal Castle (WSM MG044), located within the Yr Hafesb Valley, and it passes close to Cwrt y Person moated site (MG166) at Meifod, raising the need to consider medieval and later sites during future assessment.

7.2.16 Built heritage and landscapes are less important considerations during the assessment of the underground section, on account of the fact that the visual effects generated by the development would be short-term. In terms of Meifod town and its Conservation Area, therefore, future assessment would consider how to minimise these short-term effects.

7.2.17 In terms of the Waen-fach to Lower Frankton section of the draft route and the tee-in, the most important considerations during future assessment are three scheduled prehistoric hillforts (Soldier's Mount – MG116, Bryn Mawr hillfort – MG158 and Llanymynech – MG030), the scheduled Plas yn Dinas medieval motte & bailey (MG078) and Bromwich Park moated site and formal gardens (ESM 1017006), the latter two of which are located immediately adjacent to the draft route. In addition, there are important built heritage considerations, such as Llanymynech Village & Heritage Area and post-medieval industrial complex (ESM1021412), Llansantffraid-ym-Mechain Conservation Area and several Grade II* listed buildings at Lledrod, Llansantffraid-ym-Mechain and St Winifred's holy well. Grade II listed building Bronafon, Tre-derwen, Pentrer, Aston, Wooton, Maesbury Marsh, Llandysilio, Henhafod and the New Bridge Vyrnwy aqueduct for the Montgomery canal have been identified as being in close proximity to the draft route.

7.2.18 Other designated assets which require consideration during the assessment of the Waen-fach to Lower Frankton section of the draft route and the tee-in, include the Roman settlement and field system near Collfryn (MG200), the Llansantffraid-ym-Mechain Roman enclosure (MG216), the scheduled section of Offa's Dyke at Llandrinio (MG033), and four medieval motte & bailey castles (Knockin – ESM1019304, West Felton - ESM1019296, Hisland - ESM1013497 and Whittington - ESM1019450). In terms of built heritage, there are the Conservation Areas at Knockin and Whittington, and Grade II listed buildings at Waen-fach, Trewylan Isaf, Clawdd Coch, Bryn Mawr, Llansantffraid-ym-Mechain, Llanymynech, West Felton, Queen's Head, Middleton and Lower Frankton with others scattered along the principle roads such as the A495 and the B4393, and in association with the Montgomery Canal (e.g. Carreghofa Locks and Vyrnwy Aqueduct – WLS14206).

7.2.19 In addition, there are many undesignated assets of potential regional importance within the Waen-fach to Lower Frankton section of the draft route and the tee-in. These include a non-scheduled section of Offa's Dyke (ENMR 962984) Wat's Dyke (ENMR 650342, several historic house and parklands (e.g. Aston Hall, Halston Hall and Woodhouse) and industrial heritage such as the Montgomery Canal (SHER MSA651) and three railways (Shrewsbury & Chester Railway - SHER MSA18721, the dismantled Shropshire & Montgomeryshire Light Railway - SHER MSA18730 and the dismantled Oswestry & Newtown Railway (SHER MSA12621)..

7.2.20 A summary table of designated and registered assets (excluding Grade II listed buildings) located within the 3km study area can be found in Table 7.2 below.

Table 7.2: Archaeological considerations

Reference	Description of cultural heritage asset	Asset type
MG005	Domen Castell Mound & Bailey Castle	WSAM
MG008	Cefn-Du Camp	WSAM
MG029	Bryngwyn Wood Camp	WSAM
MG030	Llanymynech Hill Camp	WSAM
MG033	Offa's Dyke: Section extending 3000m south-east to Bele Brook, Llandrinio	WSAM
MG044	Mathrafal Castle	WSAM
MG070	Gardden Camp & Barrows	WSAM
MG077	Bwlch-Y-Cibau Dyke	WSAM
MG078	Plas Yn Dinas	WSAM
MG095	Round Barrow 225m south-east of Clwyd-Yr-Onen	WSAM

Reference	Description of cultural heritage asset	Asset type
MG096	Camp 135m south-east of Pant Mawr	WSAM
MG097	Broniarth Hill Camp	WSAM
MG098	Clawdd Llesg	WSAM
MG099	Clawdd Wood Camp	WSAM
MG100	Bwlch Aeddan Dyke	WSAM
MG103	Hen Domen	WSAM
MG116	Soldier's Mount	WSAM
MG124	Pentre Camp	WSAM
MG142	Rhysnant Hall Castle Mound	WSAM
MG158	Bryn Mawr Camp	WSAM
MG166	Cwrt Y Person Moated Site	WSAM
MG179	Y Capel Stone Circle	WSAM
MG200	Collfryn Enclosure & Field System	WSAM
MG203	Site 300m south-west of Tan-Llan (Revealed By Aerial Photography)	WSAM
MG210	Bwlch-Y-Cibau Enclosure	WSAM
MG214	Carreghofa Castle	WSAM
MG216	Roman Supply Depot, Llansantffraid-ym-Mechain	WSAM
MG218	Root Store at Bon-Y-Maen 800m north-west of Blaen Y Cwm	WSAM
MG231	Bryn Y Saethau Hillfort	WSAM
MG232	Ffridd Mathrafal Hillfort	WSAM
MG272	Gelli Gethin Round Cairn	WSAM
MG320	Mynydd Waun Fawr Roman Road	WSAM
MG327	Mynydd Y Gribin Kerb Cairn	WSAM
MG330	Clawdd Wood Round Barrow	WSAM
PO41	Bryngwyn	WRPG
n/a	Bwlch-Y-Cibau Enclosure Conservation Area	WCA
n/a	Llanfair Caereinion Conservation Area	WCA
n/a	Llanfechain Conservation Area	WCA
n/a	Llanymynech Conservation Area	WCA
n/a	Meifod Conservation Area	WCA
n/a	Llansantffraid-ym-Mechain Conservation Area	WCA
7646	Parish Church of St. Tysilio and St. Mary	WLB I
7609	Pen-Y-Lan Hall (formerly listed as Pen-Lan Hall), Welshpool Road, Broniarth Hill	WLB II*
7625	Church Of St. Garmon	WLB II*
7633	Church Of St. Cynyw	WLB II*
7638	Church Of St. Ffraid	WLB II*
7643	Cefnllyfnog Farmhouse	WLB II*
7650	Pentre'r Gof (also known as Pentrego), Pentre	WLB II*
7661	John Hughes Memorial Chapel (Pontrobert Chapel)	WLB II*
8649	Friends' Meeting House, Dolobran	WLB II*
8658	Garth-Fawr	WLB II*

Reference	Description of cultural heritage asset	Asset type
8703	Ffinnant Farmhouse	WLB II*
8709	Neuadd Cynhinfa	WLB II*
8710	Bryngwyn Hall, A490 (north-east side) Blwch-Y-Cibau	WLB II*
14194	Pont Llanymynech (lies partly in Llansdysilio Community Area), Llanymynech	WLB II*
14206	Aqueduct Carrying Montgomeryshire Canal over River Vyrnwy (lies partly in Llandysilio Community Area)	WLB II*
15990	Goetre, Pentre	WLB II*
26960	Dolobran Hall	WLB II*
83068	Cruck-Framed farm building at Ystum Colwyn	WLB II*
84403	Primary House at Rhos Fawr Isaf	WLB II*
1003014	Offa's Dyke: 360yds (330m) section, Llynclys Hill	ESM
1003674	Rhyd-Meredydd Bridge over River Tanat	ESM
1004781	Blodwell Rock Camp and Portions of Llanymynech Hill Camp. Also in Powys: Wales	ESM
1006255	Llanyblodwel Bridge	ESM
1013497	Motte Castle at Hisland	ESM
1017006	Bromwich Park Moated Site aAnd Formal Garden Remains	ESM
1019296	Motte Castle Adjacent to St. Michael's Church	ESM
1019304	Knockin Castle: A Motte and Bailey Castle immediately east of St. Mary's Church	ESM
1019450	Whittington Castle	ESM
1020562	Wat's Dyke: section 350m long, 540m east of Weston Farm	ESM
1020616	Wat's Dyke, 380m lsection, immediately east of the Sewage Works	ESM
1021412	Lime Kilns, Associated Tramways, Structures and Other Buildings at Llanymynech	ESM
1001251	Pradoe	ERPG II
n/a	Llanymynech Village and Heritage Area	ECA
n/a	Knockin Conservation Area	ECA
n/a	Whittington Conservation Area	ECA
1054216	Halston Hall including attached Flanking Walls and Balustrade to rear	ELB I
1178307	Whittington Castle	ELB I
1307719	Church of St. Michael	ELB I
1367397	Domestic Chapel approximately 350m south ff Halston Hall	ELB I
1054231	Woodhouse including attached Service Range to north	ELB II*
1054245	St Winifred's Well	ELB II*
1054646	Summerhouse attached to west end of Garden Wall at Blodwel Hall	ELB II*
1054683	Church of St. Mary	ELB II*
1055883	Church of St. Mary	ELB II*
1176516	Hardwick Hall	ELB II*

Key: WSAM = Wales Scheduled Ancient Monument, WRLPG = Wales Registered Park & Garden, WCA = Wales Conservation Area, WLB = Wales Listed Building, ESM = England Scheduled Monument, ERPG = England Registered Park & Garden, ECA = England Conservation Area, ELB = England Listed Building

10km Study Area

7.2.21 In total, one World Heritage Site, 152 Scheduled (Ancient) Monuments, nine Conservation Areas, 107 Listed Buildings (Grade I/II*), 1458 Listed Buildings (Grade II), three Historic Landscapes and 16 Registered Park & Gardens are located within the 10km study area.

7.3 Potential Effects

Potential effects during construction

Archaeology

7.3.1 Archaeology that exists on the course of the draft route could be affected by works associated with the installation of foundations (e.g. for the substation, sealing end compounds, or for pylon bases in area proposed for overhead line, etc.), by the undergrounding of cables, and by works connected with the construction of access roads.

7.3.2 Effects might also result from high volumes of works traffic, the construction of temporary compounds, and other earth-moving activities.

7.3.3 The potential effect of the proposed development on below ground archaeology depends on the degree of survival. The desk-based assessment will identify assets where previous activity (such as an appreciable reduction or increase in ground level, or previous construction) is known to have taken place and that may have damaged, destroyed or sealed any archaeological remains.

Built heritage

7.3.4 The visual settings (and landscape context) of built heritage assets will most likely be affected by the presence and operation of works traffic and plant, and by the construction of pylons. Additional effects may result from changes in air and noise quality (resulting from construction works and works traffic).

Historic landscape

7.3.5 The proposed development may affect historic landscapes (or their individual components) and may affect their overall comprehension and appreciation.

Potential effects during operation

Archaeology

7.3.6 There should be no appreciable effect on buried archaeological remains during the operation of the development. However, potential changes to hydrology resulting from the development may affect below ground archaeology in the mid- to long-term (e.g. drying out and desiccation of palaeo-environmental and organic remains).

Built heritage

7.3.7 Any permanent above ground components of the proposed development (e.g. the substation, sealing end compounds, pylons, overhead lines, etc.) may affect the visual setting (or landscape context) of a built heritage asset.

Historic landscape

7.3.8 Any permanent above ground components of the proposed development (e.g. the substation, sealing end compounds, pylons, overhead lines, etc.) may affect the visual setting of an historic landscape asset.

Potential effects during decommissioning

Archaeology

7.3.9 There should be no appreciable effect on archaeological remains during the decommissioning of the development.

Built heritage

7.3.10 Any permanent above ground components of the proposed development (e.g. the substation, sealing end compounds, pylons, overhead lines, etc.) may have a temporary effect on the visual setting of a built heritage asset.

Historic landscape

7.3.11 Any permanent above ground components of the proposed development (e.g. the substation, sealing end compounds, pylons, overhead lines, etc.) may have a temporary effect on the visual setting of an historic landscape asset.

7.4 Proposed Assessment Methodology

Objectives

7.4.1 The main objective of archaeological and cultural heritage assessment at EIA stage will be to gain information about the archaeological and cultural heritage resource, in order to make an assessment of the effects of the proposed development, leading to one or more of the following:

- formulation of a strategy to ensure the recording, preservation and management of the archaeological and cultural heritage resource; and
- formulation of a strategy for further archaeological and cultural heritage research and investigation - where the character and value of the resource is not sufficiently defined to permit a mitigation strategy or other response to be devised at the assessment stage.

7.4.2 The specific aims of the assessment would be:

- To determine the known (and potential) archaeological and cultural heritage resource;
- To provide an assessment of the importance of the identified archaeological and cultural heritage resource;
- To assess the potential effect (including both physical and visual) of the proposed development on the known and potential archaeological and cultural heritage resource; and
- To make recommendations on the need for, and scope of, any further archaeological investigation and mitigation where necessary.

Principal Studies

7.4.3 The objectives laid out above, will be achieved through a suite of investigations, including:

- Desk-based Assessment;
- Field Surveys, comprising;
  - Field Reconnaissance Survey;
  - Field Walking Survey; and
  - Geophysical Survey.

7.4.4 Consideration will also be given to the possible need to undertake additional targeted surveys, such as earthwork survey, and hand-auger survey, depending upon the results of the principal studies.

7.4.5 The final scope and specifications will be formulated, agreed and applied in consultation with Cadw, English Heritage, Clwyd-Powys Archaeological Trust (CPAT) and Shropshire Council's Archaeology Service (SCAS).

7.4.6 The archaeological scope and specifications will be laid out in an overarching Archaeological Project Design, supported by a suite of Archaeological Written Schemes of Investigation, with reference to relevant research frameworks and professional standards.

Asset Type

7.4.7 Consideration will be given during the assessment to the 'type' of heritage asset. These fall into three categories:

- Archaeology;
- Built heritage; and
- Historic landscape.

Study/Survey Corridors

7.4.8 In the first instance, a defined Study/Survey Corridor will be applied to each of the principal studies/surveys, and centred on the draft route. In addition, however, a degree of flexibility in the application of these corridors would be required, in order to take account of asset type, sensitivity and potential cumulative effects with other developments. Study/Survey Corridors may also be refined as the proposed development evolves or to respond to the results of the other EIA disciplinary assessments.

Desk-based Assessment

7.4.9 The Study Corridor for desk-based assessment is currently proposed to be a 3km study area either side of the draft route for all cultural heritage and archaeology assets, extending up to 10km to either side, where necessary, for designated assets (Scheduled Ancient Monuments, Listed Buildings and Conservation Areas) plus Registered Historic Parks and Gardens, and Registered Historic Landscapes. A distance of 10 km has been selected because this is regarded as the maximum point at which the proposed development would potentially give rise to significant visual effects. Further rationale is presented in Chapter 6: Landscape and Visual).

7.4.10 Historic map and aerial photographic data will be collected from a 1km study area either side of the draft route.

7.4.11 LiDAR data, where such data exists within the 1km buffer, will be interrogated in conjunction with the baseline data in order to assist in the verification of known or suspected earthwork features (e.g. palaeo-channels) and in the identification of previously unknown earthworks of potential archaeological importance.

7.4.12 An important consideration during assessment is the visibility of the proposed development from built heritage assets and historic landscapes. Where it is considered that any component of the proposed development might be visible from built heritage assets and historic landscapes lying beyond the 3km study area (and within the 10km study area), such assets would be included in the assessment.

Field Surveys

7.4.13 The Survey Corridors for field reconnaissance, structured fieldwalking and geophysical survey are currently proposed to be 200m, 42m and 50m wide, respectively. As not all of

these surveys will be required for the whole of the draft route (e.g. geophysical surveys), the length of the areas to be surveyed will be agreed with the statutory consultees.

7.4.14 In the case of field reconnaissance, a full systematic corridor survey will take place. Field-walking and geophysical survey, however, will focus on locations where there will be below-ground disturbance (e.g. substation, pylons, sections of underground cabling, access tracks, etc.), as these become known. All surveys will take account of route modifications, as these become known. Precise survey areas would be agreed in consultation with relevant consultees.

7.4.15 Consideration will be given to widening the field surveys in areas of raised archaeological potential in order to identify areas of least 'archaeological resistance'.

7.4.16 Site visits will take place to important assets within the 3km buffer (extending up to 10km from the draft route, where necessary) in order to determine the effects of the scheme on settings, views and inter-relationships.

Consultations

7.4.17 Consultation will take place with:

- Cadw;
- English Heritage;
- CPAT;
- SCCAS; and
- Natural Resources Wales.

Data Collection

Desk-based Assessment

7.4.18 A comprehensive desk-based assessment would be undertaken of the known and potential archaeological, built heritage, and historic landscape resources lying within the defined Study Corridor.

7.4.19 Data collection would include but not be limited to those sources listed in Table 7.3 and would seek to address identified gaps in data sources used for the RCSSS and later research:

Table 7.3: Data sources for desk-based assessment

Source	Data type
British Museum (BM)	Portable Antiquities Database
Cadw	Listed Buildings Registered Landscapes of Special Historic Interest Registered Parks and Gardens of Special Historic Interest Scheduled Ancient Monuments World Heritage Sites.
Council for British Archaeology (CBA)	Defence of Britain Database
Clwyd-Powys Archaeological Trust	Historic Environment Record Historic maps (tithe, OS, etc.) LiDAR data (2m resolution) Published landscape histories and historic map regression data

Source	Data type
Defra (for England)	Register of World Heritage Sites, Listed Buildings, Scheduled Monuments Parks and Gardens
English Heritage	Listed Buildings National Monuments Register (NMR) Events database of archaeological works NMR collection of vertical and oblique aerial photographs The National Mapping Programme (NMP) Registered Parks and Gardens Scheduled Monuments
Environment Agency	LiDAR data (high resolution)
MWH	Geotechnical data
National Grid	LiDAR data (high resolution)
National Library of Wales	Documents and pictorials Historic maps (tithe, OS, etc.)
Natural Resource Wales / Natural England	Ancient Woodland
Powys County Archive	Documents and pictorials Historic maps (tithe, OS, etc.)
Powys County Council	Conservation Areas
RCAHMW	Collection of vertical and oblique aerial photographs NMR data
Shropshire Council	Sites and Monuments Record (SMR)
Shropshire Archives	Historic maps (tithe, OS, etc.) Published landscape histories and historic map regression data

7.4.20 Full cross-referencing of the asset database would be undertaken to prevent duplication arising.

7.4.21 Geotechnical, geo-archaeological and palaeo-environmental review of relevant published data and data generated as part of the proposed development would take place.

7.4.22 An assessment of the viability of geophysical survey, considering geological and technical issues would also be undertaken.

Field Surveys

7.4.23 A suite of archaeological field surveys will be considered for implementation in proposed construction areas and also in any ancillary works areas (e.g. compounds and access tracks) as these become known.

- *Field reconnaissance survey*, where applied, will record the presence and nature of any above-ground remains such as earthworks, structures, soil and vegetation marks. Built heritage (other than for instance agricultural structures and dry-stone walls) is not envisaged on account of the fact that the development would generally avoid such assets. Reconnaissance, however, would record any built heritage or archaeological landscapes potentially visible from the development.
- Structured field walking of arable land, where applied, would recover archaeological finds.

- Geophysical survey will be carried out by means of recorded magnetometer survey, supplemented by magnetic susceptibility coverage, in accordance with current professional standards (English Heritage 2008), and would be deployed subject to the results of the geophysical viability assessment.

7.4.24 The 'seasonality' of the above surveys would be considered during programming and allowance made, where possible, for multiple phases of survey, so as to maximise data capture.

Special Considerations

River valley: technical science advice

7.4.25 In river valleys, specialist geophysical, geo-archaeological and geo-environmental advice will be sought prior to finalisation of the archaeological field survey approach.

River valleys: organic and palaeo-environmental remains

7.4.26 Archaeological organic material and palaeo-environmental remains are nationally rare, and therefore can be of importance. Organic preservation occurs best in poorly-aerated, water-logged conditions. Such conditions persist most frequently within alluvium and peat in proximity to both extant and extinct water-sources such as rivers, lakes and bogs. Such conditions are likely to be found upon the floodplains of the River Vyrnwy and River Banwy and their associated tributaries. The North West Wetlands survey has demonstrated high potential for waterlogged organic deposits dating to the prehistoric and later periods within the floodplain of the River Vyrnwy, particularly in the vicinity of Llanymynech.

7.4.27 Where the draft route crosses these floodplains, therefore, there is raised potential for archaeological organic material and palaeo-environmental remains.

7.4.28 Watery sites, such as rivers and marshes, were also favoured locations for acts of votive deposition during prehistory.

Pinch-points

7.4.29 'Pinch-points' are places where routeing, siting and design mitigation is restricted on account of geomorphology, environment, socio-economic and planning constraints. This is a particular concern for linear developments. Pinch-points along the draft route as currently proposed include, for example, the narrow Yr Hafesb Valley and the route past Plas yn Dinas.

7.4.30 Particular attention will be given during the assessment to the identification of further pinch points and where possible to their early investigation.

Research Frameworks and Standards

7.4.31 The overall archaeological approach will be devised with reference to relevant existing and developing archaeological frameworks.

- A Research Framework for the Archaeology of Wales (IFA Wales/Cymru 2008)
- West Midlands Regional Research Framework for Archaeology (University of Birmingham 2011)

7.4.32 The archaeology and cultural heritage assessment of the EIA will be undertaken by Network Archaeology, which is an IfA Registered Organisation. The lead compiler is the Responsible Post-holder and a long-standing Member of the IfA.

7.4.33 All work will be undertaken in accordance with relevant published IfA standards and guidance as set out below:

- IfA Code of Conduct (2013);
- IfA Standard and guidance for historic environment desk-based assessment (2012);

- IfA Standard and guidance for archaeological field evaluation (2008); and
- IfA Standard and guidance for archaeological geophysical survey (2011).

Assessing Value, Impact and Significance of Effect

7.4.34 The assessment of archaeology and cultural heritage will be compiled according to the methodology set out in the revised Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 2 (Highways Agency 208/07, 2013).

7.4.35 DMRB is the only guidance for mitigating development effects on archaeology and cultural heritage currently endorsed by Welsh Assembly and Whitehall.

7.4.36 The approach adopted by DMRB for assessing the potential environmental effect of the proposed development, as it relates to a specific cultural heritage asset, is determined by identifying the value of an asset, and then assessing the effect that the proposed development would be likely to have on the value of the asset. This methodology, one that combines value and effect to determine overall effect, is well-established, and facilitates the clear differentiation between likely insignificant and likely significant environmental effects. This approach, addresses the principles to be adopted when managing effects of energy developments on archaeology and cultural heritage as set out in the National Poicy Strategy for Energy (NPS EN-1, Section 5.8). It also mirrors the policy statements set out in Section 12 of the National Planning Policy Framework (NPPF), relating to the conservation and enhancement of the historic environment (DCLG 2012).

7.4.37 During the EIA, criteria will be used to identify the value of an asset, to assess the effect of the proposed development on the asset's significance, and assess how these are combined to determine the overall likely effect.

7.4.38 The methodology will adopt a three stage process, based on DMRB (Volume 11, Section 3, Part 2, Annex 7, Tables 7.3 and 7.4, 2013), as follows:

- Stage 1: Assessment of importance/value;
- Stage 2: Assessment of potential effects; and
- Stage 3: Assessment of significance of likely effect.

7.4.39 Existing designations and professional judgement will be used to determine receptor sensitivity (i.e. importance of archaeological assets).

7.4.40 Potential effect of the proposed development upon each cultural heritage asset will consider:

- nature of impacts (adverse, beneficial or neutral);
- type of impacts (direct or indirect);
- magnitude of impacts;
- duration of impacts.

Special Considerations

Historic Landscapes

7.4.41 For Wales, this will be done with reference to the Register of Historic Landscapes in Wales (Cadw 1998) and LANDMAP. This is a web-based system, allowing information about landscape in Wales to be gathered, organised and evaluated into a nationally consistent data set. Evaluation scores for historic landscape aspect areas potentially affected by the draft route fall mostly in the range 'high' to 'outstanding' (CPAT 2011b). These scores will be considered in assessing value of such cultural heritage assets and carried through to the determination of effects process.

7.4.42 The characterisation and assessment of historic landscapes will follow the guidance in DMRB (Volume 11, Section 3, Part 2, Annex 7, Paras 7.9 and 7.10, 2013).

Assets benefitting from statutory protection

7.4.43 Assets of this kind (Designated Historic Landscapes, Registered (Landscapes) Parks and Gardens, Scheduled Ancient Monuments and Listed Buildings), have for the most part been avoided by the draft route. The EIA process will focus on assets benefitting from statutory protection, paying particular attention to potential visual effects on the settings (and landscape context) of these sites in consultation with Cadw and English Heritage.

Assessment of Site Setting

7.4.44 The overall setting (and landscape context) of any visible archaeology, built heritage, or historic landscape, will be taken into account. Consideration will be afforded to effects that the proposed development would be likely to have on both the visual setting of historic sites, and on that of the wider landscape, in line with existing guidance:

- English Heritage: The Setting of Heritage Assets (2012ed)
- Cadw: Conservation Principles for the sustainable management of the historic environment in Wales (2011)

Combined and Cumulative Effects

7.4.45 Existing guidance does not address approaches to be adopted for cumulative or combined effects on archaeology and cultural heritage. In the absence of formal guidance, the process of cumulative or combined assessment is a matter of professional judgement. In terms of cultural heritage, many of the aspects identified as important considerations in Landscape & Visual cumulative assessment (IEMA 2013) are equally applicable to determination of effects on cultural heritage assets and their settings (Entec 2008).

7.4.46 The proposed development may generate effects which have greater in-combination effect on a particular receptor than the sum of effects when considered individually. The archaeology and cultural heritage assessment will include an impact assessment to identify, describe and evaluate *combined* effects. The applied methodology would broadly follow the three stage process presented above in paras 7.4.33 – 7.4.39).

7.4.47 The cumulative effect of similar developments concentrated in one area can be greater than the sum of effects from the same development when considered individually. The archaeology and cultural heritage assessment will include an impact assessment to identify, describe and evaluate *cumulative* effects. The approach adopted would look at the cumulative effects of the proposed overhead line interacting with other overhead lines, wind-energy developments (existing, consented and proposed) and other relevant developments.

7.4.48 The applied cumulative assessment methodology would broadly follow that presented in Chapter 6: Landscape and Visual. Firstly, a Zone of Influence (i.e. the area in which significant effects are most likely to be experienced) would be defined for the overhead line and all relevant developments which are likely to interact with the proposed overhead line. Secondly, available information, in particular Zones of Theoretical Visibility (ZTVs) for each development, would be interrogated to identify overlaps where significant cumulative effects would be most likely to occur. Thirdly, cumulative effects would be assessed, predicted and described using professional judgement to determine whether these effects are likely to fundamentally affect the cultural heritage resource. Assessment of cumulative effects would be determined using the same principles as for the proposed development in isolation (as laid out above in paras 7.4.33 – 7.4.39).

Other matters

7.4.49 Effects of a permanent nature (e.g. substation, pylons, sealing end compounds), and those which will be temporary (e.g. increased construction traffic) will be assessed and taken into account.

7.4.50 The long term temporal evolution of a cultural heritage asset's landscape setting will be considered, as will the effect on visual impact of contemporary cyclic changes (e.g. annual loss of tree leaf cover).

ASIDOHL2

7.4.51 The Assessment of the Significance of Impacts of Development on Historic Landscape ASIDOHL2 system was developed as an assessment tool for large-scale developments affecting the historic landscapes appearing in the Register of Landscapes of Historic Interest in Wales, but is increasingly being used for the assessment of developments in landscapes outside these areas.

7.4.52 The SSA-B area at the western extent of the development boundary, which includes the Cefn Coch substation and pylon line, has been characterised and ASIDOHL will be applied here for those character areas which receive a visual influence based on the ZTV map.

Additional Requirements

7.4.53 The need for further investigation will be considered in light of the results of the desk-based assessment and field surveys.

7.4.54 A general or targeted strategy of evaluation will be determined following the field surveys, and prior to final determination of mitigation.

Residual impacts

7.4.55 The significance of any residual impacts will be assessed according to accepted criteria for assessing archaeological, landscape and built heritage sites.

7.4.56 Residual impacts will be mitigated through a combination of design mitigation and archaeological mitigation (e.g. preservation *in situ* and archaeological investigation and recording).

Consultation

7.4.57 Consultation will continue with Cadw, English Heritage, CPAT, SCCAS and Natural Resources Wales and other relevant bodies throughout the archaeological assessment process. This will include discussion regarding: the importance of known and potential archaeology, the settings (and landscape context) of built heritage and historic landscapes, and the effect of the proposed development.

Mitigation Scoping

7.4.58 The EIA process may determine that some receptors are likely to be subject to significant effects, where mitigation may help to offset those effects.

7.4.59 Mitigation options might include but not be limited to the following:

- Minimising adverse effects through sensitive design (e.g. adjusting locations of pylons in areas proposed for overhead line; adjustments to the route alignment in areas proposed for undergrounding; appropriate siting of works compounds; choice of construction materials, etc.);
- Enhancing heritage assets (e.g. through improved access, better information, augmenting screening);
- *In situ* preservation of below-ground archaeology;
- Historic building recording; and

- Archaeological excavation and recording.

8 ECOLOGY AND BIODIVERSITY

8.1 Introduction

8.1.1 This section details the preliminary findings of a desk study and initial walkover surveys of the 100m-wide draft route corridor to date. Where appropriate, reference is made to the initial findings of these studies in the baseline information presented. This information, together with feedback from consultees, has been used to identify ecological features along the draft route corridor and refine the scope of the ecological surveys.

8.1.2 This section also details the methodology to be followed during the Ecological Impact Assessment (EcIA) that will be incorporated into the ES.

8.1.3 The purpose of the EcIA will be to: identify and describe existing ecological features within and around the proposed location of the works in a defined area; and to assess the significance of the impacts of the proposed connection and associated infrastructure on these ecological features in conjunction with agreed mitigation measures.

8.1.4 Recommendations for avoidance, mitigation, and enhancement measures will be proposed to minimise any adverse impacts of the project on ecological features and the significance of any residual impacts will be assessed. Examples of potential mitigation measures are described in this section. However, full mitigation proposals would be provided once the EcIA has been undertaken.

8.1.5 In accordance with the EIA Regulations, the assessment will identify and appraise the potential effects which may arise during the construction, operation and decommissioning phases.

8.1.6 Relevant ecological legislation is summarised in Appendix 8.1.

8.2 Existing / Baseline Environment

8.2.1 Detailed ecological surveys and assessments commenced in March 2013. The following description of the baseline conditions is based upon a review of: detailed extended Phase 1 and Phase 2 surveys that have commenced; desk study data; online data sources; and, aerial photography.

Desk Study

8.2.2 A variety of sources were contacted to gain information about notable habitats and species which could be affected by the proposed scheme. These are listed below. The information obtained from these sources to date has been used to generate the ecology scoping plans presented in Appendix 8.2.

- Montgomeryshire Wildlife Trust (MWT);
- Shropshire Wildlife Trust (SWT);
- Powys and Brecon Beacons National Park (BBNP) Biodiversity Information Service (BIS);
- Powys/Radnorshire Badger Group (PBG);
- Shropshire Badger Group (SBG);
- The Barn Owl Trust (BOT);
- The Red Kite Trust (RKT).
- British Trust for Ornithology (BTO);
- Royal Society for the Protection of Birds (RSPB);
- Natural Resources Wales (NRW);

- Natural England;
- Multi-Agency Geographic Information for the Countryside (MAGIC) website http://magic.defra.gov.uk;
- National Biodiversity Network (NBN) Website www.nbngateway.org;
- UK BAP http://www.ukbap.org.ukand http://www.ukbap-reporting.org.uk;
- Powys BAP http://www.powys.gov.uk;
- Shropshire BAP http://www.naturalshropshire.org.uk/ShropshireBiodiversityPartnership; and
- Ordnance Survey (OS) maps and on line mapping resources and aerial photographs to identify water bodies within 300m of the draft route corridor.

8.2.3 The MAGIC website was consulted to determine whether any statutory designated sites are present along the draft route corridor and within the wider area. This website includes information on: European designations, Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and the internationally designated Wetland of International Importance, i.e. Ramsar sites, nationally designated Sites of Special Scientific Interest (SSSIs), and Ancient Woodland. A search was made for the presence of SACs designated for their bat interest within 30km of the draft route corridor as recommended in the Bat Conservation Trust (BCT) guidelines, 2007 and 2012.

8.2.4 The following search areas either side of the draft route corridor were used: 30km for SACs and candidate SACs where bats are one of the qualifying species; 2km for Natura 2000 sites (SACs, SPAs and Ramsar sites), nationally important statutory sites of nature conservation importance, such as SSSIs; and 1km for non-statutory sites of nature conservation importance and protected or notable species. Whilst these distances are applied as a guide to assess potential impacts to statutory and non-statutory sites, consideration will also be given to distant sites with mobile qualifying features present that may potentially be affected by the development, for example, the Berwyn SPA. Notable habitats and species are those which are legally protected, those included in Section 42 (NERC Act 2000), those included in Section 41 (NERC Act 2000), Birds of Conservation Concern, species and habitats protected under the Wildlife and Countryside Act 1981 (as amended), those included in the Habitats and Birds Directives, those identified in a Red Data book, nationally or locally rare or endangered habitats and species, or are identified as a priority habitats or species in the UK Biodiversity Action Plan (BAP) and the Shropshire BAP and Powys BAP.

8.2.5 Great crested newts can use suitable terrestrial habitat up to 500m from a breeding pond, however research shows that capture rates during mitigation fall off dramatically beyond 100m and mitigation beyond 250m should be critically assessed. Furthermore, research also shows that the majority of great crested newts are located in habitats within 60m of their breeding site. In terms of impacts to great crested newts and their habitats, the proposed scheme is likely to lead to only small scale localised permanent habitat loss (e.g. pylon locations, sealing end compounds) and temporary habitat losses (access areas and compounds). The project will not create any barriers to amphibian migration or lead to the loss of any breeding habitat. Therefore, assuming mitigation is implemented, e.g. vegetation management, ecological clerk of works), impacts to great crested newts are unlikely to be significant and a survey area within 300m either side of the draft route corridor is considered to be sufficient for this project. For temporary impacts and schemes such as this, a 250m survey distance is usually sufficient; the slightly wider distance of 300m is recommended to allow for minor re-routeing. Where larger scale permanent impacts are likely to arise, i.e. at the substations, a 500m survey distance will be applied.

Designated Sites

8.2.6 Information from the MAGIC website and Biological Records Centres, SWT, Powys and BBNP BBIS revealed that there are a number of statutory and non-statutory designated sites within the 2km search areas. Internationally and nationally designated sites within the search area are described below. Locations of these sites are shown on the Ecological Scoping Plan in Appendix 8.2.

8.2.7 There is one site within the search area which is of international importance:

- Montgomery Canal SAC, which crosses the draft route corridor. The presence of the Annex II species floating water-plantain (*Luronium natans*) is the primary reason for selection of the site as a SAC. This is the largest and the most extensive population of floating water-plantain in Britain and is a highly significant lowland population. In favourable management conditions the species can be dominant over kilometre lengths of canal, carpeting the shallow bed and flowering and setting seed in abundance. This is a semi-natural population, having colonised from drift material or seed but needing periodic human disturbance for continued growth; in this respect the canal is a substitute for the species' former slow-moving, mesotrophic river niche, which has been largely destroyed in lowland Britain.

8.2.8 There are two sites within the 2km search area which are of international importance:

- The Tanat and Vyrnwy Bat SAC is designated for large numbers of lesser horseshoe bat (*Rhinolophus hipposideros*) maternity and hibernation sites. The SAC comprises six different locations. The nearest locations to the search area are the Allt y Main Mine hibernation roost, which is 0.25km to the north-west of the route corridor and the Bryngwyn Hall maternity roost, which is approximately 2.2km to the north-west of the route corridor; and
- The Midland Meres and Mosses Ramsar site is designated for its geographically discrete series of lowland open water and peat land sites in the north-west Midlands of England. A number of sites make up this Ramsar site. Morton Pool & Pasture is the only component site within 2km of the draft route corridor and is immediately to the west of the Woolston to Lower Frankton section.

8.2.9 As part of the consultations, NRW and Natural England have said they need to know whether there could be impacts on qualifying interests of European wildlife sites, most notably the Tanat and Vyrnwy bat SAC and the Montgomery Canal SAC.

8.2.10 As part of the process of assessment of ecological impacts, a separate document will be prepared as part of the Habitat Regulations Assessment (HRA), in consultation with NRW and/or Natural England.. The HRA would consider the scheme in the context of the relevant Natura 2000 sites (Tanat and Vyrnwy bat sites and Montgomery Canal). The need for an Appropriate Assessment will be assessed during the Environmental Impact Assessment of the scheme in consultation with the relevant statutory conservation agency (NRW and/or Natural England).

8.2.11 There are two SSSIs within the draft route corridor; these sites are of national importance:

- Ffridd Mathrafal Track Section (just within the draft route corridor on existing the western sealing end siting area) - designated for its geological interest;
- Montgomery Canal (crossed by the draft route corridor) - diverse assemblage of plants and invertebrates;

8.2.12 There are a further fifteen SSSIs within the 2km search area:

- Gweunydd Ger Fronhaul - unimproved lowland dry grassland and associated stands of rush pasture and woodland/scrub;
- Cors Ty Gwyn - basin mire on which natural succession has progressed to the woodland stage;

- Cors Cefn Llwyd - carr woodland which has developed in a defined basin;
- Coed Ty Mawr - mixed deciduous woodland developed on generally neutral soil conditions with a variety of tree species and a well-developed ground-layer which includes uncommon species;
- Afon Banwy Ger Mathrafal;
- Glascoed – major maternity roost for lesser horseshoe bats;
- Allt y Main Mine - important winter hibernation roost for lesser horseshoe bats;
- Gweunydd Ty Brith - unimproved lowland mesotrophic grassland managed as traditional hay meadow;
- Llanymynech and Llynclys Hills - carboniferous Limestone hills with extensive grassland, scrub and woodland communities and also natural rock faces, screes, a series of abandoned quarries and areas affected by past lead and copper mining. This site is particularly important for its limestone plants;
- Morton Pool and Pasture - fen and carr vegetation around a small pool, the damp woodland surrounding it and adjacent pasture field;
- Crofts Mill Pasture - rich example of damp peaty pasture;
- Montgomery Canal and Aston Lock Keeper's Bridge - among the best localities for aquatic plants in Shropshire;
- Gwaun Efail Wig - mosaic of wet and dry grassland and swamp plant communities;
- Gweunydd Ceunant - the largest known population of the greater butterfly-orchid (*Platanthera chlorantha)* in Montgomeryshire; and
- Mawnog Gwaunynog – carr woodland developed on peatland in a defined basin.

8.2.13 The desk study identified seven non-statutory designated sites within 1km of the draft route corridor:

- Llyn Hir – nutrient poor lake;
- Llyn Gogor – blanket bog;
- Shropshire Union Canal Filed – unimproved grassland;
- Morton Pool and Pasture – fen and carr vegetation around a small pool, the damp woodland surrounding it and adjacent pasture field;Halston Hall – heronry, and the wood, parkland and river surrounding it;
- Main Oxbow Montgomery County Wildlife Site - an oxbow lake;
- Halston Hall – heronry, and the wood, parkland and river surrounding it; and
- Cupids Ramble Shropshire County Wildlife Site - Several unimproved and semi-improved wet meadows.

8.2.14 There is one designated road side verge within the 1km study area.

8.2.15 Some habitats along the draft route corridor are habitats of Principal Importance for the conservation of biodiversity in England and Wales and are Powys and Shropshire BAP habitats. Such habitats occurring along the draft route corridor could include field margins, hedgerows, lowland grassland, peatland habitats, rivers and streams, ponds and semi-natural broad-leaved woodland.

8.2.16 A summary of existing data and baseline information is provided below. Information on habitats is based upon assessment of desk study data and data collected in the field. There is a wide range of habitats along the draft route corridor; these include:

- Broadleaved woodland;
- Plantation woodland;
- Peatland habitats (degraded blanket bog and possibly flush and mire habitats);
- Hedgerows;
- Scrub and trees;
- Grassland (unimproved, semi improved, improved and amenity grassland);
- The River Vyrnwy, its tributaries and floodplain;
- Other aquatic habitats and wetland (dry and wet ditches, standing and running water, swamp);
- Arable land; and
- Other habitats such as tall ruderal, ephemeral, bare ground, and hard standing.

Notable Plants

8.2.17 The desk study revealed the presence of a number of UK BAP species of vascular plant along the route, including floating water plantain, spreading bellflower, cornflower, basil thyme, purple ramping fumitory, red hemp nettle, tubular water dropwort, lesser butterfly orchid, marsh stitchwort, annual knawel and grass-wrack pondweed. It is possible that other plant species (lower and higher) of note occur along the draft route corridor. For example, the following BAP species could occur along the draft route corridor, if suitable habitats are present: globe flower, wood bitter vetch, pillwort, black poplar, marsh flapwort, slender green feather moss and river jelly lichen.

Invasive Plants and Animals

8.2.18 Japanese knotweed (*Fallopia japonica*), giant hogweed (*Heracleum mantegazzianum*) and Himalayan balsam (*Impatiens glandulifera*) are recognised as invasive species and listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to plant these species or otherwise cause it to grow in the wild. These species, along with other species listed on Schedule 9 of the Act, may be present along the draft route corridor and will require consideration as part of the EIA.

8.2.19 Invasive animal species such as signal crayfish (*Pacifastacus leniusculus*) are listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to release these species or otherwise cause it to escape into the wild. This species, along with other animal species listed on Schedule 9 of the Act, may be present along the draft route corridor and will require consideration as part of the EIA.

Protected or Otherwise Notable Species

8.2.20 Historical records of protected or otherwise notable species were collected during the desktop studies. Plans of the data, obtained from Powys BIS during the desk study for these species, have been generated and are presented in Appendix 8.2.These records can give an indication of the likely presence of such species throughout the area. A summary of results from the desk study together with data gathered during field surveys is provided below.

- *Badger* - Badgers (*Meles meles*) are protected under the Protection of Badgers Act 1992, which makes it an offence to kill or injure badgers, disturb badgers within their setts, or cause damage to or obstruct a badger sett. The desk study revealed records of active badgers throughout the survey area and setts have been located along the draft route corridor during field surveys. It is considered that this species will be widely distributed throughout the draft route corridor where suitable habitats occur.

- *Brown Hare* - Brown hare (*Lepus europaeus*) is a species of Principal Importance for the conservation of biodiversity in Wales and England (under Section 41 and Section 42 of the Natural Environment and Rural Communities Act (NERC) 2006). Brown hare are a UK BAP Priority species and are also listed on the Shropshire BAP and Powys BAP. Suitable habitats for this species occur commonly within the area and has been sited on several occasions during field surveys.
- *Hedgehog* – Hedgehog (*Erinaceus europaeus*) is afforded protection under Schedule 6 of the Wildlife and Countryside Act 1981 (as amended). The hedgehog is also a species of Principal Importance for the conservation of biodiversity in Wales and England (under Section 41 and Section 42 of the Natural Environment and Rural Communities Act (NERC) 2006). Hedgehogs are also a UK BAP priority species. Suitable habitats for this species occur throughout the draft route corridor.
- *Water Vole* - Water vole (*Arvicola terrestris*) is afforded protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). The water vole is also a species of Principal Importance for the conservation of biodiversity in Wales and England (under Section 41 and Section 42 of NERC 2006). Water voles are a UK BAP Priority species and are also listed on the Shropshire BAP and Powys BAP, with particular note to their presence on the Montgomery Canal. The desk study results revealed a number of records for this species. Field surveys in the Meifod area also suggest that there is abundant suitable habitat along the River Vyrnwy and within associated habitat.
- *Otter* - Otter (*Lutra lutra*) is a European Protected Species that is afforded protection by Schedule 2 of the Conservation of Habitats and Species Regulations 2010 (as amended); and Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). The otter is also a species of Principal Importance for the conservation of biodiversity in Wales and England (under Section 41 and Section 42 of NERC 2006). Otter is a UK BAP Priority species and is also listed on the Powys BAP. The desk study identified otter records along the River Vyrnwy within the study area. This species was observed on the same river in the Meifod area whilst carrying out bat surveys in September 2011, and again in July 2013 whilst carrying out field surveys.
- *Dormouse* - Dormouse (*Muscardinus avellanarius*) is a European Protected Species that is afforded protection by Schedule 2 of the Conservation of Habitats and Species Regulations 2010 (as amended); and Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). It is also a species of Principal Importance for the conservation of biodiversity in Wales and England (under Section 41 and Section 42 of NERC 2006). The dormouse is a UK BAP Priority species and is also listed on the Shropshire BAP and Powys BAP. The desk study identified a single dormouse record of that was 600m from the edge of the draft route corridor.
- *Bats* - All bats and their roosts receive full protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2010 (as amended). Lesser horseshoe bat and pipistrelle bats are listed on the Powys BAP. Various records of bats were identified within the 2km study area. Species known to be present along the draft route corridor include: Myotis species (more than one species including Daubenton's, species such as whiskered and Brandt's are also likely to be present), brown long eared bat, lesser horseshoe, greater horseshoe bat, common pipistrelle, soprano pipistrelle, serotine (possibly recorded in September 2011 near Meifod), noctule, nathusius pipistrelle (possibly recorded in September 2011 near Meifod). There is also potential for species such as barbastelle bats to be present. There is suitable foraging, commuting and roosting habitat along the draft route corridor.

- *Red Squirrel* - Red squirrel (*Sciurus vulgaris*) is afforded protection by Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). It is also a species of Principal Importance for the conservation of biodiversity in Wales and England (under Section 41 and Section 42 of NERC 2006). The red squirrel is a UK BAP Priority species and is also listed on the Powys BAP. This species has been recorded from woodland near Lake Vyrnwy.
- *Birds* - All nesting wild birds are afforded protection under the Wildlife and Countryside Act 1981 (as amended). The desktop study and consultation exercise have highlighted significant ornithological interests along the draft route corridor. These include the potential presence of waders and wildfowl (e.g. Cefn Coch area and the potential for flight lines between the Vyrnwy valley and Lake Vyrnwy), raptors, herons and breeding bird species. Surveys carried out to date indicate a number of Schedule 1 species (species that are fully protected under the Wildlife and Countryside Act 1981) in the Cefn Coch area, including hen harrier, peregrine falcon and red kite. Other raptors including kestrel, sparrowhawk and short-eared owl were also recorded in this area together with a number of waders including curlew, golden plover, lapwing and snipe.
- *Great Crested Newts* - Great crested newts (*Triturus cristatus*) are fully protected by the Wildlife and Countryside Act 1981 (as amended) and the Conservation (Natural Habitats & c) Regulations 2010 (as amended). It is a UK BAP Priority species and is also listed on the Shropshire BAP and Powys BAP. It is also a species of Principal Importance for the conservation of biodiversity in Wales and England (under Section 41 and Section 42 of NERC 2006. The desk study has revealed a number of records for this species along the search area. The distribution of this species appears scattered with a relatively high concentration of records south of Oswestry. Five records were found within 2km of the draft route corridor; none were located within 300m of the draft route corridor (Powys BIS and SWT). Records for great crested newts are generally all low population counts. Great crested newts are known to be present around the substation at Shrewsbury.
- *Common Toad* - Common toad (*Bufo bufo*) are protected from intentional killing or injury under the Wildlife and Countryside Act 1981 (as amended), and are listed as a Species of Principal Importance for the conservation of biodiversity in England (under section 41 of the Natural Environment and Rural Communities Act (NERC) 2006), they are also a UK BAP priority species. Suitable habitats for common toad are common throughout the draft route corridor.
- *Reptiles* - All native reptiles are protected from intentional killing or injury under the Wildlife and Countryside Act 1981 (as amended) and all are listed as species of Principal Importance for the conservation of biodiversity in Wales and England (under Section 41 and Section 42 of NERC 2006). Slow worm, grass snake, common lizard and adder are all identified as priority species on the UK BAP. The desk study revealed records for slow worm and common lizard, both of these species may be present in suitable habitat along the draft route corridor, e.g. upland/upland fringes near Cefn Coch, south facing habitats such as tall grassland, scrub, bracken, heathland and woodland with glades.
- *Invertebrates* - The draft route corridor includes a wide range of habitats that will support both terrestrial and aquatic invertebrate interest. Desk study reveals that there are numerous records along the draft route corridor for species of terrestrial and aquatic invertebrates that are listed on either the UK or Local BAP. For example, the following terrestrial invertebrate BAP species could occur along the draft route corridor, if suitable habitats are present: red northern wood ant, high brown fritillary, pearl bordered and small pearl bordered fritillary, dingy skipper, argent and sable, grizzled skipper, wood white, grayling, silver studded blue, white faced darter and club tailed dragonfly. National and Local BAP invertebrate species

along the draft route corridor include white-clawed crayfish (listed on the Powys BAP) and species of moth and damselfly/dragon fly. There are a number of records for white-clawed crayfish (*Austropotamobius pallipes*) along the draft route corridor which are partially protected by the Wildlife and Countryside Act 1981 (as amended). There are numerous local BAP invertebrate species.

- *Fish* - The Rivers Vyrnwy, Banwy and Morda are important salmon and trout migratory and spawning areas. The smaller ditches and streams are important habitats for eels, with the River Vyrnwy being an important migratory route. Brown trout and river lamprey are included in the Powys BAP, and are also protected under the Conservation of Habitats and Species Regulations 2010 and the Salmon and Fisheries Act 1975. Both of these species, plus eels, may occur on the River Vyrnwy, associated tributaries and other watercourses along the draft route corridor.

8.3 Potential Impacts

8.3.1 The EcIA will include assessment of potential impacts and the resulting effects on ecological receptors. Based on the information available at the time of this scoping exercise, examples of potential effects of the proposed connection infrastructure on ecology and nature conservation resources could include:

- Effects resulting from potential impacts on European sites.
- Effects resulting from potential impacts that may occur on statutory (SSSI) and non-statutory wildlife sites (County Wildlife Sites).
- Effects resulting from the construction of new OHLs.
- Effects of potential collision impacts on bats and birds (particularly birds with large wingspans, slow flying speeds and lack of flight agility, such as swans and herons).
- Undergrounding of cable can lead to habitat loss (temporary) and habitats disturbance which could also cause severance of important foraging and commuting routes for fauna including bats
- Aquatic habitats along the draft route corridor might be adversely affected by poor water quality as a result of runoff during construction.
- Areas of habitat would be lost due to land-take for the construction of the substation and associated infrastructure.
- Temporary habitat loss and disturbance where features are reinstated following construction to a potentially differing quality as that originally present; e.g. temporary hedgerow removal to enable access.
- If suitable mitigation were not undertaken, there is a risk of impacts to legally protected species in discrete areas, including: great crested newt, reptile, breeding bird, badger, water vole, otter, dormouse, white-clawed crayfish and bats.
- Some disturbance to protected species might be expected through noise, vibration, air emissions (dust), air pollution from vehicles and presence of human workers associated with construction activities. This may particularly affect areas of valuable vegetation, badger setts within 30m of the construction footprint, birds, bats, amphibians and reptiles within and immediately adjacent to the construction footprint.

8.3.2 Cumulative impacts will also be considered, reference can be made to Section 5.9 of this report with regard to the proposed approach to assessing cumulative impacts.

8.4 Proposed Assessment Methodology

8.4.1 The EcIA will be undertaken with reference to current best practice and in particular the Guidelines for Ecological Impact Assessment in the United Kingdom (Chartered Institute

of Ecology and Environmental Management, June 2006) and BS42020:2013 Biodiversity – Code of practice for planning and development (BSI, 2013).

8.4.2 Further surveys will be carried out, as described below. Ecological features and resources will be described and mapped (including Biodiversity Action Plan (BAP) priority habitats and species, and species and habitats of Principal Importance). Potential ecological effects associated with the proposed works will be identified and a full ecological impact assessment and assessment of the likely significance of effects will be carried out (in line with the methodology described below). Mitigation measures to avoid or reduce likely effects will be provided and opportunities for enhancement measures will be identified.

Zone of Influence or Spatial Scope

8.4.3 To define the total extent of the area for ecological assessment, the proposed activities were reviewed in order to identify the spatial scale at which ecological features could potentially be affected. The zone of influence is the area encompassing all predicted ecological effects from the proposed development, including all ancillary, associated, temporary and permanent works included in the proposed development, such as temporary access roads, both those which will occur by land-take and habitat loss, and those which will occur through disturbance such as noise. The extent of all surveys will account for the ancillary, temporary and permanent works included in the development, such as temporary access roads in addition to the draft route corridor and include the appropriate buffers for each survey as required. The spatial scope of the surveys will take into account any changes of the proposed areas for development as the assessment proceeds and be altered appropriately.

8.4.4 For the extended Phase 1 survey, the draft route corridor, including all ancillary, temporary and permanent works, plus 250m either side is an appropriate area to survey. The pond search will cover 300m either side of the draft route corridor (which is 100m wide), extending beyond this distance where considered necessary. This will ensure that a sufficient area outside the development footprint is covered to address any permitted flexibility in the design (insofar as provided for in any development consent and/or planning permission).

8.4.5 The zone of influence will be reviewed throughout the EcIA and revised as appropriate. It will be reviewed during further design development during the EIA process and amended if necessary.

Temporal Scope

8.4.6 To define the temporal scope for ecological assessment, the proposed activities were reviewed in order to establish when impacts could occur and over what duration. Impacts have been assessed in the context of the predicted baseline conditions within the zone of influence during the lifetime of the proposed development (i.e. the assessment takes into account how the existing conditions might change between the surveys and the start of construction and/or operation). The predicted changes in the baseline will also consider the implementation of Glastir agreements and Habitat Management Plans for associated wind farms including the Tir Gwynt wind farm. Potential changes in existing conditions up to the beginning of construction will be considered in the ES.

Data Gathering

8.4.7 Establishment of baseline conditions will involve the collation of existing published data and an extended Phase 1 habitat survey. Specialist surveys will be undertaken where appropriate.

Desktop Study

8.4.8 A large amount of data has already been collated as part of this scoping exercise, as described above. Further data gathering with specialist recorders and groups will also be carried out to further inform the ecological assessment for the proposed development.

Extended Phase 1 Habitat Survey

8.4.9 The survey will follow the 'Extended Phase 1' methodology as set out in the Phase 1 survey handbook (JNCC, 2010), and the Guidelines for Baseline Ecological Assessment (Institute of Environmental Assessment, 1995). The extended version of the Phase 1 survey is a modified approach to the Phase 1 survey and follows the approach recommended by the *Guidelines for Preliminary Ecological Appraisal* (CIEEM, 2012) and conforms with the British Standard 42020:2013 Biodiversity – Code of practice for planning and development. This method of survey provides information on habitats along the draft route and within a 300m buffer and assesses the potential for notable or protected fauna to occur in or adjacent to the draft route. Habitats/features of importance or significant ecological value are individually target noted and identified for further survey.

8.4.10 The majority of the Phase 1 survey will be undertaken during the optimum time of year (April to Oct), however, some of the Phase 1 survey may be undertaken outside the optimum period for completing such a survey, due to reasons such as access restrictions. It will be ensured that the conditions are suitable, the whole of the site is accessible and the survey is undertaken by experienced ecologists. As a result, a comprehensive and valid assessment of the habitats present and their potential to support legally protected species will be undertaken. The route will be revisited throughout the survey season and the Phase 1 survey will be updated to ensure that all habitats are adequately considered and impacts assessed in the EIA.

8.4.11 The extended Phase 1 habitat survey will also involve preliminary investigations in respect of the presence of legally protected species within the survey area in terms of searching and recording signs of the species or assessing the presence of suitable habitat in which the species can exist. 'Suitable habitats' are those that are reasonably considered to support a protected or notable species such as ponds, hedgerows, woodlands, habitat mosaics, upland moorland. Within the phase 1 habitat survey, this will include:

- Recording evidence of the presence of invasive weeds listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), including Japanese knotweed and giant hogweed,
- Assessment of habitat potential for reptiles and amphibians, in particular great crested newts,
- Searching for signs of otters and water voles, including spraints, latrines, footprints and runs,
- Assessment of suitable habitats for nesting birds,
- Evaluation of habitats within the site and its surrounds for their potential to support other protected species or groups, including terrestrial/aquatic invertebrates,
- Assessment of any watercourses for their suitability to support white-clawed crayfish and fish such as salmonids (brown trout) and river lamprey,
- Assessment of suitable habitats for dormice/ evaluation of habitat suitability for dormice,
- Searching for signs of badger activity including setts, tracks, snuffle holes and latrines; and
- A visual inspection of trees and buildings to assess their suitability for bat roosts.

Phase 2 Vegetation Survey – NVC

8.4.12 Habitats of value occur within and adjacent to the draft route corridor, where these habitats are identified during the Phase 1 habitat survey (within the draft route corridor

and a 50m buffer), a Phase 2 survey and description according to the NVC will be carried out.

8.4.13 Where a Phase 2 vegetation survey is carried out the survey method will follow the NVC Users' Handbook (Rodwell, 2006). Records of rare or notable plant species will also be made whilst undertaking Phase 1 and Phase 2 surveys in relation to the draft route corridor. All Phase 2 vegetation surveys will be implemented at an appropriate time of year to allow identification of all plant communities present.

8.4.14 Valuable habitats can include semi-natural habitats, those habitats which are considered to be vulnerable, species rich, rare and/or habitats that are representative of BAP/S41 habitats. Examples recorded within the draft route corridor include grassland, wetland, broadleaved woodland, marshy grassland/fen meadow and peatland habitats. Where peatland habitat is identified, peat depths and locations will be recorded using a peat probe and hand held GPS unit.

Tree survey

8.4.15 Mature, veteran and ancient trees throughout the draft route corridor will be identified using online aerial photographs, desk top study and findings from extended Phase 1 habitat surveys. During extended Phase 1 habitat survey all mature, veteran and ancient trees will be assessed and individually target noted and locations recorded using hand held GPS.

8.4.16 Veteran and ancient trees are those that have passed beyond maturity and are old, or aged, in comparison to other trees of the same species (Lonsdale, 2013).

8.4.17 These trees will then be subject to further survey depending on their age and location within the draft route corridor in the spring/summer of 2014, following methods as described in Lonsdale (2013). A pro forma will be completed for all veteran and ancient trees, indicating their location, size, condition and any other important features they may possess. Surveys will be completed throughout the year.

8.4.18 Furthermore, specialist arboricultural surveys will be undertaken in relation to engineering requirements, and reference will be made to this information when assessing ecological value of trees which may be affected by the scheme.

Hedgerow Survey

8.4.19 Hedgerows within the draft route corridor and within a 300m buffer will be surveyed following hedgerow evaluation and grading systems, methodology (HEGS) Clements & Toft (1993). This method requires surveying of the entire length of each hedgerow within and adjacent to the draft route corridor. Recording important features such as; notable flora and fauna, height, length, width, average cross section percentage gaps, purpose, number of connections, number of standard trees within the hedgerow and presence of features including; hedgebank, ditch and grass verges.

8.4.20 The majority of the HEGS surveys will be undertaken during the optimum time of year (April to October), however, some of the hedgerow survey may be undertaken outside the optimal period for completing such a survey. All hedgerow assessments will be undertaken, ensuring that conditions are suitable. This may require more than one visit within the optimum survey period to assess, for example, associated woodland ground flora species or to compile a complete list of woody species in a hedgerow. As a result, a comprehensive and valid assessment of hedgerows present and their importance will be documented. Information from the HEGS methodology will be used in the assessment of 'Important Hedgerows' according to ecological criteria.

Great Crested Newt

8.4.21 Suitable ponds and ditches for great crested newt in the draft route and within a 300m buffer will be identified using online aerial photographs, desk top study, OS maps and findings from extended Phase 1 habitat surveys.

8.4.22 The proposed scheme will lead to limited permanent habitat loss (pylon locations, substation siting area and cable sealing end compounds) and temporary habitat losses (underground route, access areas and compounds). A survey corridor within 300m of the alignment is considered to be sufficient due to the temporary, localised nature of the development. For temporary impacts and schemes such as this, a 250m corridor is usually sufficient; in this case the slightly wider corridor of 300m is recommended to allow for minor re-routing (for example, the consented United Utilities West East Link Main 55km underground water pipeline from St Helens to north Manchester applied a 300m buffer to its great crested newt survey methodology). A 500m buffer will be applied to the substation siting area due to its larger, permanent footprint.

8.4.23 Great crested newt surveys would commence mid-March (weather dependent) with a minimum of two of the surveys being undertaken between mid-April and mid-May, following the recommendations of the Great Crested Newt Mitigation Guidelines (English Nature, 2001). This ensures that the peak period for detecting great crested newts is sampled appropriately. The great crested newt surveys will only be undertaken during suitable weather conditions, following best practice guidance.

8.4.24 An initial habitat suitability assessment of ponds will be undertaken to produce a habitat suitability index (HSI) in accordance with Oldham *et al.* (2000). HSI methodology is a requirement of the EPS licencing procedure to support method statements for licence applications; it is therefore considered appropriate to include this survey methodology in assessing pond/ditch suitability. Suitable ponds/ditches within 300m of the draft route corridor will be surveyed for great crested newt presence/absence. Ponds which are isolated from the draft route study area by barriers to newt movement/dispersal (major roads, railway lines, fast-flowing watercourses) will be excluded from further surveys as it is considered reasonably unlikely that newts from such ponds will utilise habitats within the works area. Ponds which are considered to be unsuitable for newts will also be excluded from further survey. Examples of unsuitable ponds and ditches, might be a ditch that has a strong flow of water through it, a stand of open water in highly acidic peatland, or a pond that regularly dries out (annually).

8.4.25 Where suitable ponds and ditches have been identified, presence/absence surveys will be carried out to determine if great crested newts are present. These surveys will be undertaken in accordance with the methodologies described in the great crested newt mitigation guidance produced by Natural England (English Nature, 2001). Further surveys to ensure that sufficient data is collected to enable a thorough population size class assessments, in accordance with the guidance, will be undertaken if great crested newts are found.

8.4.26 Field survey methods will include: bottle trapping, egg searches, torch searches, netting and refugia searches.

8.4.27 The only exception to the standard methodology will be in unique circumstances, for example, there is a heronry located at NGR 324439 320100 (PIL 100). There are currently 11 nests at the site; to minimise disturbance to these birds throughout the breeding season, surveys on the adjacent pond will be restricted to bottle trapping, no torching will take place after dark with the aim of avoiding flushing the birds from their nests at night, which may have a detrimental impact upon their breeding success.

8.4.28 In certain circumstances eDNA may be used as a supplementary survey method for identifying the presence / absence of great crested newts. Where this method is deployed it will follow the *'Analytical and methodological development for improved surveillance of the Great Crested Newt WC1067 Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA'*. Where this method is applied in respect to this project further detail will be included within the Environmental Statement. Ecologists utilising the method have already been provided with training by the Freshwater Habitats Trust in April 2014 to ensure adherence to the quoted guidance.

Water Vole

8.4.29 All watercourses within the draft route and within a 100m buffer have been identified using online aerial photographs, OS maps, desk top study and findings from extended Phase 1 habitat surveys. Where suitable water vole habitat is identified and is likely to be impacted by the proposed development a full habitat assessment and survey for water voles will be undertaken. The surveys of these watercourses will be carried out at the appropriate time of year following guidelines set out in the Water Vole Conservation Handbook, third edition, (Strachan *et al.*, 2011). All surveys will commence between April and October which is with within the optimal/ sub-optimal period for completing such a survey.

8.4.30 Following assessment of the habitat, the watercourses will be searched for potential signs of water voles according to guidelines set out in the Water Vole Conservation Handbook, third edition, (Strachan *et al.*, 2011). These field signs include: faeces, latrines, feeding stations, burrows, nests, runways in vegetation and footprints.

Otter

8.4.31 All watercourses in the draft route and within a 100m buffer will be identified using online aerial photographs, highlighted on OS maps and findings from extended Phase 1 habitat surveys. Historical records from detailed desk top studies indicates that otters are present throughout the entire route corridor.

8.4.32 Otter surveys will involve searches for field signs including the following: spraints, sign heaps (e.g. twisted grass, silt heaps with spraints), footprints, otter holt/resting sites and feeding remains. Surveys will be carried out throughout the year; any evidence indicating presence of otters will be detailed and GPS recording noted. The surveys will follow a modified methodology of the standard methodology of Lenton, *et al* (1980).

Wader Surveys

8.4.33 Suitable habitat for wading birds within the draft route corridor and within a 500m buffer will be identified using online aerial photographs, OS maps, desk top study and findings from extended Phase 1 habitat surveys. Experienced ornithologists will confirm the suitability of the habitats and identify survey locations. An 800 m buffer will be used for all areas where disturbance effects to curlew are likely to arise (e.g. construction of the substation at Cefn Coch, pylon locations, proposed access routes and porposed site compounds). This 800 m buffer has been applied to the survey areas to allow for the displacement of curlew during the construction period (Pearce-Higgins *et al*., 2009).

8.4.34 Surveys for breeding waders commenced in 2012 with territories for curlew and lapwing recorded; repeat surveys have been and will be conducted in 2013 and 2014.

8.4.35 Surveys have been and will continue to be undertaken in accordance with BTO survey methodologies, in particular the Brown and Shepherd (1993) method for censusing upland breeding wader populations and "*Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms*" (Scottish Natural Heritage, 2013), taking into account primarily; Golden Plover, Dunlin, Oystercatcher, Lapwing, Curlew, Snipe and Redshank, based on recommendations by Pearce-Higgins *et al*. (2009).

8.4.36 There will be a minimum of four visits per season, per year, commencing in March 2012 and concluding in June 2014 between the hours of 8:30 and 18:00.

8.4.37 Where curlew nesting sites are identified, curlew will be surveyed using the extended 'Brown and Shepherd' method (Brown and Shepherd, 1993). This involves five visits to each site with a walkover survey to record breeding behaviour during April and May and further visits until August to identify foraging areas as requested by NRW.

Wintering Birds

8.4.38 Suitable habitat for wintering birds throughout the draft route corridor and within a 300m buffer will be identified using online aerial photographs, OS maps and findings from

extended Phase 1 habitat surveys. This information will be used by experienced ornithologists to identify suitable vantage point locations.

8.4.39 The vantage point surveys will follow a modified survey methodology as describe in "Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms" (Scottish Natural Heritage, 2013). Modification of the method would involve an increase in the survey effort should important areas of bird activity be encountered. This method will be used to assess concentrations of birds, the presence of sensitive species and migration routes of species such as; swans, geese, waders, waterfowl, gulls and raptors. All species within 500m of the vantage point location will be identified and their location and flightline recorded. The wintering bird surveys commenced in winter 2011, focussing on the Cefn Coch area. The surveys will be undertaken from November 2013 until March 2014, with surveys completed over one week per month, with a minimum of three visits per week per vantage point location. Each vantage point will be surveyed for a minimum of 36 hours in total.

8.4.40 Throughout the alignment a total of six vantage point locations have been identified. The vantage point locations were identified following a walk over of the entire route corridor, in which the majority of the route was considered to be unsuitable for wintering or wetland birds. The vantage points were selected to cover the most sensitive areas of the route based on the proximity to known foraging or roosting sites (such as the VP at SJ 24271 20168 which is in close proximity to a heronry), confluence of watercourses and wetland habitats.

8.4.41 Grid references of each VP are:

- SJ 32884 26132
- SJ 24271 20168
- SJ 21170 18124
- SJ 07677 09389
- SJ 03752 05142
- SH 99944 02229

8.4.42 The vantage point at SJ 32884 26132 has been highlighted as a hotspot for many species of bird, due to the presence of a heronry and location close to the confluence of the River Vyrnwy and River Tanat. At this location, a monthly, 3 hour vantage point survey will carry on throughout the summer from April to August at this location with a total of 51 survey hours. This will allow for a thorough analysis of those bird species present and passing through the area.

Raptor surveys

8.4.43 Records of raptors have been maintained since ornithological surveys commenced in 2011, full details of this information will be included in the Environmental Assessment.

8.4.44 Raptor surveys have been undertaken at vantage point locations including the 6 listed above (para 8.4.40) during the winter of 2012 and 2013. This survey has extended through winter 2014 and will continue through summer 2014. The survey during the summer of 2014 will also include one additional vantage point site at SJ 11730 09580 and three spot check sites in the undergrounding section through the Meifod Valley:

- SJ 317878 315732
- SJ 316645 313126
- SJ 313267 311000

8.4.45 Raptor vantage point surveys will follow the methods as described by Hardy *et al.* (2009). These surveys will be undertaken during summer 2014. These surveys, in addition to data

gathered from surveys carried out previously and from desk study, will be used to assess the status of Schedule 1 raptors in relation to the scheme.

Breeding Birds

8.4.46 A modified breeding bird survey will be adapted from the common bird census survey methodology as described in Gilbert *et al.* (1998). Modification of the method would involve an increase in the survey effort should important areas of bird activity be encountered. The draft route corridor has been divided into 11 transects for the breeding bird surveys, which covers all habitats throughout the whole corridor. The method will involve walking the transects on a total of five occasions between March 2014 and July 2014.

8.4.47 Surveys will be carried out between 06:00 and 10:00, avoiding the first hour before sunrise. No census will be undertaken in adverse weather conditions (heavy rain, poor visibility or strong winds). Listening points will be identified and used at important features along each transect, such as; hedgerows, woodland, areas of scrub and any other feature that may provide suitable habitat for breeding birds. All birds identified during the census will be mapped with their activity noted.

Crayfish

8.4.48 Suitable watercourses throughout the draft route corridor and within a 100m buffer will be identified using online aerial photographs, OS maps and findings from extended Phase 1 habitat surveys.

8.4.49 The alignment contains a number of watercourses that have the potential to provide habitat for white clawed crayfish. Where habitat is found to be suitable during extended Phase 1 survey, a habitat assessment of the watercourse will commence. It is noted that the optimal time for completing such a survey is after the breeding season, mid-July to mid-September. Surveys will follow methods as described by Peay (2003) and will avoid late May and June when females are carrying newly hatched young. Hand searches for crayfish will be completed by selecting ten suitable refuges within five optimal patches of habitat within a 100m section of each watercourse surveyed.

Dormice

8.4.50 Suitable habitat for dormice throughout the draft route corridor and within a 300m buffer will be identified using online aerial photographs, OS maps and findings from extended Phase 1 habitat surveys. Where habitat is found to be suitable to support a population of dormice then a further Phase 2 habitat assessment will commence and will involve a proforma based assessment which will include the following attributes:

- Habitat feature
  - Woodland
  - Woodland understorey layer
  - Scrub
  - Hedgerow
- Size of wood/scrub (ha) and thickness of hedgerow/s (m)
- Availability of important food sources
- Connectivity of dormouse presence, e.g. opened nuts, nests
- For habitats listed above, assessments to include:
  - Data relating to notable species, e.g. hazel, oak, honeysuckle, bramble, sycamore, ash, wayfaring tree, yew, hornbeam, broom, sallow, birch, sweet chestnut, blackthorn, hawthorn, conifers, cherry, crabapple, holly, ivy, other fruits.

- Age range of trees present
- % cover for standard trees and understorey layer/scrub. Indicate the level of diversity of trees/shrubs
- For any other features level of suitability: excellent/good/moderate/poor.

8.4.51 Findings of the habitat assessment will inform the suitability of the habitat and consequently locations for the placement of nest boxes and nest tubes throughout the route corridor. There will also be concurrent nut searches following methods described in Natural England's (2006) Dormouse Conservation Handbook to inform presence/absence of dormice.

8.4.52 Research suggests that nut searches when used in isolation are not sufficient to confirm absence of dormouse. Therefore, three survey methods will be used (nut searches, nest tubes and nest boxes will be utilised). However, as guidance and research suggests, it is difficult to prove absence of the species due to their elusive behaviour, low population densities and varied omnivorous diet, particularly where suitable habitat provides abundant nesting opportunities. Where there is optimum habitat within the draft route corridor but dormice are not confirmed to be present, appropriate working procedures will be implemented to account for their potential presence (Eden, 2009).

8.4.53 During the survey where habitat is thought to be suitable, and in locations where there may be effects to habitat arising from the proposed scheme, nest tubes and boxes will be placed at appropriate locations throughout the draft route corridor to survey for dormice. All surveys will be undertaken within a variety of habitats including; hedgerow, woodland, dense and scattered scrub. Particular focus will be paid to locations (e.g. the undergrounding section) and activities (e.g. construction access, OHL spanning woodland) which may lead to the loss and severance of habitats. Survey methods will follow those described in Natural England's (2006) Dormouse Conservation Handbook. Nest tubes and boxes will be checked monthly from April until November.

8.4.54 Current research (Eden, 2009) suggests that in certain circumstances (e.g. conifer plantation lacking a shrubby understorey) nest boxes placed between 1-2m on the trunks of trees are less likely to be inhabited by dormice as they are below the leafy zone of the tree. Therefore in certain locations nest boxes will be placed at differing heights along the trunk to assess the use of nest boxes at different heights.

Reptiles

8.4.55 Suitable reptile habitat throughout the draft route corridor and within a 100m buffer will be identified using online aerial photographs, OS maps and findings from extended Phase 1 habitat surveys. Methods will follow those set out in Froglife (1999) and Gent, A.H. & Gibson, S.D. (Eds.) (2003).

8.4.56 Records show that slow worm and common lizard are present within the draft route corridor. Surveys for reptiles will focus upon suitable habitat that will be impacted by the proposals. This will include known sites arising from the desk top study as well as other potentially suitable habitats such as the degraded peatland habitats of Cefn Coch and south facing areas with bracken, scrub, woodland (with glades) and coarse grassland. A combination of tins and felt will be deployed, along with a visual encounter survey along a set transect encompassing suitable areas of habitat. Surveys will be undertaken between March and October.

Badger

8.4.57 Suitable habitat for badgers throughout the draft route corridor and within a 50m buffer will be identified using online aerial photographs, OS maps and findings from extended Phase 1 habitat surveys.

8.4.58 The desk top study confirms that badgers are common throughout the draft route. During extended Phase 1 habitat survey of the route corridor signs of badger including; locations

(using GPS) of setts, latrines, hairs, paths and feeding grounds will be target noted. The status and activity of any recorded sett will be determined in accordance with the standard published description and criteria (Cresswell, Harris & Jeffries, 1989).

8.4.59 Surveys will be conducted throughout the year, however, it is noted that the optimal period to carry out badger surveys is in early spring, autumn and winter.

Bats

Activity Surveys

8.4.60 Bat activity surveys were undertaken in September 2011, September 2012 and September 2013 in the Meifod Valley to provide initial information regarding the species present within the area and to inform the 2014 field season (which will be undertaken throughout the entire field season (March 2014 to November 2014) and the positioning of static detectors (with omnidirectional microphones) along the draft route corridor. Activity surveys in 2013 were conducted in representative samples of habitat along the overhead cabling section of the draft route corridor, and along the entire undergrounding section (Meifod Valley).

8.4.61 Bat surveys will follow Bat Conservation Trust Good Practice Guidelines 2nd Edition (Hundt. L, 2012), and be adapted with the development of the surveys. For example, modification of the method would involve an increase in the survey effort should areas of high bat activity be encountered.

Undergrounding Section

8.4.62 Bat activity surveys will commence March 2014, with monthly transects throughout the entire undergrounding section until November 2014. The timings of the survey allow for all species present in the area to be recorded. All activity surveys will commence 15 minutes before dusk and a three minute listening stop will be made at every feature along each transect. There will be three walking transect surveys (transect 1 (4.2km), transect 2 (4.7km), transect 3 (3.7km) which cover the entire length of the undergrounding section of the draft route corridor. In addition, there will be a 4th driving transect (12.7km) along the A495 which will cover the entire length of the undergrounding section and runs between the eastern cable sealing end compound location and the western cable sealing end compound location site. Driving transects provide useful information that contributes towards the information collected from the walked transects and static detectors, allowing more thorough assessment of potential impacts. The starting location of the activity transects will alternate each month; this will allow for species that emerge from roosting sites later in the night to be recorded.

8.4.63 The survey effort within the Meifod Valley area has been increased with the walking transects covering the entire length of the undergrounding section and deployment of additional static detectors, to enable assessment of potential impacts in relation to the Tanat and Vyrnwy Bat SAC.

Overhead Cable Section

8.4.64 In areas where overhead cable is proposed, representative samples of habitat (such as hedgerows, woodland, scrub, aquatic habitats) throughout the overhead cabling section of the draft route corridor will be surveyed. There will be seven walked transects in total throughout the overhead cable section of the draft route corridor. In addition to the walked transects, there will be one driven transect covering the Llansantffraid area.

8.4.65 Surveys in the overhead cable section of the draft route corridor will consist of three surveys, per transect over the season (spring/summer/autumn). The lower survey effort (compared to the undergrounding section) reflects the significantly lower bat activity encountered in these areas, following completion of the initial activity surveys in 2011, 2012 and 2013. Bat activity was considered to be lower in these areas, based upon habitat availability (i.e. less woodland and more intensively famed arable land).

8.4.66 The River Vyrnwy traverses through the Llansantffraid area making it difficult to complete walking transects that are in accordance with BCT Guidelines (Hundt. L., 2012), as the specific distances and time periods required to complete a walking transect would not meet BCT criteria for such a survey. Therefore, to supplement this shorter transect the addition of a driven transect in the Llansantffraid area will ensure a representative sample of habitats and species present are recorded.

Static Detectors

8.4.67 In addition to standard field survey, the assessment of impacts to bats will involve the deployment of static detectors. The survey effort in relation to static detectors will follow that advised in the BCT Guidelines (Hundt. L, 2012). Static detectors (SM2, Anabat, Anabat Express) with omnidirectional microphones will be placed on linear features (hedgerows, scrub, woodland, wooded/tree lined watercourses) throughout the route corridor, with particular focus on the Meifod Valley which will be affected during the construction phase of development. Static detectors will be placed on linear features (three static bat detectors will be placed on each walked transect within the overhead cable section and three static bat detectors per transect within the undergrounding section) for five to seven days per month, each month from March 2014 until November 2014. Bat activity surveys will influence the positioning of the detectors and as the survey season advances the static detectors will be placed in/relocated to areas of higher bat activity.

Bat Tree Assessment

8.4.68 Trees within the draft route corridor will be initially surveyed during extended Phase 1 habitat survey and highlighted as having low, medium or high bat roost potential.

8.4.69 Further detailed tree assessments will be conducted on all trees within the draft route corridor that have been highlighted in the extended Phase 1 habitat survey as having medium and high bat roost potential. These surveys will involve a ground level assessment of trees and will be undertaken in winter/spring when bat features are identifiable due to the lack of foliage on trees. Features of trees and signs indicating possible use by roosting bats will be identified using the methods for visual inspection of trees as described in Bat Conservation Trust Good Practice Guidelines 2nd Edition (Hundt. L, 2012). Features and signs will be recorded on a pro forma and mapped using GPS.

8.4.70 Where a tree within the draft route corridor is highlighted as being high risk for roosting bats, it will be selected as a listening point during the bat activity transects. This information will be supplemented by information gathered from the results of the activity surveys (e.g. where areas of bat activity are high and bat risk trees are present, it is considered that the potential for bat roosting is high).

Red Squirrel

8.4.71 Suitable red squirrel habitat throughout the draft route corridor and within a 100m buffer will be identified using online aerial photographs, OS maps, and findings from extended Phase 1 habitat surveys. Survey methods will follow those described in Practical Techniques for Surveying and Monitoring Red Squirrels by the Forestry Commission (Gurnell *et al.* 2009).

8.4.72 Line transect visual surveys for red squirrel will be undertaken within suitable habitat such as coniferous and broadleaved woodland that will be affected by the development. Particular attention will be paid to undergrounding sections and areas where there will be woodland loss. Surveys can be carried out all year round, with the optimum period being March-September. Surveys will be completed twice per year, once each in spring and autumn.

Fish

8.4.73 Where open cutting of watercourse crossing is anticipated and aquatic habitats are affected, NRW and the EA will be consulted regarding the availability of data for salmonid habitat. If such data is not available and potential salmonid habitat (spawning and/or migration habitat) is likely to be affected then fish surveys will be undertaken according to standard methodology. The methodology for fish surveys will be agreed with NRW and the EA should they be required.

Other Mammals

8.4.74 The draft route corridor provides a range of habitats for other mammals including UK BAP species. Mammals which may be present within the draft route corridor that may require consideration within the EIA include: brown hare, pole cat, pine marten, water shrew and hedgehog. There are records for pine marten and pole cat within the draft route corridor.

8.4.75 Consideration will be given to the potential impacts on these species and others of note that may be encountered during the EIA. The assessment of these species will be based upon desk top study. Where these species are observed during extended Phase 1 Habitat survey they will be target noted and their location recorded.

Terrestrial Invertebrates

8.4.76 The draft route corridor encompasses a wide range of habitats that support a high diversity of invertebrates including notable species. The proposed scheme is unlikely to cause any significant long term impacts on terrestrial invertebrates and their habitats. Overhead lines developments, including above ground equipment, are unlikely to impact upon terrestrial invertebrate habitat and the undergrounding of cables will lead to temporary habitat loss. At this stage it is envisaged that specialist invertebrate surveys will not be required. However, if it becomes apparent from desk study, consultation and extended Phase 1 habitat survey that potentially significant invertebrate species and their habitats are subject to negative impacts, then specialist surveys will be undertaken.

Nature Conservation Evaluation

8.4.77 The following criteria are proposed for evaluation of nature conservation features and the Guidelines for Ecological Impact Assessment in the United Kingdom (Chartered Institute of Ecology and Environmental Management (CIEEM, 2006).

Nature Conservation Evaluation Criteria

8.4.78 The determination of the significance of likely effects requires values to be assigned to nature conservation features. Such valuations are a function of the geographic context, existing designations, biodiversity values and potential nature conservation value. The geographic context of features is related to the following outline scale (note the scale below may be modified during the EIA as a consequence of survey findings):

- International:
  - Internationally (including European) designated sites (Special Protection Area (SPA), Ramsar, Special Area for Conservation (SAC)).
  - A site which meets the criteria for designation as an international site but is not designated.
  - A significant population of a European protected species in this geographical region.
  - A small population of a European protected species not typical of the geographical region.
  - Annex 1 habitats and Annex 2 species outside designated sites.
- National/UK:

- Nationally designated sites (Site of Special Scientific Interest (SSSI), National Nature Reserve).
- A site which meets the criteria for designation as a national site but is not designated.
- A significant population of a more common and widespread European protected species in this geographical region.
- A significant population of a protected species under all parts of Schedule 1, 5 or 6 of the Wildlife and Countryside Act 1981, e.g. Badger.
- UK Biodiversity Action Plan (BAP) Priority Habitats as defined by S41 and S42 of the Natural Environment and Rural Communities (NERC) Act.
- Significant populations of UK Biodiversity Action Plan (BAP) Priority Species as defined by S41 and S42 of the NERC Act.

- Regional importance:
  - A good/typical example of a UK BAP Priority Habitat that satisfies all the criteria in the Priority Habitat definition but is in some way slightly enhanced (e.g. presence of a species that is localised in the region).
  - A regularly occurring, locally significant population of a species listed as being nationally scarce.
  - Habitats and species listed on the local BAP (but not already listed as UK BAP Priority Habitats and Species).
- County or District importance:
  - Sites of County importance (non-statutory) designated by local authorities or others, including semi-natural ancient woodland greater than 0.25ha, and species equivalents.
- Local Local/Parish importance:
  - Populations of UK BAP Priority Species which are not considered to be exceptional or of significance in the local geographical area.
  - Areas of habitat which appreciably enrich the habitat resource in the local or parish contexts but are not of substantive biological importance.
- Within the zone of immediate influence only/Site:
  - Species-poor vegetation communities
  - Typical populations of common and widespread mammal, bird, amphibian and/or invertebrate species
  - Habitats which are sub-optimal for use by wildlife because of problems with the structure, species composition and/or very limited size.
- Negligible:
  - Built development (unless supporting a significant population of a protected species)
  - Bare ground (car parks, hard standing, roads)
  - Intensive agricultural land
  - Stands of non-native/invasive species.

8.4.79 It should be noted that it is usual to consider habitats and species together when ascribing a value to a feature using this geographic context. However, there are circumstances where it may be necessary to assign a value to a particularly valuable species. In assigning value to a species it is necessary to consider the species distribution and

status, including a consideration of trends based on available historical records and to make use of any relevant published evaluation criteria. For instance, the presence of a significant population of European protected species such as bats and great crested newts may be worth separate consideration.

Criteria for Assessment of Significance of Likely Effects

8.4.80 The assessment of the potential impacts of the proposed development needs to take into account both on-site impacts and those that may occur to adjacent and more distant ecological features. It should also include impacts arising during construction and operation. Impacts can be positive or negative. Negative impacts can include:

- Direct loss of wildlife habitats;
- Damage to wildlife habitats;
- Fragmentation and isolation of habitats;
- Direct loss of species;
- Damage to species;
- Disturbance to species from noise, light or other visual stimuli;
- Changes to important habitat features;
- Changes to the local hydrology, water quality and/or air quality; and
- Disturbance during the operational phase, including;
  - vegetation clearance beneath conductors,
  - collision of species with conductors,
  - electrocution of species, and
  - introduction of non-native species and risk of fire.

8.4.81 Negative and positive impacts on nature conservation features have been characterised based on predicted changes as a result of the proposed activities. In order to characterise the impacts on each feature, the following parameters are taken account of:

- The magnitude of the impact;
- The spatial extent over which the impact would occur;
- The temporal duration of the impact;
- Whether the impact is reversible and over what timeframe; and,
- The timing and frequency of the impact.

8.4.82 The assessment identifies those positive and negative impacts which are likely to be 'significant', based on the integrity and the conservation status of the ecological feature. Impacts are unlikely to be significant where features of local value or sensitivity are subject to small scale or short-term impacts. However, where there are a number of small-scale impacts that are not significant alone, it may be that, cumulatively, these may result in an overall significant impact.

8.4.83 Having characterised impacts, professional judgement has then been applied to assess whether likely impacts are 'significant' or not in line with the EIA Regulations. Significance is determined by changes in the integrity or conservation status of nature conservation features. The integrity of 'defined' sites is described as follows by IEEM (2006) and has been used in this assessment to determine whether the impacts of the proposals on a designated site are likely to be significant:

'The integrity of a site is the coherence of the ecological structure and function across its whole area that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified'.

8.4.84 The conservation status of habitats and species within a defined geographical area is described as follows and will be used in this assessment to determine whether the impacts of the proposals on non-designated habitats and species are likely to be significant:

- For habitats, conservation status is determined by the sum of influences acting on the habitat and its typical species, that may affect its long term distribution, structure and functions as well as the long term survival of its typical species within a given geographical area;
- For species, conservation status is determined by the sum of influences acting on the species concerned that may affect the long term distribution and abundance of its population within a given geographical area.

8.4.85 In addition to assessing whether an impact is significant or not, the confidence in the prediction is also considered, using an appropriate scale and any limitation to certainty is described:

- Certain/near certain (probability estimated at 95% chance or higher)
- Probable (probability estimated at between 50% and 95%)
- Unlikely (probability estimated at between 5% and 50%)
- Extremely unlikely (probability estimated at less than 5%)

8.4.86 In addition to determining the significance of a likely impact on any ecological features, the EcIA will also identify any legal requirements for mitigation measures and discusses any policy implications. This refers to policies as set out in Local Development Plans and/or Local Development Frameworks (LDFs).

8.5 Ecological Design Input

8.5.1 Where possible, significant ecological effects have been avoided by design. For example, by:

- routeing to avoid direct and indirect effects on European sites (SPAs, SACs and Ramsar sites) and nationally designated sites (SSSIs);
- routeing to avoid effects on locally designated sites, where possible;
- sensitive siting of the sealing end compounds and tee-in;
- sensitive siting of pylons and the final underground cable position; and
- including appropriate measures within the design and construction programme to avoid significant effects on legally protected species.

8.5.2 Where avoidance of effects is not possible, suitable mitigation will be included to ensure that the residual effects are not significant.

8.6 Potential Mitigation Measures

8.6.1 Mitigation measures will be incorporated into the proposed development that will be taken forward for construction and these will be taken into account in the assessment of impacts, so that the residual assessment reflects the completed connection infrastructure. Monitoring requirements will be identified where appropriate.

8.6.2 For the purpose of this assessment, mitigation refers to measures that will be incorporated into the design to avoid and reduce negative impacts. In addition, opportunities to provide nature conservation enhancements will be incorporated within the

proposed design where possible. Enhancement refers to measures that improve biodiversity within land acquired for the proposed development but not specifically for the purposes of ecological mitigation.

8.6.3 In addition to determining the significance of an effect on any ecological features, the assessment will also identify any legal requirements such as protected species licensing.

8.6.4 Those features that are likely to be significantly affected by the scheme will be included in a summary table at the end of the Ecology and Nature Conservation chapter. Examples of mitigation measures that might be required are described below.

General Mitigation

8.6.5 All the mitigation proposals below will be supported and supervised by the presence of an ecological watching brief throughout the main construction phase of the works. An Environmental Management Plan will be designed to ensure that methods of best practice are followed, that the integrity of features is maintained and they remain undamaged, and disturbance to protected species is avoided. All recommended mitigation measures will be discussed and agreed with NRW and Natural England as appropriate.

Designated Sites

8.6.6 With regards to the SAC and Ramsar sites and following consultation with NRW and Natural England, suitable measures to avoid impacts may include constraints on the timing of works and sensitive working practices to avoid pollution. A Stage 1 Screening assessment will be undertaken on the effects of potential impacts on the qualifying features of the three European sites that could be affected by the scheme. This assessment will guide the requirement for a Stage 2Appropriate Assessment under the Habitats Regulations. This process will also identify any requirements for further surveys or mitigation measures.

8.6.7 With regard to SSSIs, the draft route corridor and associated infrastructure has beendesigned to avoid these sites. Consultation with NRW and Natural England will be necessary to identify further mitigation measures for SSSI which may include pollution prevention measures, reduced working widths, habitat re-instatement if required, sensitive timing of works, and post construction monitoring.

Notable Habitats

8.6.8 Based on current knowledge, the draft route and associated infrastructure are likely to avoid, as far as possible, more sensitive habitats such as woodland, peatland and wetland habitats. Mitigation against permanent and temporary loss of habitats during construction of the proposed connection infrastructure will include approaches such as minimising working areas, habitat translocation (e.g. careful lifting, storage and reinstatement of grassland, soils, etc.) and/or habitat reinstatement using an appropriate species mix. Measures (e.g. high visibility fencing, signage, etc.) to protect more sensitive habitats, such as peatland habitat, fen, bogs, marshy grassland, woodland, hedgerows, ponds and watercourses, in close proximity will also be adopted. Mitigation for the loss of trees will involve replanting on a 4:1 basis, in line with National Grid policy.

Protected and Notable Species

8.6.9 Deterrent measures to avoid or reduce impacts on birds should there be a collision risk, particularly along a significant migration route, will be considered in liaison with NRW and Natural England Measures to minimise disturbance to breeding birds during construction will include removal of any vegetation outside the bird breeding season (early February to end August). If this is not possible, an ecologist will check the area for nesting birds 24 hours prior to commencement of works.

8.6.10 Works will be carefully timed to avoid impacts to breeding birds, specifically curlew, during construction. Measures to deter predators of curlew would be implemented to minimise potential impacts arising during the operational phase of the development.

8.6.11 If great crested newts are found during the surveys, mitigation measures will have to be agreed, and will most likely to take the form of excluding them from the working area. In order to do this, a relevant licence may be necessary.

8.6.12 Where the working area is within 30m of any badger setts, appropriate measures to limit disturbance will be undertaken. A NRW or Natural England licence may be required.

8.6.13 Suitable mitigation measures will be implemented to minimise impacts on reptiles. Appropriate measures may include exclusion fencing or, if the population is found to be sufficiently large, relocation to an alternative suitable habitat away from the area of works. A fingertip search prior to any vegetation clearance will also be undertaken.

8.6.14 To minimise impacts on bats during construction, where possible works will be carried out during the day to avoid disturbance from lighting. However, if any trees or buildings with potential to support roosting bats need to be removed, suitable mitigation will be provided.

8.6.15 Suitable mitigation measures will be followed to minimise impacts on white-clawed crayfish. Appropriate measures may include sensitive timing of works, careful removal (under the appropriate licence) from working areas and relocation to an alternative suitable habitat away from the area of works.

8.6.16 There may be temporary and/or permanent impacts on dormouse and other species of note (red squirrel, pole cat, pine marten, hedgehog, common toad, fish species) resulting from the proposed works. Suitable mitigation measures will be followed to minimise these impacts. Appropriate measures may include sensitive timing of works, careful removal (under the appropriate licence) from working areas and relocation to an alternative suitable habitat away from the area of works.

8.6.17 Where vegetation is removed due to construction, replanting programmes shall use native species from seed banks of local provenance. In areas that previously consisted of introduced or ornamental species, native planting shall be prioritised, while also considering the surrounding landscape character.

Opportunities for Enhancement

8.6.18 Any opportunities for habitat creation to improve the nature conservation value of the site will also be explored. Particular attention will be paid to improve habitats for protected species and in the areas close to designated sites.

8.6.19 Consideration could also be given to finding opportunities to input to the enhancement of the nearby Nature Improvement Areas; the Meres and Mosses of the Marches. Enhancement measures could also consider improvements to peatland habitats and enhance habitats for breeding curlew.

9 WATER QUALITY AND RESOURCES

9.1 Introduction

9.1.1 This section of the ES will address the potential effects on water quality and resources that may arise during the construction, operation and decommissioning phase of the proposed development, including discharges, dewatering of excavations, surface runoff of silts, and potential for contamination of the local water environment. This section will also address flood risk, hydromorphological risk and compliance with the EU Water Framework Directive (WFD).

9.1.2 The scoping of water quality and resources risks, plus the scoping of the flood risks, has been undertaken in line with the guidance provided in the letter from the Environment Agency to National Grid, dated 24 June 2011. In addition, the scoping of these risks has been based on the guidance set out in the following documents:

- Environmental Impact Assessment (EIA): A handbook for scoping projects, Environment Agency, May 2002.
- Guidance Note I13 on Scoping the Environmental Impact of Overhead Transmission Lines. Environment Agency, May 2002.
- Groundwater Protection: Policy and Practice (GP3), Environment Agency, August 2013.
- Overarching National Policy Statement for Energy (EN-1). Planning for new energy infrastructure.Department of Energy & Climate Change, July 2011.
- National Planning Policy Framework (NPPF) and accompanying Technical Guidance, Department for Communities and Local Government, March 2012.
- *Technical Advice Note (TAN) 15 for Wales: Development and Flood Risk.* Welsh Assembly Government, July 2004 (Updated in March 2013).
- Adaptation sub-committee Progress Report 2012 on climate change and flooding (applicable to England and Wales).

9.1.3 The comments received from the various stakeholders have been taken on board; these are considered in more detail below.. The hydromorphology risk assessment report and the proposed EU WFD Assessment do not form part of the EIA, although information from these reports will be utilised in the EIA where appropriate.

9.2 Existing / Baseline Environment

Water Resources and Water Quality

9.2.1 The draft route extends predominantly within the upper reaches of the Severn catchment and crosses numerous watercourses including Environment Agency classified Main rivers and ordinary watercourses, and minor ditches (drains). Rivers potentially affected by the overhead sections of the route include the Afon Banwy, Afon Efyrnwy/River Vyrnwy, Afon Tanat, River Severn, River Morda and the River Perry. Rivers potentially affected by the underground development are the Afon Efyrnwy/River Vyrnwy and Afon Cain.

9.2.2 The Montgomery Canal, a part of which is designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC) under the EC Habitats Directive (Council Directive 92/43/EEC), is also crossed, twice, by an the overhead section of the draft route, to the south of Llanymynech, in Powys, and at Maesbury Marsh, in Shropshire. The crossing point near Llanymynech is at a section of the canal that is in water but not currently navigable, whilst the Maesbury Marsh section is navigable. The draft route then follows parallel to the canal to the north-east, towards the tee-in at Lower Frankton, where the Montgomery Canal joins the Llangollen Canal. Works to restore the

canal have been ongoing since 1969, with future restoration likely to include the construction of a new electrically operated lift bridge at the B4398 crossing.

9.2.3 Other water features have also been identified along the draft route, including ponds and lakes.

9.2.4 A number of licensed surface water abstractions have been identified along the draft route that draws water from the river network. These primarily provide water for agricultural use, although several provide a private water supply (potentially used for drinking water), while two are used for generating electricity.

9.2.5 When considering groundwater along the draft route, the south-western part of the route, from the substation site through to where the overhead line passes to the south of Llanymynech, the geology is characterised by mudstones of the Silurian and Ordovician periods which are classified as Secondary B aquifers while the overlying drift geology are predominantly classified as Secondary A Aquifers. These aquifer classifications indicate that only limited amounts of groundwater are available for water supply, supporting abstractions at a local scale and providing base flow to rivers.

9.2.6 Along this section of the draft route a significant number of small private unlicensed groundwater abstractions (less than $20m^3$/day) have been identified. Such small abstractions are usually used for providing a water supply to a single domestic property for general use, including drinking water. Only a small number of licensed groundwater abstractions (greater than $20m^3$/day) have been identified, which provide water supplies which include drinking water uses as well agricultural uses.

9.2.7 The geology in the north-east part of the draft route, from Llanymynech to Lower Frankton, is dominated by the Permian Kinnerton Sandstones and Triassic Chester Pebble Beds, forming the Permo-Triassic sandstone aquifer that is classified as a Principal Aquifer by the Environment Agency. This is locally known as the Knockin aquifer. These formations contain significant quantities of groundwater.

9.2.8 A greater number of larger groundwater abstractions are located along this section of the draft route, including three public water supplies, operated by Severn Trent Water, identified at Kinnerley, Rednal and Kinsall. A number of licensed and unlicensed water supplies have also been identified within the north-eastern section.

9.2.9 The Environment Agency use Source Protection Zones (SPZ) to apply a level of protection to drinking water sources. SPZs are used to identify those areas close to drinking water sources where the risk associated with groundwater contamination is greatest and are an important tool for identifying highly sensitive groundwater areas. SPZs are of particular importance when considering siting of certain above ground and underground infrastructure, particularly during the construction phase of the proposed development.

9.2.10 The Environment Agency has developed bespoke SPZs for public water supplies, which have been provided for the three identified sources at Kinnerley, Rednal and Kinsall. The draft route is shown to pass through, as overhead line, the SPZ3 (the Total Catchment zone) for these three sources, which is defined as the area around an abstraction source within which all groundwater recharge is presumed to be discharged at the abstraction source. Construction within the SPZ3 would be considered to present a low risk to these water sources. For private water supplies (both licensed and unlicensed), default SPZs are defined based on Environment Agency guidance provided in the document Groundwater Protection: Principles and Practice (v1.1, August 2013). The draft route crosses the default SPZ2 (Outer Protection Zone) for a number of water sources, potentially presenting a moderate risk to these sources.

9.2.11 Also within the north-eastern area of the draft route planning permission has been granted to allow future development of the Shropshire Groundwater Scheme Phase 7. This scheme is made up of existing groundwater abstraction sites and a pipeline connection

which form part of a system used to supplement flows in the River Severn during periods of low flow. Consultation with the Environment Agency has identified that there should be a radial exclusion zone of 50m (100m diameter) around each pumping abstraction point. Locating an overhead line directly over head of the pumping stations would severely compromise the ability of the Environment Agency to maintain the operational asset as they could not safely operate cranes in close proximity to high voltage overhead lines. Phase 7 comprises two separate groups of abstraction wells, with one group of two wells located to the north and west of the draft route, and four wells to the south and east. The draft route passes approximately 500m from the closest of the abstractions wells and as such should not present a significant constraint on the potential development of the overhead line in this area.

9.2.12 Environment Agency Catchment Abstraction Management Strategies (CAMS) are strategies for management of water resources at a local level. The most recent updates to the CAMS documents (dated February 2013) indicate that each of the identified CAMS units, for both surface water and groundwater resources, along the draft route has been assigned a resource availability status of 'Restricted water available for licensing', meaning that if all water that is licensed is abstracted then there would not be enough water left for the needs of the environment, indicating potential stresses to water resources in the area.

9.2.13 The draft route also passes a number of sites which are subject to discharge consents, including from sewage treatment works and from domestic properties.

9.2.14 The draft route also extends across areas that are subject to the River Severn River Basin Management Plan (RBMP). The RBMP provides an indication of the water quality through providing a classification for the current status of each water body in the district. Overall, all surface water bodies have a current status of either 'Good' or 'Moderate' and with an objective of achieving 'good' status by either 2015 or 2027.

9.2.15 A number of designated ecosystems and habitats have been identified within the EIA study area. These include Special Areas of Conservation (SACs), Ramsar sites (wetlands of international importance designated under the Ramsar Convention), Sites of Special Scientific Interest (SSSI), County Wildlife Sites and local Wildlife Trust sites, many of which are water dependent. The sites include the Morton Pool and Pasture Ramsar site and SSSI which is located to the south of Oswestry, and forms part of the Meres and Mosses series of Ramsar sites. A number of other potentially water dependent SSSIs are located towards the south-western part of the draft route between the substation site and Mathrafal. See Section 8: Ecology for further details.

Flood Risk

9.2.16 The draft route extends predominantly within the upper reaches of the Severn Catchment and its tributaries have large functional floodplains that annually provide flood storage. The draft route also extends across areas that are subject to the River Severn River Basin Management Plan (RBMP). Flood Defence Consents (FDC) would be required from Natural Resources Wales (NRW) and/or Environment Agency for any works in/under, over or within a specific distance (typically 8m) from the top of the bank of a Main River or any NRW or Environment Agency owned and maintained flood defence asset. The lead Local Flood Authorities would also be required to give consent for any works in/under, over or within a specific distance (typically 8m) from the top of the bank of an ordinary watercourse.

9.2.17 Floodplains encountered within the overhead sections of the draft route include those of the Afon Rhiw, Afon Banwy, Afon Efrynwy/River Vyrnwy, River Morda and the River Perry while the floodplains affected by the underground section are the Afon Banwy and the Afon Efrynwy/River Vyrnwy.

9.2.18 In accordance with the relevant planning guidance, the development should be located outside areas of floodplain wherever possible. However, where it is a necessity that the

proposed development is located within areas of floodplain, attention should be given to the potential impact that mobile temporary works may have on important flow routes such that any adverse effects of pylon foundations and/or crossings can be assessed.

9.2.19 There a number of small watercourses, both main river and ordinary, which cross, or run in close proximity to, the draft route. Some of these watercourses have been included in the NRW/Environment Agency national flood mapping exercise and as a result indicative floodplain outlines are available for these. Others due to their scale and nature (catchments less than 3km^2) do not have floodplain outlines available. Some assessment of these 'un-mapped' watercourses would be necessary, as part of an overarching flood assessment, that would consider both construction and operational phases. It is anticipated that the scope and method for assessing these watercourses would be agreed in advance with NRW and the Environment Agency as appropriate.

Hydromorphology

9.2.20 The draft route requires the use of underground cable technology to cross the Meifod valley between Tan House and Waen-fâch. The total required underground cable length is about 13km; around 7km of this is within the River Vyrnwy floodplain. Upstream and downstream of Meifod valley, the proposed development requires the utilisation of overhead line technology. The total length of overhead line cables to the southwest of the Meifod Valley is 15km; to the north east of Meifod valley the overhead line length is 26km to the connection point with the existing 400 kV overhead line. The proposed overhead line and pylons will cross a protected area from the confluence of the Vyrnwy and Tanat rivers downstream to the confluence of the Vyrnwy and Morda rivers. This site is a Geological Conservation Review (GCR) site (Gregory, 1997).

9.2.21 Lewin (1997) notes that this GCR site is characterised by exceptionally preserved palaeochannels and other surface sedimentation features revealed as crop marks in aerial photography. These are probably the best preserved in Wales and show the complex changes in channel patterns that have occurred since de-glaciation in this location. The palaeochannels are located within a set of terraces up to 10m above the present river level. A blanket of fine alluvium covers many of the terraces making these features difficult to identify on the ground. Lewin (1997) cautions that the fragility of these palaeochannels requires careful conservation so that they are not inadvertently impacted.

9.2.22 Lewin (1997) has noted that the River Vyrnwy above its junction with the River Morda is laterally mobile producing point bar sediments and a cut-off immediately down valley of its confluence with the River Tanat.

9.2.23 Lateral river movement and the potential for erosion are important considerations and would be covered by the geomorphological assessment.

9.3 Potential Issues

9.3.1 Potential issues to be addressed as part of the EIA include:

- Sensitivity of the groundwater and surface water resources and features along the draft route , including groundwater protection and recharge, surface water flows and quality, water dependent ecosystems and habitats, and existing protected water abstractions;
- Effects of the proposed development on water quality, water resources and physical characteristics of the water environment including:
  - Water quality risks to both surface water and groundwater during the construction phase, including silting/sedimentation of nearby surface watercourses and contamination through spills/leaks of oil, fuels and other hazardous chemicals from construction vehicles or through inadequate storage/handling;

- Potential water quality risks to groundwater during the operation phase of the cable connection;
- Modification of the physical characteristics of the local water environment, including the creation of impermeable surfaces, construction of underground structures and temporary re-routing of small watercourses;
- Effects of dewatering activities on the surrounding hydrogeology and any nearby water features; and
- Effects upon the water abstractions and discharges along the draft route, including the planned Phase 7 of the Shropshire Groundwater Scheme.

- Development of appropriate construction management methods to protect site neighbours, the environment and prevent pollution to groundwater and surface waters;
- Flood risk, including an assessment of 'un-mapped' watercourses; the potential impacts of the construction and operational phases on floodplain flow paths; the impacts of the completed development on surface water runoff; and consideration of mitigation measures as appropriate. It is anticipated that an overarching flood assessment report would be produced that takes into account the requirements of both NRW and the Environment Agency. It is envisaged that the form and structure of this document would be agreed with both NRW and the Environment Agency prior to its production;
- The effect of the proposed development on lateral channel instability;
- The effect of the proposed development on critical flow routes across floodplains and confluence areas and hence to river / floodplain connectivity;
- The effect of the proposed development on GCR sites;
- The effect of the proposed development on fluvial forms and processes.

9.4 Potential Impacts

Construction Phase – Water Quality and Water Resources

9.4.1 During the construction phase it is likely that there would be the introduction of new temporary impermeable areas such as access tracks. The installation of underground cables, the erection of pylons and associated infrastructure can also result in compaction of soils and an increase in impermeable (or slowly permeable) surfaces. There is a risk that the subsequent increase in surface runoff could increase soil erosion and increase sediment loads into any nearby watercourses, if not appropriately managed.

9.4.2 Impermeable areas could also locally reduce the natural recharge from rainfall to groundwater, potentially impacting on the groundwater resources balance of an area. This effect is likely to be negligible on a catchment scale when considering the implications for the CAMS status of the groundwater units. However, on a local scale there could be effects to specific groundwater dependent features, such as water abstractions or groundwater dependent ecosystems.

9.4.3 Soil stripping and excavations for underground structures, including the underground cable and foundations for pylons, would require the excavated soils to be stored within the working area. This could result in the mobilisation of silts and sediments which can potentially lead to silting/sedimentation of nearby surface watercourses if not appropriately managed.

9.4.4 There is also the potential for accidental leaks or spills of oil, fuels and other hazardous chemicals from construction vehicles or through inadequate storage/handling that could lead to contamination of surface and groundwater resources along the draft route. This

could have water quality implications for nearby water abstractions or water dependent ecosystems that may receive such contaminated water.

9.4.5 Where shallow groundwater levels are encountered, the excavations would need to be dewatered and the pumped water discharged at a suitable location potentially resulting in effects on the quality of the water of the receptor. The use of silt busters would mitigate any impacts from high sediment content in the discharged water, while other measures would be necessary to prevent contaminated water being discharged to a surface watercourse (such as removing contaminated water offsite for treatment using tankers).

9.4.6 Potential impacts on groundwater levels and flow directions during dewatering operations also have the potential to occur and consideration is necessary to ensure water is not taken away from any water dependent features along the route, or a reduction in yields from any existing groundwater sources through the drawdown of water levels.

9.4.7 The draft route will extend across Main rivers and ordinary watercourses as these are unavoidable. For the underground section of the draft route, watercourse crossing points would be sensitively chosen, and consultation has been, and would continue to be undertaken with the NRW and the Environment Agency, and their feedback reflected within the choice of location and the proposed working practices. In addition, relevant consents (Flood Defence Consents) for works likely to affect watercourses, including working in proximity to watercourses, would be requested by the appropriate consenting authority, including Internal Drainage Boards where appropriate, further influencing the choice of location and proposed working practices.

9.4.8 For crossings of major watercourses within the underground section it is likely that they would be completed by directional drilling or micro-tunnelling to feed to cables beneath the watercourse, thus avoiding direct effects. However, in these locations careful design is required to ensure that the drilling is at a suitable depth to avoid any impacts to the watercourses, including creating possible contamination pathways

9.4.9 Where the underground cable crosses small watercourses or drainage channels, the channel would be temporarily diverted to allow the excavation across the watercourse. Measures would be implemented to ensure no significant modification on the downstream flow of water. These small watercourses would be fully restored following completion of the construction works.

9.4.10 In order to control and manage the potential impacts and resulting effects of the construction phase, it is anticipated that a Construction Environmental Management Plan. would be produced. The measures detailed in this plan would be implemented to prevent releases to surface watercourses and groundwater and manage any incidents should they occur.

Construction Phase – Flood Risk and Hydromorphological Risk

9.4.11 For the proposed development to disrupt critical floodplain and confluence flow routes (i.e. change river / floodplain connectivity), it would need to modify flow and sediment conveyance, either temporarily (e.g. during construction), or permanently (e.g. during operation). The draft route crosses more than 30 overland flow routes and there is a risk that, unless the flow route is re-installed (as close as is reasonably practicable) to its pre-development dimension and form following construction, critical flow routes would be modified and hence connectivity changed.

9.4.12 An assessment of the ‘un-mapped’ watercourses would also be made in order to consider construction phase impacts on flow paths in these areas. It is envisaged that the scope and form of this assessment would be agreed with both NRW and the Environment Agency before work on this element of the project commences.

9.4.13 It is likely that soil stripping (and storage) and vegetation removal would be required for the following elements of the proposed development during the construction phase for an unknown period:

- Sealing end compounds;
- Underground cabling including open cut trenches;
- Joint bays;
- Working areas, compound areas, link boxes and working areas for future maintenance;
- Temporary and permanent access roads; and
- Pylons.

9.4.14 There is a risk during construction (and for the post-construction period while vegetation becomes re-established) that these areas could be subject to flooding, and hence to overland flows, and to erosion and sediment transport, particularly as there would be no protection as a result of vegetation stripping. This could result in sediment mobilisation (and downstream transfer) and the development of incipient channel(s) and/or head cuts. Surface drains, installed to distribute water evenly around the working areas of pylons to prevent water-logging of the soil, may also increase flood risk depending on the time of year construction took place.

9.4.15 Mobile temporary works may also have a potential impact on floodplain flow routes and any likely adverse effects due to the pylon foundations and/or crossings would be considered in the assessment.

Operational Phase – Water Quality, Water Resources and Flood Risk

9.4.16 The main considerations during the operational phase relate to the potential physical modifications to the water environment (including water quantity and flows) as a result from the physical presence of the permanent infrastructure, including the underground structures such as the underground cables or pylon foundations, and impermeable surfaces at substations and sealing end compounds.

9.4.17 Where shallow groundwater levels are found, any underground structures have the potential to provide a local barrier to groundwater flow. This could reduce the input of water to down-gradient features, such as groundwater supply boreholes, watercourses or water dependent ecosystems, or potentially lead to increased risk of groundwater flooding up-gradient from the structures. Due to the anticipated shallow depth of the underground structures any effect is likely to be limited and localised to areas where groundwater levels are close to the ground surface. The results of ground investigations would provide an indication of where such impacts would be expected, allowing mitigation measures to be put in place, if required

9.4.18 Following the construction of the underground structures any voids remaining in the ground have the potential to form preferential pathways for water movement. This has the potential to increase the risk from contamination transport to groundwater and surface water in the event of any spills or other contamination events in the local area. Along the underground section of the draft route, the method of backfilling the open-cut trenches with compacted material would limit the likelihood of any voids remaining, mitigating any such impacts

9.4.19 The pylon foundations and support pads, underground structures, the substation and sealing end compounds are also likely to increase the extent of impermeable surfaces within a Greenfield area, and subsequently increase both the rate and volume of surface water runoff. Increased surface runoff has the potential to increase soil erosion and the input of sediment to surface watercourses, if not appropriately managed.

9.4.20 A surface water runoff assessment for the pylon foundations and any other new hardstanding areas would, therefore, be undertaken to the 1% plus climate change standard to ensure that surface runoff is not increased to third parties, and utilising sustainable drainage techniques where appropriate. Consideration would also be given to

the residual risk associated with the failure of any proposed drainage features. Liaison with the Lead Local Flood Authorities would be undertaken as part of the surface water assessment.

9.4.21 The presence of the impermeable surfaces could also reduce the available infiltration capacity of the land following periods of rainfall, reducing the natural groundwater recharge input and impacting the groundwater resource balance. Due to the likely size of these impermeable surfaces, any affect is likely to be negligible on a catchment scale. However, on a local scale there could be effects to specific groundwater dependent features, such as water abstractions or groundwater dependent ecosystems.

9.4.22 Other potential water quality risks are formed by the operation of the underground cables with the potential to increase the groundwater temperatures. Heat is classified as a pollutant by the Water Framework Directive, and any such thermal pollution could result in extra growth of indigenous pathogenic organisms. The material used to backfill the open-cut trenches during the construction of the underground section of the route would be designed to dissipate the heat generated by the cables, thereby reducing any such impact.

9.4.23 With regard to above ground structures, the requirements of the Overarching National Policy Statement for Energy (EN-1), TAN 15, NPPF and the accompanying Technical Guidance, are that the peak surface water flow rates leaving a development site should not be greater than the rates prior to development. In terms of the proposed substation site, as it is within a greenfield area, the development is likely to increase the extent of impermeable urban surfaces and subsequently increase both the rate and volume of surface water runoff. If unmanaged, this has the potential to permanently increase the risk of surface water flooding to both the site and down-slope locations. The presence of the substation will reduce the availability of land with infiltration capacity to contain water following periods of intense rainfall. This potential impact would be addressed by the surface water runoff assessment mentioned above.

9.4.24 The NRW and the Environment Agency have indicated that the River Severn and its tributaries have large functional floodplains that provide annual flood storage. They recommend that the ES should demonstrate that critical flow routes across the floodplains and confluence areas are not impacted. Where possible pylons should be sighted outside flood zones, and where not possible, pylons should be sighted outside critical flow paths. Similarly, the impact of underground cables and associated equipment should also be investigated. The location of the connection on or within close distance to any formal flood defences (and other assets) should also be considered as the route alignment develops and any associated requirement for FDC acknowledged.

Decommissioning Phase

9.4.25 Should the permanent infrastructure no longer be required for operational purposes, the proposed decommissioning involves leaving the underground structures *in situ*. As such, many of the potential impacts identified in the operational phase, relating to the physical modifications to the water environment, would remain. Otherwise, the decommissioning of above ground structures is anticipated to result in similar effects to those anticipated for the construction phase.

9.5 Proposed Assessment Methodology

9.5.1 Liaison would be undertaken with Powys County Council, Shropshire Council, NRW, the Environment Agency, and Natural England and other relevant organisations (e.g. British Geological Survey) to obtain available information in respect of the status of the water resources (ground/surface/drainage).

9.5.2 A review of the above information would be carried out, in the form of a desk top assessment, in conjunction with the information obtained with regard to Ground Conditions and Soils, to assess the sensitivity of the draft route.

9.5.3 The potential for significant effects during the construction, operation and decommissioning of the proposed development would be assessed. Any significant effects would be determined based on the amalgamation of the sensitivity of identified water features along the draft route and the magnitude of the impact to that feature from the proposed development, based on the proximity of the feature to the draft route. Watercourses would be assessed for the ecological significance and the likely presence of protected species (e.g. water voles); however this would be discussed within the Ecology section of the ES. The results of these surveys would be discussed with Powys County Council, Shropshire Council, NRW and Natural England, as appropriate.

9.5.4 Mitigation measures would be identified for incorporation within the detailed construction method statements and the requirement for any licences highlighted. Measures would also be proposed, if required, to mitigate potentially significant operational and decommissioning phase effects.

9.5.5 The EIA would also include an assessment of the potential effects of remediation works on the local watercourses, including the effects following the implementation of any site drainage works to be undertaken as part of the development proposals.

9.5.6 The following activities would be undertaken as part of the EIA:

Water Quality and Water Resources Assessment

9.5.7 The water quality and water resources assessment would consider the sensitivity of the groundwater and surface water resources with particular focus on the water features identified along the draft route, including groundwater protection and recharge, surface water flows and quality, water dependent ecosystems and habitats and existing protected water abstractions

9.5.8 In particular, the assessment would consider:

- Derogation to groundwater abstractions along the draft route, with particular consideration of public water supplies close to the north-eastern section of the draft route, due to changes to the groundwater system including locally reduced recharge, impermeable underground structures and dewatering activities;
- Water quality risks to water abstractions along the draft route, including consideration of contamination events of groundwater and surface water resources;
- Siltation and sedimentation of surface watercourses, lakes, ponds and water dependent ecosystems, resulting from increased runoff from impermeable areas, soil stripping and vehicle movements;
- Water quality risks to surface watercourses, lakes, ponds and water dependent ecosystems (including peatlands) during the construction and decommissioning phases, through accidental spills and/or discharges of poor quality water during dewatering activities;
- Temporary re-routing/diverting of small watercourses and drainage channels during construction of underground cable section; and
- Potential implications for water quality particularly associated with the underground cable section on discharge consents.

9.5.9 Hazard maps have been produced that show the sensitivity the important surface water and groundwater features that have the potential to be impacted from a water resources or water quality aspect by the proposed construction of the cable route. The sensitivity of the individual features has been determined based on defined criteria that consider the specific baseline water environment along the draft route. These hazard maps have been used to advise the alignment of the draft route and identify areas where further consideration may be needed to limit the magnitude of the impact from the potential

development. These maps would form part of the detailed impact assessment for water quality and water resources.

9.5.10 The detailed impact assessment would be completed based on the proposed alignment of the draft route. This would consider the potential magnitude of any effects from the construction, operation and decommissioning on each of the water features that are identified along the route. This would be determined based on the distance of the route from each of the features, along with the particular position of the features (such as whether they are located in a flood plain, or positioned up- or down- hydraulic gradient, etc.). This stage would incorporate a Water Features Survey along the route to confirm the locations and nature of the features and water abstractions, enabling a more detailed assessment of the magnitude of the potential effects.

Overarching Flood Assessment

9.5.11 It is anticipated that an overarching flood assessment report would be produced that takes into account the requirements of both NRW and the Environment Agency. It is envisaged that the form and structure of this document would be agreed with both NRW and the Environment Agency prior to its production.

9.5.12 The overarching flood assessment would also consider the morphology of the River Severn Catchment, with particular regard to the potential for land loss as a result of the erosion/deposition process, which can affect the location of the development, including siting of overhead line pylons and the installation of underground cables and associated equipment.

9.5.13 Any effects identified as part of the overarching flood assessment would be addressed by mitigation measures agreed with NRW and/or the Environment Agency as appropriate.

9.5.14 A 1D / 2D ISIS / Tuflow hydraulic model has been produced for the River Vyrnwy from Newbridge in the southwest to Llanymynech in the northeast. The model has been used to simulate flows, levels, depths, inundation extents and velocities for the 1 in 2, 1 in 5, 1 in 10, 1 in 20, 1 in 50, 1 in 100 and 1 in 100 year plus climate change flood events. This model would be used to inform the flood assessment.

9.5.15 The ES will summarise the findings of the overarching flood assessment.

Hydromorphology Risk Assessment

9.5.16 In response to aforementioned concerns along the River Vyrnwy and in order to help the route alignment for the Mid Wales Connection project, an hydromorphology risk assessment is currently being undertaken and focusses on four areas:

1. The risk of the proposed development to lateral channel instability;
2. The risk of the proposed development to critical flow routes across floodplains and confluence areas and hence to river / floodplain connectivity;
3. The risk of the proposed development to GCR sites; and
4. The risk of the proposed development to fluvial forms and processes.

9.5.17 This risk is assessed for the site investigation, construction, operation and decommissioning stages of the project. The purpose of the risk assessment is to identify areas where either a) the draft route may require modification and / or b) mitigation measures would be required to allow the proposed development to progress. It should be noted that hydromorphology risk assessment report does not form part of the Environmental Impact Assessment (EIA), although information from that report can be utilised in the EIA.

EU Water Framework Directive Assessment

9.5.18 It is anticipated that a WFD Assessment would be undertaken in consultation with NRW and the Environment Agency to confirm that the proposed development would contribute

to achieve good qualitative and quantitative status of all water bodies by 2027. The approach and methodology would be defined in collaboration with NRW and the Environment Agency.

9.6 Potential Mitigation Measures

Water Quality and Water Resources

9.6.1 There is the potential for impacts to adjacent watercourses and groundwater from temporary construction activities as described in Section 13.4. Impacts can largely be avoided/minimised through the use of good, well established environmental site practices, including adopting, where practicable, Environment Agency guidance, and introducing standard measures to reduce pollution potential, including runoff minimisation and fuel management.

9.6.2 Mitigation during construction may include:

- Implementation of a Construction Environmental Management Plan which would include measures to minimise potential effects on bio-security and biodiversity;
- Storage of materials according to codes of best practice. Oils and chemicals must be stored in suitable areas on stable, level and impervious surfaces using appropriate storage containers;
- Inspection and maintenance of vehicles and equipment during operation;
- Protection of soil stripping, particularly along the underground section during construction; and
- The location of the excavated soils chosen to avoid modifying the identified overland flow routes.

Flood Risk

9.6.3 Sustainable Drainage Systems (SuDS) may be considered as part of the design of above ground infrastructure.

9.6.4 Mitigation during construction may include:

- Locating temporary site / storage compounds outside of high or extreme flood risk areas where practicable;
- Design of temporary site / storage compounds to take account of water flows particularly if these are required within high or extreme flood risk areas; and
- Undertaking construction activities outside of the winter period where practicable;

9.6.5 National Grid seeks to avoid developing in areas of flood risk. Overhead lines and associated pylons are not considered inappropriate development in areas at risk of flooding. Flood resilience can be built into overhead lines by observing a safe clearance from predicted flood levels in line design (overhead lines and conductors must be designed to be at least 8m above ground level so interaction with the floodplain is not anticipated to be an issue). Where it is not possible to avoid building pylons within a floodplain, this can be taken into account in their design and construction.

9.6.6 Erosion/deposition processes in the Vyrnwy/Severn catchment has been known to lead to extensive land loss within relatively short periods. As part of the stakeholder consultations carried to date, the Environment Agency has advised that in detailed final routeing in areas proposed for overhead line, pylons should be placed as far back from tops of banks as feasible to avoid the impacts of erosion, in accordance with best practice techniques for service crossings of watercourses. During flood events on the River Severn, the river corridor (or the flood storage areas) can hold flood water for days and possibly weeks. Consideration should be given to how maintenance and construction works can be carried out on the design of the connection in the event of inundation by

flood waters. NRW and the Environment Agency have advised that contingency plans should be in place and acknowledged in the application if access to the infrastructure at these times is required.

9.6.7 For both water resources and flood risk aspects, consultation would be undertaken with NRW and the Environment Agency, and their feedback reflected within the proposed working practices.

9.6.8 Additional consideration would be given to the siting of pylons away from tracks used by NRW and the Environment Agency such that future access to watercourses for maintenance purposes or to their assets is not compromised.

Hydromorphology Risk

9.6.9 Risk to lateral channel instability: it is recommend that no infrastructure is located in a 30m wide buffer zone around the outer envelope of historical channel changes. It is also recommended to engage with the appropriate risk management authorities around potential managed realignment of flood defences in the Vyrnwy floodplain. Many of these defences have served to limit lateral channel instability. Removal of these defences could pose a future risk to infrastructure in important locations (downstream of Meifod, for example).

9.6.10 Risk to critical flow routes and connectivity: the risk to critical floodplain and confluence flow routes can be mitigated through appropriate construction methods and ensuring the post-construction hydrography is as close as reasonably practicable to the pre-construction hydrography. Further, wherever possible, pylons should be located outside of the floodplain. Where this is not possible, pylons should be located outside critical flow routes. Along the underground section of the proposed development, it is recommended that the temporary storage of excavated soil and alluvium is located outside the floodplain (preferred). If this is not possible, the temporary storage piles should be located to avoid critical flow routes and areas of high velocity, particularly as there is a high probability the floodplain would be flooded during construction. It is also recommended that use is made of the 2D hydraulic model to avoid, wherever possible, overland flow routes.

9.6.11 Risk of mobilisation of sediment and incipient channel development: vegetation and top soil stripping and removal should be minimised as far as is reasonably practicable. Where this is unavoidable, measures must be put in place to avoid the mobilisation of sediment. Measures should be considered to protect the exposed soil and alluvium from erosion in the construction phase. Failure to do this is likely to result in pulses of sediment being delivered downstream during flood events. Exposure during a flood event (the 1 in 2 year flood inundates much of the existing floodplain) could result in the formation of an incipient channel.

9.7 Issues to be Scoped Out

9.7.1 From the review of the potential issues relating to water quality and resources, a number of issues are considered to not be significant and therefore would not be addressed in detail in the EIA. These include:

- Water quality risks due to the potential to increase the groundwater temperatures along the underground section of the route during operation. The Cement Bound Sand (CBS) material used to backfill the open-cut trenches would be designed to dissipate the heat generated by the cables, thereby reducing any such impact.
- Enhanced contamination impacts due to voids remaining following the construction of underground structures, as the method of backfilling the open-cut trenches with compacted material would limit the likelihood of any voids remaining, mitigating any such impacts.
- Reduction in the natural groundwater recharge due to creation of impermeable surfaces within a Greenfield area. The impact to the groundwater resource balance

on a catchment level is not considered to be significant to impact on the available water resources, although localised impacts may need to be considered to specific features located close to the cable route.

10 GEOLOGY, SOILS AND CONTAMINATED LAND

10.1 Introduction

10.1.1 This section of the ES will address the issues relating to existing geo-environment conditions for the vicinity of the proposed development, including geology, soils and contaminated land, and ensure that suitable and safe conditions are achieved for the proposed end use. A range of potential effects associated with the construction, operation and decommissioning phases of the proposed development will be considered, particularly concerning geotechnical conditions and contamination. Should significant adverse impacts be identified, suitable mitigation measures will be proposed.

10.1.2 All the following data and information has been derived from the British Geological Society (BGS), the Landmark Information Group, the Coal Authority, Historical maps, Geoindex and site walkover.

10.2 Baseline Context

Solid (Bedrock) Geology

10.2.1 The underlying (bedrock and outcropping) geology between Cefn Coch and Wern comprises of mainly sedimentary rocks of the Penstrowed Grits and Nantglyn Flags and Dolhir formations. Between Wern and Llanymynech the route extends across an area of interbedded siltstone and mudstone (Allt-Tair-Ffynnon Formation). Further east towards Woolston the underlying geology comprises rocks of the Kinnerton Sandstone Formation. The underlying geology of the north-east of the draft route is mainly comprised of pebbly (gravelly) sandstone of the Chester Pebble Beds Formation.

10.2.2 The underlying rock contains a series of local faults; crossing near Meifod (oriented north-west to north-east and north-south) and further east along the A495, both sides of the draft route (oriented generally west-east, and south-west to north-east in the east of the route).

Drift (Superficial) Geology

10.2.3 Between Cefn Coch and Melin-y-grug the draft route extends over rock (devoid of superficial deposits) and drift deposits consisting of mainly Till and Alluvial Fan Deposits (sand and gravel) associated with the upper reaches of the Afon Rhiw. Between north-east of Melin-y-grug and near Mathrafal the draft route crosses drift deposits of mainly Alluvial Fan Deposits and Alluvium associated with the Afon Einion and Afon Banwy and further areas of Till. East of this, along the Meifod Valley, drift deposits comprise Alluvium and glaciofluvial fan deposits. The drift deposits between Trefnanney and near Waen-fach consist of mainly Hummocky Glacial Deposits. Between Waen-fach and Aston Hall the drift deposits comprise mainly glaciofluvial sheet deposits and Alluvium with areas of River Terrace Deposits (undifferentiated) along the River Severn. To the north-east of Aston Hall the drift deposits along the draft route primarily comprise Till (Devensian). The drift deposits along the north-east of the draft route mainly consist of Alluvium associated with the River Perry, Till, glaciofluvial deposits (sand and gravel) and peat near the eastern extent of the draft route.

Soils

10.2.4 Between Cefn Coch and Melin-y-grug the draft route extends over slowly permeable seasonally waterlogged loamy upland soils with a peaty surface horizon and have some very acid peat soils. These are associated with drift deposits of Palaeozoic sandstone, mudstone and shale. Further east, between near Melin-y-grug and Mathrafal including the western sealing end compound siting area, soils become fine silty and clayey – with some fine silty and fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging on slopes – and include well drained fine loamy soils over rock in places.

10.2.5 Between Mathrafal and Llanymynech, along the Meifod Valley, the majority of the draft route is located within River Alluvium. This includes the underground section of the route, the east sealing end compound siting area and areas of overhead line. These loamy soils are generally deep, stoneless, permeable and course with some fine soils variably affected by groundwater, over gravel in places.

10.2.6 From north-east of Llanymynech to Morton Hall, with the exception of where the sections cross river alluvium within valleys associated with the Rivers Vrynwy and Severn and their tributaries, the draft route crosses drift soils which are deep, well drained fine loamy soils and similar soils with slowly permeable subsoils and slight seasonal waterlogging. These contain some coarse loamy soils affected by groundwater. To the east of these, to Babbinswood, soils are slowly permeable, seasonally waterlogged, fine silty and clayey soils.

10.2.7 The north-east of the draft route extends through river alluvium and soils associated with Permo-Triassic and Carboniferous reddish sandstone, which are well drained sandy and coarse loamy soils over soft sandstone and have a risk of water and wind erosion. This extent of the draft route contains areas of fen peat which extends across the majority of the route near the eastern extent. These areas are characterised by deep peat soils on flat land and are typically at risk of wind erosion.

Peat

10.2.8 Areas of peat have the potential to contain highly compressible organic soil. In addition, they also have the potential to contain significant amounts of water which may require additional construction land take due to poor cohesion of the deposits. As well as being a consideration in terms of construction, peatland habitats are important as a nature conservation resource and in wider respects in terms of their importance relating to carbon storage and sequestration (peat soils contain approximately 30% of all soil carbon in Wales whilst covering only 3% of the land surface).

10.2.9 Peat is of particular importance when considering siting of any substation, sealing end compounds, underground infrastructure and pylon foundations, and the proposed development has been developed to avoid peat wherever possible.

10.2.10 Within the upland areas in the south-west of the draft route the soils include areas of comparatively shallow surface peat. The superficial deposits include areas of comparatively deep fen peat associated with the River Perry and its valley, located near the north-eastern extent of the draft route, as described in Section 10.2.3.

Preliminary Ground Stability Review

10.2.11 A review of ground stability was undertaken in 2011 to identify geo-hazards within the route corridor options. The overall ground stability of the draft route generally lies within areas of low or very low risk. There are a small number of medium risk areas and no areas of high or very high overall risk. The assessment did not include the south-western extent of the draft route.

Running Sand

10.2.12 Excavations and trenches may become unstable due to groundwater ingress if the groundwater level is high. Such problems could occur for pylon base excavations and in undergrounding trenches.

10.2.13 The BGS interpretation raster data have classified this ground stability hazard into either ‘No hazard’, ‘Very Low Hazard’ or ‘Low Hazard’. Comparison with geological mapping indicates that the areas classified as ‘Low Hazard’ generally comprise alluvium and the areas classified as ‘Very Low Hazard’ comprises glacial Sands and Gravels and Glacial Till. All remaining deposits are classified as ‘No Hazard’. Areas of alluvium (low hazard) are as described above, being associated with the floodplains of the Dyffryn Meifod / River Vyrnwy and River Severn.

Collapsible Ground

10.2.14 Certain types of ground that have an open porous structure with large pore spaces can collapse when too great a load is placed on them or when they become saturated when a lesser load is applied. As a result, a very thick piling mat may be required to construct the pylon foundations in areas proposed for overhead line. During operation of overhead lines, collapsible ground may lead to minor ground movements or excessive settlement. Collapsible ground is a lesser issue for areas proposed for undergrounding.

10.2.15 All deposits outcropping along the draft route have been classified as either 'No Hazard' or 'Very Low Hazard'. Very low hazard areas are associated with alluvium, located as noted above.

Compressible Ground

10.2.16 Certain types of ground material, such as those deposited in floodplains or bogs, e.g. alluvium or peat, can be very soft and very compressible and may undergo large ground movements when a load is applied. During construction and decommissioning, this may result in access difficulties and settlement for heavy machinery or instability of excavation/trench sides. During operation, the result could be settlement, potentially causing foundation and structural damage in areas proposed for overhead line.

10.2.17 The BGS interpretation raster data have classified this ground stability hazard from 'No Hazard' through to 'High Hazard'.

10.2.18 Comparison with geological mapping indicates that deposits classified as 'High Hazard' comprise peat, known to be the softest and most compressible geological deposit. Those deposits classified as 'Moderate Hazard' comprise alluvial clays and glacio-lacustrine deposits. Those classified as 'Low Hazard' comprise the less clayey alluvial deposits. A small number of localised areas of Made Ground appear to be classified as 'Very Low Hazard'; the remaining material is classified as 'No Hazard'.

10.2.19 There are several areas of moderate to low hazard along the draft route, generally associated with the alluvium deposits as noted above.

Ground Dissolution

10.2.20 No areas of Ground Dissolution hazard have been identified in the vicinity of the draft route.

Landslide Ground

10.2.21 Downslope movement may occur as a result of a combination of factors, including, amongst others, the rock type, the presence of excess water (natural or relating to man-made activity), the angle of the slope, and construction work, e.g. cuttings or embankments. Activities associated with the construction of overhead lines have the potential to trigger landslides leading to damage of equipment, cable lines and presenting a health and safety risk. Incipient landslides have the potential to damage pylons during operation.

10.2.22 The BGS interpretation raster data have classified this ground stability hazard from 'No Hazard' through to 'High Hazard'.

10.2.23 Topographical mapping indicates that the High Hazard areas are typically located on regions of relatively steep ground. In many of these locations, no superficial deposits are shown to be present and bedrock of various types is exposed. Further to this, there is relatively close correlation between those areas defined as Low Hazard and those where no superficial deposits are present. In some of the locations designated as being at Moderate to High Risk from landslides, landslide deposits are recorded present, thus indicating previous landslide activity.

10.2.24 Areas of moderate hazard along the draft route are located along a classified road extending parallel to and south-west of the B4382, to the north-west of Glascoed – within

an overhead line section west of the western sealing end compound siting area. From site walkover, the topography was noted to be relatively steep, with hummocky ground, possibly of glacial origin, although no conclusive evidence of incipient or past landslipping was observed.

Mineral exploitation sites

10.2.25 An active mineral site: Tan Y Foel Quarry, an existing permitted working area, is located approximately 1km from the south-western extent of the draft route. The quarry has produced sandstone / gritstone stone and aggregates and was subject to a consented planning application in 2008 for a change of use from quarry to a 'waste transfer station for the recycling of concrete, bricks, stone and soil'. A recent (2013) planning application was submitted for a new waste tip (partly retrospective), regularisation of use, quarry deepening and the retention of the existing permitted quarrying site. That application was within the existing mineral buffer zone around the quarry. An application for EIA Scoping Opinion determined (2012) that an EIA was required for proposals to accommodate stable non-reactive hazardous waste (asbestos) at the site.

10.2.26 The review of ground stability outlined in Sections 10.2.11 to 10.2.24 above included consideration of potential ground stability hazards to result from past mining activities. This identified several dormant / former mineral sites within 500m of the draft route comprising those of sandstone, limestone, sand, and sand and gravel. In addition, a former lead mine at Allt-y-Main Mine is located approximately 0.1km from the Draft Route (this is also designated as a biological SSSI, see Chapter 8 Ecology). Desk based assessment indicated that the extents of the mining activity are not anticipated to extend into the draft route corridor, however that the adoption of a precautionary mining hazard area is recommended in this vicinity.

10.2.27 The potential for future mineral exploitation within the vicinity of the route corridor options was also considered within the review of ground stability. This identified three areas of potential coal mining interest comprising:

- A small area to the west of Crewgreen / Melverley, Shropshire;
- A large area between west North of Half Way House and west of Wattlesborough, Shropshire;
- A large area between east of Westley and west of Yockleton, Shropshire.

10.2.28 None of these areas are located in the vicinity of the draft route and at the current time it is considered very unlikely that coal mining would be economic in these areas in the foreseeable future.

Mineral protected areas for potential future exploitation

10.2.29 There are numerous mineral allocation sites (termed mineral buffer zones) identified within the Powys Unitary Development Plan (adopted 2010), although the only allocation in the vicinity of the substation site and draft corridor is at Tan Y Foel.

10.2.30 Tan Y Foel Quarry is surrounded by an outer minerals buffer zone.

10.2.31 In order to prevent valuable mineral resources in Shropshire from being sterilised by other forms of development Shropshire County Council have identified a Minerals Consultation Area (MCA). The MCA identifies where potentially economic mineral resources (excluding coal) are located within the county, but without establishing any presumption in favour of the working of such potential resources. Large areas of MCA extend across the eastern extent of the draft route. These areas form part of a particularly large consultation area stretching from the north-west of Shrewsbury northwards to Oswestry.

10.2.32 National minerals guidance requires Shropshire Council to maintain an adequate and steady supply of sand and gravel within the period of their development plans. To achieve this, the Council's evidence base indicated that they need to allocate additional

sites within the broad locations identified in Local Development Framework Core Strategy Policy CS20 (strategic planning for minerals). The minerals industry and landowners were asked to nominate potential future sites for sand and gravel working in Shropshire. Eighteen sites were identified, and subjected to a desk-based appraisal. None of these sites are within the vicinity of the draft route, the closest site being approximately 6km distant to the east at Colemere (a 'preferred' site). It is not anticipated that there will be any likely effects on these sites as a result of the proposed development.

Designated sites for geological protection

10.2.33 There are several sites designated for geological protection within the vicinity of the draft route. These comprise a Site of Special Scientific Interest (SSSI) and several RIGSs (Regionally Important Geodiversity Sites); the latter are designated for Stratigraphy and Educational / Scientific importance. Additional details of these sites are provided below.

- Llanymynech and Llynclys Hills Site of Special Scientific Interest (designated for earth science and biology) is located c.1km north of the draft route . This is sited on elevated ground and is separated from the draft route by the town of Llanymynech.
- Tan-y-foel Quarry RIGS is located within the southern extent of the draft route. This site occupies an area of c.17ha.
- Craig-wen Quarries and Tan-y-Ffridd Quarry RIGS are a series of comparatively small protected sites located within and near the centre of the draft route, immediately south of the A495 north of Glascoed. These occupy areas of c.0.5ha and 0.3ha respectively.
- Pentre'r beirdd / Bank Road Cutting RIGS is located c.340m south of the draft route.
- Llanymynech Rocks RIGS is located c.1km north of the draft route and is separated from the corridor by the town of Llansantffraid-ym-Mechain.
- Llanymynech Hills RIGS (c. 1km north of the corridor) is also an earth science SSSI (see above).

10.2.34 Of these, Craig-wen Quarries and Tan-y-Ffridd Quarry RIGS are located closest to the draft route: one of the Craig-wen Quarries RIGS is located within the west sealing end compound siting area and Tan-y-Ffridd Quarry RIGS is located at the eastern edge of the west sealing end compound siting area.

10.3 Issues and Concerns

10.3.1 The impacts of the proposed development on geology and soils, and from contaminated land, will largely occur during the construction and decommissioning phases and will be temporary and of short duration. Potential issues to be addressed as part of the EIA include:

- Disturbance of underlying geology;
- Presence of potential geo-engineering hazards, as presented in Table 10.1 below;
- Disturbance of, and damage to, soils, including peat soils and the potential effects on carbon sequestration;
- The potential presence of mineral reserves and the potential for their sterilisation as a result of the development;
- Possible presence and mobilisation of localised areas of contaminated ground that may have resulted from historical uses or be occurring currently;
- Potential impacts on designated geological sites and

- Development of appropriate management methods to protect site neighbours, the environment and site workers during construction and decommissioning works in terms of health and safety and pollution prevention.

10.3.2 Direct peatland habitat loss, as a result of access tracks, pylon bases and other foundations, and peat habitat modification due to changes in hydrology, will be addressed within Chapter 8 (Ecology).

Table 10.1: Potential Geo-engineering Hazards

Hazard	Comment
Unforeseen Ground Conditions.	Soft/loose ground particularly in areas underlain by alluvial and glacial sand and gravel deposits. Temporary works and settlement issues.
Soft ground deposits, i.e. peat.	Pockets of peat identified. Foundation, bearing and settlement issues.
Shallow / deep salt mine workings.	Potential for ground instability. Take least risk route in these areas once mining information is obtained.
Shallow Bedrock.	Possible hard/difficult rock excavation. Implications for tunnelling.
Groundwater.	Shallow groundwater near to local watercourses and old gravel pit lakes. Excavation stability, temporary works, buoyancy and flotation issues.
Contaminated land.	Contamination associated with urban/industrial development of the area may be present. Re-use of spoil and waste disposal issues.

10.4 Proposed Assessment Methodology

10.4.1 An assessment of the potential impacts of the project on the underlying geology and soils, and from potential contaminated land, will be undertaken. This assessment will be undertaken largely by means of a desk study, utilising information from the published mapping and preliminary assessment to identify geo-hazards such as superficial deposits and bedrock geology, former mining (including coal, metalliferous, ironstone evaporate, sandstone, etc.), made ground, former surface mineral sites (which may contain non-engineered fill, wastes, etc.) peat, compressible ground, running (sand) conditions, shrink swell clays and landslip.

10.4.2 The following activities will be undertaken as part of the EIA:

- Liaison with Powys County Council and Shropshire Council, Natural Resources Wales, the Environment Agency and other relevant organisations (British Geological Survey, etc.) to obtain available information on the proposed draft route in respect of contamination and ground conditions;
- A further check will be made of the Powys and Shropshire Minerals Plans, and liaison with the Councils' Minerals Teams, to ensure the accurate identification of mineral reserves. (Information from this assessment will also be used within the socio-economic assessment);
- Combine the above information with historical maps, detailed site walkovers and reviews of environmental data bases, and further desk-based information (maps, reports, etc.) to assess sensitivity and risk; and
- Liaison with DEFRA with regard to Soil Classifications.

10.4.3 Intrusive site investigations will be undertaken at selected locations in order to obtain geotechnical information in support of engineering and construction feasibility studies. It is currently understood that this information will be provided to inform the EIA.

Peat

10.4.4 Further assessment of the potential effects on peat will be undertaken with reference to available guidance and methodology for the assessment of the impacts of developments on peatlands, e.g. *Assessing the impact of windfarm developments on peatlands in Wales* (CCW Guidance Note, January 2010) and also guidance pertinent to wind farm developments in Scotland. Whilst this guidance is specific to wind farms examples, it is considered appropriate to other developments such as electricity connections.

10.4.5 The aim will be to demonstrate that the extent of peat along the draft route has been investigated, and that the proposed development has been designed to avoid and minimise, as far as is practicable, the quantity of peat excavated and that these quantities will be appropriately managed.

Desk Study

10.4.6 A review will be undertaken of topographical, geological and soil maps, as well as aerial photography to identify locations of potential peatlands. It will also draw from information obtained from other studies, such as the ecological, cultural heritage and hydrological/hydrogeological assessments.

Initial Walkover

10.4.7 Site walkovers will be undertaken along the draft route and at locations of temporary access tracks and other proposed working areas, and will verify the desk study information and record targeted peat information based on a visual assessment of the presence and nature of the peat deposits (as well as any natural or man made topographical, hydrological, and hydrogeological features, type of vegetation cover and any other relevant features). Where peatland habitat is identified, peat depths and locations will be recorded using a peat probe and hand held GPS unit. This will be undertaken as part of the ecology walkovers (Section 8.4.14) in order to identify the habitat sensitivity.

10.4.8 Where possible, characteristics of the peat will be obtained in order to assess its likely suitability for reuse.

Assessment

10.4.9 The assessment will determine the overall effects of the proposed development on peat along the draft route, identifying areas affected and likely quantities, as well as identifying mitigation measures and opportunities for its reuse. The assessment will also feed into the overall Sustainability Assessment (as detailed in Chapter 19).

Further Site Investigation (Intrusive Works)

10.4.10 Where necessary, the intrusive site investigations (detailed above) to be undertaken at selected locations in order to obtain geotechnical information in support of engineering and construction feasibility studies, will include further investigation of peat, if present.

11 AGRICULTURE AND LAND USE

11.1 Introduction

11.1.1 This section details the scope of the agricultural and land use assessment to be undertaken as part of the EIA with respect to the proposed development and identifies the issues relating to agricultural operations, in particular, and the scope of possible significant effects arising from potential impacts. In general, this section of the ES will assess impacts in terms of usage of the land through which the draft route passes and on which the associated above ground structures will be constructed; Agricultural Land Classification; land drainage; agri-environment schemes; and Notifiable Scheduled Diseases and weeds (invasive species and injurious weeds).

11.1.2 In accordance with the EIA Regulations the assessment will identify and assess potential effects which may arise during the construction, operation and decommissioning phases.

11.2 Existing / Baseline Environment

Land Use

11.2.1 Owing to the predominantly rural nature of the area within which the draft route and substation site are located, land use is dominated by pasture for grazing in the Cefn Coch to Afon Banwy and Meifod Valley sections, with arable becoming more prevalent from Waen-fach to Lower Frankton sections.

Soils and Geology

11.2.2 Soil types vary along the draft route, including freely draining acidic loamy soils and slowly permeable acidic loamy and clayey soils within Powys and parts of Shropshire. Both free draining and naturally wet loamy floodplain soils types are present around the Powys/Shropshire border and areas of free draining sandy soils are found in the Shropshire section.

11.2.3 Drift geology types across the draft route consist predominantly of siltstone, mudstone and alluvial soils, with some sandstone present in the north-eastern region between Llanymynech and Lower Frankton.

Climate

11.2.4 The average annual rainfall for the Powys area is <280mm (1971-2000). The average summer and winter temperature ranges for the area are between 10-18°C and 1-6°C respectively. The climate for Shropshire is drier, with average annual rainfall of <70mm (1971-2000) however temperature ranges are comparable to Powys, with summer ranges of 11-20°C and 1-6°C in winter.

Agricultural Land Classification

11.2.5 The Agricultural Land Classification (ALC) map shows the land grades for the draft route and substation site. Under the ALC, the majority of the land in the Powys section is Grade 4 (poor quality agricultural land) with some small regions of Grade 3 (good to moderate quality agricultural land and Grade 5 (very poor quality agricultural land)). The majority of land in the Shropshire section is ALC Grade 3 with some Grade 2 (very good quality agricultural land) and some Grade 4. There are no designated ‘urban’ or ‘non agriculture’ areas along the draft route.

Agri-environment Schemes

11.2.6 Numerous Agri-Environmental Schemes and Environmentally Sensitive Areas (ESA) are present along the draft route.

Nitrate Vulnerable Zones

11.2.7 Nitrate Vulnerable Zones (NVZ) are present along the draft route within Shropshire, with surface water and groundwater NVZ present between Llanymynech and Queen's Head and a surface water NVZ present around Lower Frankton.

11.3 Issues and Concerns

11.3.1 Issues and concerns include:

- the potential for construction of the proposed connection to impact on land within agri-environment schemes, such as Environmental Stewardship;
- the potential for contamination of the land from non-organic adjacent farmland or the use of unauthorised chemicals such as pesticides, fertilisers or other non-organically approved compounds where the transmission connection is to be constructed across land that is organically managed or under a recognised organic farm scheme;
- the potential for the spread of diseases, e.g. bovine tuberculosis, between landholdings e.g. on the wheels of construction and maintenance vehicles;
- the need for the control of ragwort during construction and reinstatement, where the transmission connection crosses horse-grazed land; and
- the need to ensure that invasive and injurious weeds are effectively controlled, where present, to prevent their spread.

11.4 Potential Impacts

11.4.1 Potential impacts, whether temporary or permanent, may occur at the following locations along the draft route:

- Temporary – Construction and Decommissioning Phases, including:
  - Access areas
  - Working width/areas
  - Storage areas
  - Contractor compounds
- Permanent – Operational Phase facilities, including:
  - Pylon locations
  - Underground cables and joint bays
  - Substation site
  - Sealing end compounds

11.4.2 The majority of the main impacts on normal farming operations will arise during the construction and decommissioning phases, where impacts are anticipated to be broadly similar. Potential impacts and effects include:

- Temporary loss of crop production and grazing areas within the working corridor in the area of proposed undergrounding, the Meifod Valley, as the field, or a section of the field, will need to be fenced off during construction works. Similarly in areas proposed for overhead line, temporary loss of crop production and grazing areas will occur along temporary access tracks and within working areas surrounding pylon locations; areas which will also need to be fenced off during construction works. Agricultural land may be out of production during the construction phase and for a short period following reinstatement as the ground settles and re-establishes;

- Temporary disruption to normal farm activities;
- Temporary severance of fields or division of fields;
- Temporary separation of livestock from water supplies;
- Temporary removal of field boundaries along the working corridor, which will require reinstatement on completion;
- Disturbance during lambing season, depending on the time of the works;
- Disruption to field drainage and water supplies, which may require diversion or reinstatement/repair;
- Impact on the commitments made by the farmers/landowners, etc. with regard to Agri-Environmental Schemes; and
- Increased risk of disease transmission and transfer of invasive weeds associated with vehicle movements along the working corridor.

11.4.3 The above described potential impacts can be mitigated through careful management and best practices prepared and agreed in advance with the landowner/tenant and implemented throughout the construction phase, such that the overall residual effects are likely to be of negligible to minor significance, and of a temporary/reversible nature.

11.4.4 Potential longer-term and operational impacts on agriculture as a result of the proposed connection are as follows:

- Land-take: Where the proposed connection is to be constructed as overhead line, permanent loss of operational agricultural land associated with the footprints of the pylons will occur. This would be more significant in areas of arable farming where agricultural machinery would not be able to access the areas beneath lattice pylons for sowing and harvesting. In areas of grazing, access by grazing animals to areas of reinstated grassland beneath pylons would still be possible and, as such, permanent loss would likely be negligible. Permanent loss will also arise at the proposed substation site, the sealing end compound locations and at the tee-in. Very little permanent loss would be associated with the underground section through the Meifod Valley, as all land would be reinstated to agricultural use on completion, however, some permanent loss may be associated at joint bay locations.
- Soils: The construction of the proposed connection will required the tracking of heavy vehicles across agricultural land potentially resulting in the compaction of underlying soils, damage to the soil structure and a potential long term reduction in overall soil grade. However, good construction practices and equipment would be implemented to minimise compaction, and the affected areas reinstated on completion using proven methodologies such that overall residual effects on soils are negligible or, at worst, are of minor significance.

11.5 Proposed Assessment Methodology

11.5.1 An assessment of the potential impacts of the proposed transmission connection on agriculture, and other land uses, and the determination of the significance of the effects arising from these impacts, will be undertaken largely by means of a desk study, utilising information from the published sources and from specific liaison and consultation.

- Land-take: this will be assessed in terms of quantity and quality, and the losses evaluated against national and local criteria;
- Soils: the workability of soils and their suitability for reinstatement will be described, and effects assessed assuming good working practice is followed;

- Farming practice: the methods of agricultural working will be described, and the impact of the proposals assessed. Where alternative methods of working are possible, these will be examined. Losses in terms of cropping, and increased time to travel to remaining land will be described;
- Access: the general effect on access both into and out of farms and internally within units will be described;
- Economic impacts: the effect of the proposed development will be described and assessed in terms of broad economic impact. Comparative assessments will be made to evaluate the order of magnitude of the impact. These will be for a comparative assessment only, using standardised data, and will not necessarily reflect accurately the potential financial losses on each farm. It should be noted that the purpose of this assessment will be to indicate the severity of impact and not to evaluate levels of compensation payable;
- Drainage and water supply: the general disruption of field drains and water supplies requiring diversion or repair will be described; and
- Agri-Environment Schemes: details of the schemes, areas and zones within the area of the draft route will be identified as part of the EIA.

11.5.2 Information will be obtained from farmers and farm tenants, via consultations between them and the land agents, on farming operations, existing soil conditions, field land drainage and services, etc.

11.5.3 More detailed information on Agri-Environment Schemes and organic land will be obtained via discussions with farmers, and with Welsh Government and Natural England.

11.5.4 Information on notifiable pests and diseases will be obtained from Natural Resources Wales (NRW) and Natural England and advice sought from them on any necessary bio-security measures, as necessary.

11.5.5 Landowner liaison will also aid in identification of opportunities for mitigation.

11.6 Potential Mitigation Measures

11.6.1 Mitigation measures will be informed by further detailed routeing and design, and will be proposed within the ES.

11.7 Issues to be Scoped Out

11.7.1 Recent study findings[16] indicate that power lines give off ultraviolet light as flashes at insulators and as a corona along the conductors. As birds and mammals are sensitive to ultraviolet light, this is believed to be the reason why animals appear to avoid overhead power lines. Domesticated animals (e.g. cattle, sheep and horses) may also be affected by the flashes. By avoiding areas where overhead lines are located, the amount of land available for grazing may, therefore, be reduced. However, due to the lack of confirmed evidence for the effects on domesticated animals, this potential effect will not be addressed within the EIA.

[16] Tyler, N., Stokkan, K.-A., Hogg, C., Nellemann, C., Vistnes, A.-I. and Jeffery, G. (2014), Ultraviolet Vision and Avoidance of Power Lines in Birds and Mammals. Conservation Biology. doi: 10.1111/cobi.12262

12 AIR QUALITY

12.1 Introduction

12.1.1 The ES will address the potential air quality impacts associated with the construction and decommissioning phases only of the proposed development, to include associated mitigation measures, as appropriate. Air quality impacts considered are construction related dust emissions, odour and exhaust emissions from plant, machinery and vehicles. The potential air quality impacts associated with the proposed development will be presented in the Construction Emissions chapter of the ES.

12.2 Existing / Baseline Environment

12.2.1 The nearest air quality monitoring stations (UK National Air Quality Archive) are at Aston Hill and Leominster. Aston Hill is a rural agricultural background monitoring station located at NGR 329901, 290056 and measures NO_x and ozone. Leominster is a suburban background monitoring station located at 349776, 258430 and measures NO_x, ozone and SO_2. Both stations are located more than 50km from the draft route. Powys County Council has identified one Air Quality Management Area (AQMA) within the local authority area, with respect to NO_2:

- New Road, Newtown - an area encompassing two properties adjacent to the Dolfor junction on New Road in Newtown, Powys.

12.2.2 Shropshire Council has identified five AQMAs within the local authority, with respect to NO_2:

- AQMA 01 - the area comprising part of Hereford Road (A49) between Sharpstones Lane and Burgs Lane, and adjacent land;
- AQMA 02 - the area comprising parts of Ditherington Road (A5191), Whitchurch Road (A5112), Sundorne Road (B5062) and Telford Way (A5112) and adjacent land;
- AQMA 03 (amended) - the area comprising Frankwell, part of Bridge Street and Smithfield Road Castle Gates and adjacent land, extending to encompass most of the Town Centre including High Street, Wyle Cop, English Bridge and Coleham Head gyratory;
- Oswestry AQMA - an area encompassing the property known as Gate House situated on the junction of the A483 (between Sweeny Hall and Llynclys Crossroads) and Albridge Lane;
- Bridgnorth AQMA - an area encompassing Pound Street and the junction of Whitburn Street and Salop Street.

12.2.3 The closest AQMA to the draft route is Oswestry AQMA, located approximately 3.5km north-west of the draft route at its closest point. All other AQMAs are more than 13km from the draft route.

12.2.4 The Oswestry AQMA is located just off the A483, which coincides with the abnormal load route that has been identified as potentially feasible for transporting transformers. The abnormal load route will be used up to five times to transport the transformers to the construction site. These routes will be subject to more detailed assessment and the abnormal load transport will be carried out at a suitable time to be agreed with the local Highway Authority.

12.2.5 Statutory and non-statutory ecological designations in the vicinity of the draft route are described in Section 8 Ecology.

12.3 Issues and Concerns

12.3.1 There is the potential for emissions to air to arise from the construction, operation/maintenance and decommissioning phases of the proposed development. Such emissions include fugitive dust that may arise from construction phase activities and exhaust emissions arising from vehicular movements. Emissions to air have the potential to have a negative effect on nearby sensitive receptors.

12.4 Potential Impacts

12.4.1 The Environment Agency's Guidance Note I13 on Scoping the Environmental Impact of Overhead Transmission Lines (EA, 2002) provides a matrix of activities and potential impacts related to local and regional air quality, as shown in Table 12.1. Similar activities and effects can be anticipated for underground cables.

Table 12.1. Activities and Potential Impacts

Potential Receptor	Construction phase	Operation phase/ on-going site maintenance	Decommissioning/ Post-operation
Local air quality	Use of construction vehicles and machinery: • Emissions from construction site traffic; • Dust generation.	Use of maintenance vehicles and machinery (negligible impacts): • Exhaust emissions; • Use of maintenance helicopters to inspect transmission lines	Decommissioning vehicular activities: • Release of vehicle exhaust emissions; • Dust generation.
Regional air quality		Overhead transmission line structures do not directly cause greenhouse gases to form, even if the electricity transported along them is a direct result of energy generation from the burning of fossil fuels.	

12.4.2 During construction, air quality in the vicinity of the construction site may decline temporarily as a result of associated vehicle exhaust emissions. Vehicle movements will be most intensive during mobilisation, site set up and deliveries; becoming less frequent as construction draws to completion. Cross-country haul routes would be set up to avoid the use of local minor roads, where appropriate.

12.4.3 In addition, there is the potential for dust to be generated from construction activities, particularly as a result of vehicles entering and leaving the site and moving around the construction sites. These activities have the potential to impact on sensitive receptors along the route, such as residential properties, watercourses and habitats. The severity of the impact is dependent on distance from the source, prevailing wind directions and weather conditions. In general, sensitive receptors within 200m of the source have a greater probability of being affected, if suitable mitigation is not implemented.

12.4.4 Similar temporary effects to local air quality have the potential to arise during the decommissioning phase.

12.4.5 Potential air quality impacts could arise from exhaust emissions from associated vehicle movements during the operational phase, but these impacts are not likely to be significant.

12.5 Proposed Assessment Methodology

12.5.1 Due to the short-term nature of the construction phase and as the proposed development would be located comparatively distant from residences, it is proposed not to undertake an air quality monitoring survey along the draft route. However, the potential for dust to affect sensitive properties within 200m of the working areas of the connection would be evaluated and consultation would be undertaken with the Environmental Health Officers of Powys County Council and Shropshire Council in preparation of a Construction Environmental Management Plan, which will include dust management measures.

12.6 Potential Mitigation Measures

12.6.1 Localised negative effects on air quality as a result of electricity infrastructure are likely in the short term as a result of dust and vehicle emissions generated during construction and decommissioning, with no significant operational effects. The significance of construction effects will depend on local site specific factors, including transport routes and proximity to residential areas which will be addressed in the ES.

12.6.2 Mitigation during construction may include:

- Implementation of a Construction Environmental Management Plan/National Grid Code of Construction Practice;
- Implementation of a Traffic Management Plan; and
- Inspection and maintenance of vehicles and equipment during operation.

12.7 Issues to be Scoped Out

12.7.1 It is anticipated that there will be no likely significant effects arising from operational activities, as no dust-generating operational activities are anticipated. Similarly, due to the anticipated very low volume of operational traffic associated with inspection and maintenance visits, no likely significant effects are anticipated from vehicle emissions. As such, these issues will be scoped out of the EIA.

13 ELECTRIC AND MAGNETIC FIELDS

13.1 Introduction

13.1.1 This section of the ES will address the potential effects from electric and magnetic fields (EMFs) produced by the proposed development including the 400 kV overhead line, underground cables and associated substation and sealing end compound development during the operational phase of the project. EMFs are not significant during the construction and decommissioning phases.

13.1.2 EMFs occur in the natural world, and people have been exposed to them for the whole of human evolution. The advent of modern technology and the wider use of electricity and electrical devices have inevitably introduced changes to the naturally occurring EMF patterns. Energised high-voltage power-transmission equipment, along with all other uses of electricity, is a source of EMFs. These EMFs have the same frequency as the voltages and currents that produce them, which is 50 hertz (Hz) in the UK. The fields are described as power-frequency or extremely-low-frequency (ELF) alternating electric and magnetic fields. All equipment that generates, distributes or uses electricity produces EMFs at 50 Hz.

13.1.3 Electric fields depend on the operating voltage of the equipment producing them and are measured in V/m (Volts per metre). The operating voltage of the equipment is a relatively constant value. Electric fields are shielded by most common building materials, trees and fences and diminish rapidly with distance from the source.

13.1.4 Magnetic fields depend on the electrical currents flowing, which vary according to the electrical power requirements at any given time, and are measured in μT (microtesla). They are not significantly shielded by most common building materials or trees but do diminish rapidly with distance from the source.

13.2 Existing/ Background Environment

13.2.1 The proposed development is located within a dominantly rural area which accommodates existing electrical assets, such as local distribution infrastructure. All equipment that generates, distributes or uses electricity produces EMFs.

13.2.2 In homes in the UK that are not close to high-voltage overhead lines or underground cables, the average ‘background’ power-frequency magnetic field (the field existing over the whole volume of the house) ranges typically from 0.01 – 0.2 μT with an average of approximately 0.05 μT, normally arising from currents in the low-voltage distribution circuits that supply electricity to homes. The highest magnetic fields to which most people are exposed arise close to domestic appliances that incorporate motors and transformers. For example, close to the surface, fields can be 2000 μT for electric razors and hair dryers, 800 μT for vacuum cleaners, and 50 μT for TVs and washing machines. The electric field in most homes is in the range 1-20 V/m, rising to a few hundred V/m close to appliances.

13.2.3 There are no significant electric or magnetic fields of natural origin at these frequencies, but static or 0 Hz electric and magnetic fields both occur naturally. The Earth's magnetic field, which is caused mainly by currents circulating in the outer layer of the Earth's core, is roughly 50 μT in England. At the Earth's surface there is also a natural electric field, created by electric charges high up in the ionosphere, of about 100 V/m in fine weather.

13.3 Issues, Concerns and Potential impacts

13.3.1 The proposed overhead line will produce electric and magnetic fields and which will be highest directly under the line and will decrease to the sides at increasing distance.

13.3.2 As a consequence of their design, some types of equipment do not produce an external electric field. This applies to underground cables which are enclosed in a metal sheath

(a protective metal layer within the cable). Magnetic fields are produced by underground cables directly on top or next to the equipment and reduce quickly with distance.

13.3.3 For substations and sealing end compounds, the EMFs close to the site are dominated by the overhead lines and cables entering the installation and not the equipment within the site.

13.3.4 There has been extensive research in an attempt to establish whether or not long term exposure to fields at lower levels than the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines might be a cause of ill health in humans, and this research has been extensively reviewed by bodies such as Public Health England (PHE) and the World Health Organization (WHO)[17]. There is some evidence to suggest that high magnetic fields may be associated with an increased risk of one particular disease, childhood leukaemia. However, the weight of scientific evidence is against electric and magnetic fields causing ill health in humans at levels below the ICNIRP guideline limits. The government has addressed this uncertainty by adopting precautionary measures, set out in the Codes of Practice - Optimum Phasing of high voltage double-circuit Power Lines, which the National Grid follows, where appropriate.

13.4 Proposed Assessment Methodology

13.4.1 The calculated EMF from the overhead line will be evaluated against UK Government guidelines to demonstrate compliance with EMF exposure limits and policy.

13.4.2 The electric and magnetic fields from the new assets associated with the project will be assessed using the conditions set out in the DECC Code of Practice 'Power Lines: Demonstrating Compliance with Public Exposure Guidelines' and ensuring the principles from the codes of practice on optimum phasing and microshocks are upheld. The outcomes of this will be assessed in line with the EMF requirements of the NPS EN-5.

13.4.3 All calculations will be performed using the criteria set out in the Code of Practice on compliance. The spatial scope of the assessment includes all areas where the EMFs could potentially extend from the electrical assets proposed by this project.

13.5 Potential Mitigation Measures

13.5.1 Mitigation will be through the design of the proposed development, ensuring the assets will comply with the current public exposure guidelines and the policy on phasing as detailed in NPS EN-5. If these requirements are met NPS EN-5 states that '*no further mitigation should be necessary*'.

13.6 Issues to be Scoped Out

13.6.1 During construction and decommissioning, and prior to energisation, transmission equipment will not produce any significant EMFs; these will not be considered further and are scoped out of the assessment.

13.6.2 The Electromagnetic Compatibility (EMC) performance of the National Grid Transmission system has been certificated as compliant with Directive 89/336/EEC by a Competent Body following appropriate onsite testing and investigation of good engineering practices (see Section 13.2). The proposed development will therefore present no issues with TV or radio interference under normal operating conditions and EMC is proposed to be scoped out of the assessment.

[17] World Health Organisation (2007) Environmental Health Criteria Monograph No 238 on Extremely Low Frequency Fields

14 TRAFFIC & TRANSPORTATION

14.1.1 This section of the ES will address the potential effects on the local highway network and railway lines within the area resulting from the construction, commissioning, operation, maintenance and decommissioning phases of the proposed connection. Particular emphasis will be placed on constructing, installing and commissioning the connection along with its decommissioning at the end of its working life. Additionally, provision to replace equipment during the life of the asset has been provided for.

14.1.2 The ES Traffic and Transport chapter will focus upon the potential changes in traffic as a result of the proposed development.

14.1.3 Aviation is addressed within the socio-economic section and potential effects on Public Rights of Way (footpaths, bridleways, etc.) within the landscape and visual and socio-economic sections.

14.2.1 The baseline conditions that have been considered to-date as part of the proposed development and which will be included within the EIA, are set out below.

Vehicular Access

14.2.2 Due to the nature of the proposed development, access would be required into multiple sites. Based on the currently proposed development, access from the public highway for construction is anticipated to be required:

- Along the western overhead section of the draft route, including proposed substation at Cefn Coch and the western SEC;
- Along the underground cable section of the draft route;
- Along the eastern overhead section of the draft route, including the eastern SEC and Tee-in point;
- At the Shrewsbury substation;
- At a transhipment site for the AIL; and
- To contractors compounds.

14.2.3 The main strategic highways links in the area, are as follows:

'A' roads

- A5(T) from Nescliffe to Oswestry;
- A483(T) from Gobowen to Welshpool;
- A495 (local road) between Llynclys to the junction with A458 (near Llanfair Careinion);
- A458 (T) between Welshpool (A483) and Llanerfyl; and
- A490 (local road) a small section just south of the junction with the A495;

'B' roads

- B5009 between Queens Head and Whittington;
- B4396 between Llynclys to the junction with the A5 (near Knockin);
- B4398 between Llanymynech to the junction with the B4369 (near Knockin);
- B4394 between Four Crosses and Llansantffraid;
- B4398 between the B4395 and Llanymynech;
- B4382 between the B4389 and just north of the A495; and
- B4389 between Newbridge and the A458.

14.2.4 Plans of the indicative routes showing the strategic roads that HGV deliveries may take are included in Appendix 14.1.

Rail Network

14.2.5 The proposed overhead connection will cross one railway line:

- Network Rail Route 75 – Chester to Shrewsbury

14.2.6 There are two disused railway lines crossed by overhead line sections of the draft route. These comprise:

- A disused railway line north of Four Crosses; and
- A disused railway line south of Maesbrook.

14.2.7 Construction traffic may also potentially be required to cross a level crossing of the Welshpool and Llanfair Light Railway – managed by the Welshpool & Llanfair Light Railway Preservation Co. Limited.

14.2.8 At the present time, it is considered that there are no potential effects relating to the rail network as crossings can be undertaken without the need to close the line or with the use of short term temporary closures, for example for the erection of scaffolding.

14.3.1 Potentially significant environmental effects include those which are likely to derive from the movement of heavy goods vehicles (HGVs)[18] travelling to and from the proposed development during construction, and from trips made to and from the proposed development by private cars and light goods vehicles (LGVs)[19] once the proposed development becomes operational.

14.3.2 In addition to the environmental effects of construction traffic, there may be a requirement for road closures to facilitate construction. Any road closures will be considered as part of the Traffic and Transport chapter; however there are other potential effects as a result of the traffic associated with the proposed development and these are set out below.

14.3.3 The construction phase of the currently proposed development might include a number of principal activities that would be considered in the assessment of traffic and transport related environmental effects:

- construction of new sections of overhead line;
- construction of underground cable;
- construction of the new substation at Cefn Coch;
- construction of new Sealing End Compounds (SEC);
- construction of a Tee-in point at Lower Frankton; and
- improvement works at Shrewsbury substation;

14.3.4 In addition, the proposed development could involve the conveyance of a number of abnormal indivisible loads (AILs) between Ellesmere Port and the Cefn Coch substation. These would be considered in the overall assessment of construction traffic but other effects resulting from the potential highway improvements required to accommodate these vehicles would be considered in other chapters.

14.3.5 As part of the Traffic Management Plan (TMP) and Traffic Assessment (TA) work currently being undertaken, recommended routes to the each of the development sites are being identified and estimates of traffic flows made. This work is still evolving, but will

[18] HGVs are defined as goods vehicles exceeding a gross vehicle weight of 7.5t.

[19] LGVs are defined as good vehicles with a gross vehicle weight less than 7.5t.

form the basis of the impact assessment of the traffic and transport related environmental effects.

Data Sources

14.4.1 The main sources of data to be used within the EIA are set out below. These will be used in development of the TMP, TAs, the EIA Chapter and other transport reports on the proposed development to support the various consenting processes.

14.4.2 A number of these data sources have already been collated as part of ongoing work in respect of the proposed development:

- Personal Injury Accident Data has been obtained from Powys County Council and Shropshire Council for a large area around the proposed development. The scope of this data may need to be widened to fully understand local road safety issues;
- Highway Boundary Data where Highway Boundary Data does not exist maps of the roads under the control of the local authorities have been provided;
- The Definitive Public Rights of Way Plan has been interrogated for both local authorities and definitive ACAD base produced; and
- Initial construction schedules of movements and programmes.

14.4.3 Traffic estimations will be derived using the anticipated construction programmes for the various elements of the proposed development; to form a basis for the assessment

14.4.4 Traffic count surveys will be used to determine baseline traffic information (See paragraphs 14.4.21 to 14.4.28 for further details).

Consultation

14.4.5 Consultation is ongoing with the following authorities:

- Powys County Council;
- Shropshire Council;
- The English Highways Agency;
- North and Mid Wales Trunk Road Agency;
- The Welsh Police (in relationship to AIL movements); and
- The Welsh Government.

14.4.6 Discussions have included matters which will influence the environmental assessment such as accident pinch points, sensitive locations, and hedge removal.

Study Area

14.4.7 In terms of the spatial extent of the assessment the local road network that may be affected covers a considerable area. The strategic roads which are proposed to be considered include:

- A5;
- A483;
- A458; and
- A495.

14.4.8 However, it is likely that the road links that would experience the highest perceptible changes in traffic flows would be the small ‘C’ roads and unclassified roads that route directly to many of the construction accesses, particularly where these pass though settlements or are in other sensitive locations. The assessment will include the ‘C’ road links and unclassified roads where construction traffic may routed.

14.4.9 The assessment will identify the principal points of constraint on the highway network as well as identifying preferred routes for all traffic.

14.4.10 It should be noted that the spatial extent of the assessment for construction traffic, other than the potential AILs, has been determined based on locations where there is potential for environmental effects to occur caused by changes in traffic flow as a result of the proposed development. It is considered that north of Gobowen on the A5, east of Nescliffe on the A5 (T), south of Welshpool on the A483(T) and west of Four Crosses on the A458(T) will be the limit of assessment on the strategic highways network. Beyond this, the likely potential impact of the traffic associated with the proposed development will be low as the traffic will occur on roads designed to accommodate high traffic flows and HGVs.

Assessment of Traffic Impacts

14.4.11 It is intended that the overall assessment methodology would be based on:

- '*Guidelines for the Environmental Assessment of Road Traffic*', 1992, produced by the Institute of Environmental Assessment (now the Institute of Environmental Management and Assessment, IEMA) ;
- '*Guidance on Transport Assessment*', produced by the Department for Transport, 2007; and
- Design Manual for Roads and Bridges, DfT.

14.4.12 These industry accepted guidelines will provide a consistent method of assessment across the study area. A commentary on the other issues not directly related to the proposed development that could affect the assessment, such as construction traffic peaks and road closures, and will also be provided.

14.4.13 The IEMA *Guidelines for the Environmental Assessment of Road Traffic*, 1992 will be used to assess traffic effects. The following rules, taken from the IEMA guidelines, will be used to define the roads that need to be considered as part of the assessment.

- **Rule 1:** include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%);
- **Rule 2:** include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more. Sensitive areas may be defined as locations near to more vulnerable user groups, such as school children, people with disabilities or the elderly, or accident black-spot areas, roads at or near capacity, or links with high pedestrian flows.

14.4.14 Changes in traffic flows below 10% are unlikely to result in significant environmental effects, as daily variations in background traffic flow may fluctuate by this amount. These guidelines will be used as the basis for assessment.

14.4.15 In accordance with the IEMA guidance, the following criteria will be considered in this assessment:

- severance;
- driver delay;
- pedestrian and cyclist delay;
- pedestrian and cycle amenity;
- fear and intimidation;
- accidents and safety; and
- hazardous loads.

14.4.16 The IEMA guidance requires the assessment of hazardous loads; however as the proposed development is not expected to generate any such vehicle movements, no assessment of such loads will be undertaken.

14.4.17 The estimated traffic generation resulting from the construction phase of the proposed development will be compared with baseline traffic flows in order to determine the percentage increase in traffic on each road that has been taken forward for assessment.

14.4.18 Sensitivity can be defined by road user groups such as school children and the elderly or areas where there is sizeable pedestrian activity but poor pedestrian facilities. A 'sensitive' area may therefore lie adjacent to a school, for example.

14.4.19 Further assessment of effects on those (drivers, cyclists and pedestrians) using the roads affected by increases in traffic (for example effects such as pedestrian and driver delay pedestrian amenity, fear and intimidation, severance, accidents and safety), would be undertaken for all receptors. Potential long term exposure effects from increased traffic flows on those living, working or attending school adjacent or close to affected roads and considered in other sections. Each receptor would be assessed for a worst case scenario. In some locations for example near a school this could be at the start and end of a school day, while on other rural roads it could be the middle of the day. All receptors would also be assessed for Annual Average Daily Traffic (AADT) scenarios in order that a daily impact can also be included in the assessment.

14.4.20 Where receptors are noted to exceed the threshold then further assessment and justification would be required. This would be in accordance with the criteria set out above. Management and mitigation measures will be developed as appropriate.

Traffic Count Surveys

14.4.21 Understanding the baseline traffic flows on the roads that may be affected by the proposed development will form part of the understanding of the baseline conditions and traffic count surveys will be undertaken to establish this. Figures contained in Appendix 14.2 identify the locations where it is proposed that traffic counts will be undertaken to establish the baseline.

14.4.22 Where available, baseline data will be obtained from existing data collection sources (highway authorities). There are a number of locations on the strategic highways network where the highway authorities operate permanent counts. Where this data is not available or insufficient it will be supplemented by traffic surveys. These surveys will be undertaken following discussions with the relevant highway authorities.

14.4.23 The proposed locations for traffic counts are indicated in Appendix 14.2, overlaid on the routes that construction traffic is currently anticipated to use (blue lines). This equates to approximately 60 traffic count locations. This is not a definitive list and will be agreed with the relevant local highway authorities.

14.4.24 The following considerations have been used in identifying the traffic count locations:

- properties adjacent to the carriageway (villages, individual house);
- location of other developments adjacent or near to the carriageway with high pedestrian movements (e.g. schools, towns and villages);
- the current most likely route of construction vehicles; and
- locations where traffic flow is currently noted to be congested;

14.4.25 It is intended that the traffic surveys will capture directional traffic flows for 24 hour period, vehicular speeds of vehicles (at specific access points) and the vehicle compositions (using COBA vehicle classifications). For the purposes of this assessment, the base traffic year has been assumed to be 2014. At the current time it is anticipated that construction will take nearly three years. Future assessment years will be agreed with the

relevant authorities as part of ongoing consultation, and confirmation of the construction timescales.

14.4.26 An appropriate growth factor for future year assessment flows for strategic roads will be discussed with the appropriate strategic roads authority. For local roads future year assessments, flows will be derived from the base traffic flows using TEMPRO derived growth factors. It is considered, due to the location of the proposed development, that growth factors may be low.

14.4.27 The assessment methodology will be based on the prediction of all movements to/from the individual sites by individual modes of transport (construction vehicles, staff etc.).

14.4.28 An accident assessment will also be undertaken for the entire local highways network. This will set out locations where the network has specific accident issues that need to be considered.

Peak Traffic

14.4.29 As a significant element of the proposed development is of a linear nature, the assessment would also take into account the variation in peak traffic flows that occur at locations during the construction period. With a long construction period over a significant distance involving various elements, developing a robust and justifiable set of traffic figures will be important to the delivery of an accurate assessment. An estimated construction programme would be used to identify when the peak traffic scenario at various locations would occur (future years, time of year, and time of day). This would enable to the worst case traffic scenario to be assessed.

Public Transport

14.4.30 The assessment will include a review of the potential effects on public transport in particularly sensitive locations, for example, if road closures are required.

Existing Pedestrian/ Cycle Routes

14.4.31 The potential effects on the Public Rights of Way (PROW) that could be affected by the proposed development will be included within the EIA chapter.

Road Closures

14.4.32 As mentioned above, in addition to the scenario required for assessment of the construction traffic on the existing highways network, a sensitivity test scenario would be required for any potential road closures that may be required.

Construction Compounds

14.4.33 The location of the construction compounds and construction methods will influence the likely potential effects of traffic at receptors. The location of these sites has not yet been confirmed, however they would be considered within the assessment.

Materials Requirements

14.4.34 The requirement to import materials, such as road stone and concrete, could lead to potential effects on the local or wider road networks. Consideration would be given to the use of local sources to reduce the effect on the network. Ongoing discussions will establish a realistic scenario for assessment.

AILs

14.4.35 The assessment would consider the potential effects of the potential AIL movements along the routes to the relevant construction sites.

14.4.36 These proposed AIL movements would be agreed with the relevant parties, including the police and local and strategic highways authorities, to ensure that the movements can be managed appropriately.

14.4.37 Some AIL movements will require escorting and these would be spread across the duration of the construction programme. It is also likely these would be transported during off peak times. Areas where there may be other environmental effects associated with these movements, for example areas where hedges and verges may be affected, would be considered and addressed as part of the relevant chapters of the ES (e.g. the Ecology & Biodiversity chapter).

Cumulative Assessment

14.4.38 To develop the traffic flow scenarios in the future years, the assessment would seek to add into the future year scenarios traffic from consented development in the local area, particularly (but not only) related to wind farms, that may be completed or under construction in the future year. This would enable the future year scenarios to not only take into account future year background traffic growth but also the traffic related to specific key developments in the local area.

14.4.39 It is clear however that the result of the ongoing *Mid Wales (Powys) Conjoined Wind Farms Public Inquiry Public* will also form a part in understanding cumulative development, and further consultation with the relevant local and strategic highways authorities will be undertaken going forward to identify any further key developments (see also Section 5.9).

14.5.2 The level of traffic associated with the connection and substation during the operational phase will be minimal with the highest demand associated with the substation which is estimated to generate, at most, one additional light vehicle trip per week for inspection purposes. This will have a negligible effect on traffic flows and no effect on the local road network. Therefore, it is proposed that the assessment of effects during the operational phase is scoped out of the EIA.

14.5.3 Other environmental effects that are related to the traffic and transport element of the proposed development will be assessed their relevant technical chapters. These are likely to relate to:

- the provision of new access junctions though existing hedge/ fence lines;
- the upgrading of existing informal accesses which may require the removal/ coppicing of trees;
- environmental effects relative to the potential changes to the highways network away from proposed access locations;
- Air pollution / dust and dirt; and
- Noise and vibration.

15 SOCIO-ECONOMICS

15.1 Introduction

15.1.1 This section of the environmental Statement (ES) will assess the likely significant effects on socio-economic features as a result of the proposed development during the construction, operation (including maintenance) and decommissioning phases of the project. In this context 'social impacts' refer to the consequences to human populations of any public or private actions that relate to the ways in which people live, work, play, relate to one another, organise to meet their needs and generally cope as members of society. The term also includes cultural impacts involving changes to the norms, values and beliefs that guide and rationalise their understanding of themselves and their society. The term 'economic impacts' includes issues such as employment, and direct and indirect spending associated with the proposed development.

15.1.2 The socio-economic issues that will be considered as part of the assessment include:

- Tourism: visitors to the area that may stay or visit areas in proximity to the proposed development;
- Access: residential properties and traffic issues, Public Rights of Way (PROW) and recreation activities;
- Landscape and visual issues: the effect of landscape and visual impact from a socio-economic perspective;
- Impact on forestry / land take: potential effects on economic crops / farmland;
- Employment generation: direct and indirect; and
- Supply chain impacts: on a local and national basis.

15.1.3 The effect on best and most versatile agricultural land will be considered within the Agriculture and Land Use chapter. Health consideration of electric and magnetic fields will be considered within the Electric and Magnetic Fields chapter.

15.2 Baseline Context

15.2.1 Baseline data collection has been undertaken to understand the context of the socio-economic issues which might be associated with the proposed development. The draft route has been placed within the context of the super-output areas (a geography for the collection and publication of small area statistics) along the draft route (as shown in Appendix 15.1) and these areas have been used as the basis for the baseline context for this report. The super-output areas under consideration are:

- Wales, Powys Unitary Authority: Powys 001D, 001E, 002A, 002B, 002C, 003A, 003B, 003C, 006B, 006C (super-output areas); and
- England, Shropshire Unitary Authority: Shropshire 011A, 011B, 011E, 012B, 012C (super-output areas).

15.2.2 The following is a summary of socio-economic context with detailed data tables provided in Appendix 15.2.

Population

15.2.3 The main centres of population within the vicinity of the draft route include:

- Cefn Coch
- Llanfair Caereinion
- Meifod
- Waen-fach
- Llansanffraid-ym-Mechain
- Llanymynech
- Llandysilio
- Four Crosses
- Pant
- Maesbrook
- Crickheath
- Osbaston
- Woolston
- Maesbury Marsh
- West Felton
- Queen's Head
- Babbinswood
- Lower Frankton
- Welshpool
- Oswestry

15.2.4 In terms of population within the super-output areas the average is 1,758 persons and the mean population for super-output areas in England and Wales is 1,630 persons, which suggests average numbers of population within the area.

15.2.5 Population density provides a measure of the number of people living in an area. It is higher in urban areas, and lower in rural areas. The draft route is located in a rural area with generally low population densities, avoiding the majority of centres of population. The average persons per hectare for the super-output areas are 1.2 (average population density for Wales is 1.5, and it is 4.1 for England) highlighting the rural nature of the proposed location of the draft route. It is noted that the numerous caravan parks within the area will increase the population density of the area, particularly during the summer months.

15.2.6 Based on the results of the 2011 Census there are no wards crossed by the draft route within the top 10% of the most deprived in Wales or England.

15.2.7 The age structure of a population indicates both the current and strategic (future) requirements of an area. A younger population, for example, may require additional access to schools, safe recreation play facilities and the development of future employment opportunities, while aging populations are likely to require a greater focus on health care, living support, accessibility and social networks. The age data for the super-output areas highlights a decline in the percentage of young people and young adults with the most significant percentage of the population in the mid-40 to mid-60 age bracket.

Education, Skills and Training

15.2.8 Education is an important socio-economic factor and influences a range of issues such as lifestyle, coping skills, employment prospects, income, quality of housing and healthcare. The super-output areas show a similar average to Wales and England levels in terms of qualification levels with 24% on average with no qualifications within the study area (Appendix 15.1)(compared to 25.9% in Wales and 22.5% in England as a whole) and 25.5% with a degree within the study area (compared to 24.5% in Wales and 27.4% in England).

Employment and Income

15.2.9 Between April 2010 and May 2011 in Powys County Council the average employment rate for ages 16-64 was 75.3% and 5.6% were unemployed, and within Shropshire the average was 80.1% and 5.1% respectively.

15.2.10 The greatest percentage of jobs in Powys and Shropshire are in the service sector (82% and 83% respectively), whilst public administration, education and health is the next major sector of employment (approximately 34% and 33% respectively).

15.2.11 Average income in Powys and Shropshire is below the national averages with Powys at approximately £414 gross weekly pay (Wales average is approximately £472) and Shropshire at approximately £445 gross weekly pay (England average is approximately £518).

Tourism

15.2.12 In March 2013 Mathrafal was announced as the venue of the 2015 Welsh National Eisteddfod. The Eisteddfod is likely to attract many visitors: a consultation response noted that previous events were attended by over 100,000 visitors. The chosen site was to be the same as used for the 2003 event (Mathrafal Farm). The underground section of the draft route extends within c.200m of this potential site. As approval of the proposed development is not anticipated before 2017, potential effects on this event will not arise.

15.2.13 There are no 'top 10' attractions in Wales or England within the vicinity of the draft route.

15.2.14 Identified regional level attractions include:

- Powys Castle and Garden (National Trust), c.10km to the south-east of the draft route, located to the south-west of Welshpool;
- The Tourist Town of Llanfair Caereinion;
- Welshpool and Llanfair Light Railway, c.2km south-east of the western sealing end compound siting area near Llanfair Caereinion;
- Higher density of tourist accommodation (B&B, caravan parks and camp sites) near Llansantffraid-ym-Mechain;
- The Montgomery / Shropshire Union Canal, crossed twice by the draft route: to the south-west of Llanymynech and near Maesbury Marsh. Approximately 9km of the canal extends roughly parallel with the draft route between Maesbury and Lower Frankton at c.0.5km-c.1.6km distant to the east. At these locations, the Canal is non-navigible;
- Aston Hall, the buildings of which are c.0.2km west of the draft route;
- Halston Hall, c.1km west of the draft route;
- Woodhouse, c.0.5km east of the draft route;
- Whittington Castle, c.2.3km, north-west of the draft route; and
- Park Hall (The Countryside Experience), located c.3.9km north-west of the draft route. This is the site of the Oswestry Show.

15.2.15 Identified local level attractions include:

- Red Ridge (outdoor activity) Centre is located within 200m of the draft route, c.0.5km north-west at Plas-y-drain (Cefn Coch); and
- Four Crosses (a small stopping off point for visitors) is located c.1.5km to the south of the draft route.

Recreation Resources

15.2.16 The draft route does not cross any routes which are part of the National Cycle Network. There are no Registered Parks and Gardens or Country Parks crossed by the draft route although a number of these features are present within the vicinity of the draft route and potentially would have views of an overhead line.

15.2.17 The draft route crosses a number of other recreational resource features, including the following:

- National Trails – there are two National Trails crossed by the draft route: Glyndŵr's Way at Meifod within the underground route section and Offa's Dyke Path at Wern (to the south-west of Llanymynech) within an overhead line section.
- Rights of Way – numerous PROW are crossed by the draft route and more than 100km of PROW are present within the immediate vicinity, including footpaths, bridleways and byways open to all traffic.
- Long Distance Paths / County Trails crossing the draft route include Montgomery Canal (from west of Maesbury Marsh to south of Lower Frankton) and Wat's Dyke Way Heritage Trail (at Maesbury Marsh).
- CROW Act 2000[20] Registered Access / Common Land crossed by the draft route includes pockets in the west, north-west and north of Cefn Coch.
- Golf Courses within the vicinity of the draft route include Oswestry Golf Club which forms approximately half of the draft route corridor width near its eastern extent.
- Caravan Parks - there are seven identified caravan and/or camping sites within the Preferred Route Corridor[21] and an additional twelve identified caravan and/or camping sites located within c.2km of the corridor. The closest are at Tan-y-ffridd where a proposed underground section of the draft route extends between two areas of caravan park. There are also several parks within c.1.5km of the proposed overhead line sections of the draft route; these include Dolgead Hall Caravan and Lodge Park c.0.4km south; caravan parks at Pentre, c.1km south-east; near Bryn Vyrnwy, c.0.4km north; near Tre-derwen, c.0.2km south; and Bryn Tanat, c.1.2km north.

15.2.18 The vicinity of the draft route contains a number of additional recreation resource features, including the following:

- Registered Parks and Gardens, including Bryngwyn Hall and Pradoe Estate. The draft route is located c.1.2km and c.2.7km from these sites respectively.
- Country Parks, including Nesscliffe Hill Country Park, Boreatton Park (also a PGL holiday centre) and Tedsmore Hall. The former are located c.8km from the draft route while Tedsmore Hall is located c.3km to the south-east.

15.2.19 There are numerous ponds and small lakes in the area, many of which have fishing rights.

Business

15.2.20 Local businesses in the vicinity of the draft route include the tourism and recreation resources identified previously, shops, etc. within the centres of population, plus Tan Y Foel quarry located c.1.2km to the south-east of the draft route.

Housing

Housing throughout the study area, as shown in Appendix 15.1, has a significant proportion of detached houses an bungalows at approximately 56% (compared to the Wales and England averages of approximately 28% and 22% respectively).

Existing Aviation and Defence Facilities

15.2.21 A 25m radio-telescope is located near to Knockin, approximately 6.4km south-east of Oswestry and is adjacent to the eastern boundary of the draft route. The corridor is c.3.3km wide at this point – the draft route is located approximately 2.4km north-west of the telescope. The Knockin telescope is part of the e-MERLIN National Facility, a network of 7 no. radio telescopes across the country, including the 76m Lovell Telescope

[20] Countryside and Rights of Way Act (CROW), 2000

[21] The route corridor identified in the Statement of Preference July 2012 – Red North (Cefn Coch to Lower Frankton).

at Jodrell Bank. e-MERLIN is the largest network of telescopes in the world that has such a dedicated optical network and offers a unique capability to the national and international scientific community.

15.2.22 Nesscliffe Training Area extends from south of Kinnerley to north of Shawardine and is located to the south-east of the draft route and approximately 4km at its closest. The training area is owned by the Army, and is used extensively throughout the year by helicopters from RAF Shawbury. The Nesscliffe Training Camp provides accommodation for up to 530 personnel.

15.2.23 There are two operational aviation sites are located within 5km of the draft route. Knockin airfield, an unlicensed operational aviation site, is situated south-east of Oswestry, between Woolston and Knockin. It is located approximately 1.5km from the draft route to the south-east (and is not recorded as licensed within information provided by the Civil Aviation Authority). Rednal Airfield (unlicensed) comprises a small airfield at near Houghton, north of Shrewsbury and is located approximately 2.9km south-east of the draft route, beyond the existing overhead line into which the draft route will connect.

15.2.24 There are a number of additional operational aviation sites within approximately 20km of the draft route, these include:

- Montgomeryshire Mid Wales Airport located c.2km south of Welshpool (c.12-13km from the draft route and contains a helipad);
- Breidden airstrip/airfield, is located near Pool Quay, between Guilsfield/Cegidfa and Trewern (c.8km from the draft route);
- A helipad at Nesscliffe Training Camp, c.9km south-east of the draft route;
- A helipad is located c.15km north-west of the draft route at Llanarmon Dyffryn Ceiriog;
- Sleap Aerodrome at Harmer Hill, Shropshire c.3km south-west of Wem (c.12km from the draft route). This is also referred to as Slape Airfield and contains a helipad; and
- A helipad is located c.20km from the draft route, north of Shrewsbury at Albrighton;

15.2.25 There is the potential for local gliding clubs and microlight users in the vicinity of the draft route to be affected by new above ground equipment.

15.3 Issues and Concerns

15.3.1 The electricity supplies to be made available as a result of this proposed electricity connection will help to meet the energy and climate change challenges of the next few decades, particularly by adding to the diverse mix of energy sources which include 'cleaner' fossil fuel and nuclear, as well as renewables (including wind power). The potential issues to be addressed as part of the EIA include:

- Construction phase: Land take and associated impact on land-based economic operations;
- Construction phase: Temporary severance or restricted access to resources and receptors;
- Construction phase: Demand for temporary accommodation, e.g. hotels, Bed and Breakfasts (B&Bs), caravan pitches and self-catering accommodation and the impact this has on the tourism industry in the region;
- Construction phase: Potential effects on crime and fear, e.g. associated with construction site compounds.
- Operation phase: Permanent land take and impacts on land holdings;

- Operation phase: Permanent severance of access to and from or along resources and receptors; for example the diversion of a right of way due to surface works;
- Decommissioning phase: Effects during the decommissioning phase are likely to be similar to those identified in the construction phase of the project;
- All phases: Employment generation and spending impacts through the supply chain;
- All phases: Amenity impacts (linked to results of other technical chapters including noise and traffic);
- All phases: Potential effects on relevant local authority allocations, e.g. for employment (NB: there are two allocations in the vicinity of the draft route at Llansanffraid-ym-Mechain and Llanymynech), housing and mineral exploitation. Allocated areas have the potential to create economic value and inward investment into the area.
- All phases: Potential cumulative impacts when considered with relevant proposed and consented developments.
- All phases: Potential visual effects of the proposed development on the well-being of, and enjoyment of the area by, the local community and tourists, as informed by the Landscape and Visual assessment.
- All phases: Potential perceived effects on the quality of recreational use of roads, PROW and other trails and footpaths.
- All phases: Potential effects on other community and recreational facilities, such as country parks, golf courses, other public open space, health, education and community gathering locations (e.g. halls, churches, etc.).
- All phases: Potential effects on existing infrastructure.

15.4 Proposed Assessment Methodology

15.4.1 The following activities would be undertaken as part of the socio-economic assessment for the EIA:

- Description of the existing socio-economic baseline conditions, including population and demography, business and industry, community resources and community values (expanding on the baseline information presented in this scoping report).
- Identification and assessment of potential community impacts or changes to the existing baseline conditions, including desk-based investigations, consultation with key stakeholders / surveys and evaluating likely significance of impacts.
- A tourism survey, to include an assessment of the number of tourists travelling past on routes to elsewhere (this would include engagement with those completing the transport chapter); impacts on views from tourist accommodation and attractions in the area; relative scale of tourism impact – local to national; potential positive impacts and impacts on outdoor activities in the area. Tourist organisations, e.g. Mid Wales Tourism, SUSTRANS and Sustainable Tourism Powys would be contacted to check tourist attractions and usage within the area of scope. Visitor numbers would be identified where possible to allow assessment of relative tourism impacts. Recreation facilities within the area of scope would also be identified and contacted where appropriate. Rights of way would be visited for the purposes of a tourism survey through use of unscheduled interviews with visitors along the route(s) to help understand their use of the area.
- The impact on employment would be explored within both the local and regional populations. This would include a review of local economic development / regeneration strategies, a review of Local Development Plan (LDP)/Local

Development Framework (LDF) proposals and polices (to be considered as part of the assessment of planning and policy) and consultation with economic development officers.

- Desk-based research and consultation would be undertaken to understand:
  - Construction: Likely cost of materials required (depending on pylon type selected), number of employees likely to be included in the material formation, likely number (and source) of employees during construction; likely timeline for construction; type of skills required for manufacture and construction; likely location of material formation; proportion of local employees;
  - Operation / maintenance: Lifetime of materials used in structures; regularity of maintenance work (painting / replacement of parts); and
  - Decommissioning: Likely number (and source) of employees for decommissioning; likely timescale for decommissioning activities.
- Further identification and assessment of community facilities and recreational receptors along the draft route, including schools, health care facilities, churches and other faith buildings, festivals, access land and registered common land, and the potential effects on these.
- Review of current land use along the draft route and within the study area as shown in Appendix 15.1, specifically focusing on areas where above ground permanent infrastructure is proposed and understanding temporary working areas and access routes during the construction phase. The assessment would appraise the impact of infrastructure on land use, calculating net loss during both construction and operation, where not addressed within the Agriculture and Land Use chapter, while also considering access arrangements / agreements for essential maintenance.
- Interrogation of business information along the draft route, and within the study area as shown in Appendix 15.1, including for any additional aviation sites, to identify the nature and potential sensitivity of the business, the extents of non-agricultural land interest, and potential future requirements and aspirations.
- The assessment will also address the potential for combined effects on receptors and/or groups of receptors.
- Identification of measures to avoid, manage or mitigate potential impacts.
- Assessment of potential cumulative impacts based on proposals for other developments surrounding the site;
- Assessment of residual effects for the proposed development..

Spatial Scope

15.4.2 In the socio-economic context receptors are individuals, organisations or groups who are users or beneficiaries of socio-economic resources (community facilities, businesses, accommodation, etc.). Therefore, defining the spatial scope can be complex because of the need to consider individuals and structures at a variety of distances from the proposed development that may be affected because of a number of potential effects such as economic impact (which is difficult to define categorically) and issues like visual impact (that will be coordinated with those completing the landscape assessment). In addition, there are a range of spatial levels (e.g. LSOAs, ward profiles and local authority administrative boundaries) over which socio-economic information is available.

15.4.3 Socio-economic effects will occur both as a result of direct interaction with socio-economic features, such as severance of a right of way during construction and also in terms of the economic activity in an area, such as construction job generation, affecting a much wider spatial area. Therefore, the assessment will consider an area of influence that focuses on super-output areas along the draft route (as highlighted in Appendix 15.1). The

landscape assessment work would also be checked to see if there are any additional locations at a greater distance that may need to be considered from a socio-economic perspective.Where possible, the socio-economic assessment will report in a consistent manner within these areas of influence and at an appropriate scale (e.g. scheme wide).

Temporal Scope

15.4.4 The socio-economic assessment will consider the effects across the construction, operational and decommissioning phases of the project and, in accordance with good practice, it will consider the following temporal elements.

- Temporary impacts – This will reflect impacts that will occur primarily during the construction and decommissioning phases.
- Permanent impacts – This will reflect impacts that will occur during the operational period of the project once construction is completed and/or are anticipated to occur for a period longer than five years.

Assessment of Impacts

15.4.5 The assessment of impacts will be used to determine: the sensitivity of receptors; the magnitude of impacts and the consequent significance of effects. The significance of an effect is determined by assessing the magnitude of the impact (physical change) and the sensitivity of the receptor (the beneficiary, user, occupier or owner). Magnitude of impact will be assessed as high, medium, low and negligible. The sensitivity of a receptor(s) will be assessed as high, medium or low.

15.4.6 Assessment will be made by considering findings from a range of sources including survey work, site visits, the use of Geographical Information Systems (GIS), background research and professional judgement. Magnitude includes an assessment of what type of effect there would be on baseline conditions and the functioning of that resource. The following questions are considered when assessing magnitude:

- How will the impact affect the operation of the resource?
- To what extent will the resource be able to adapt to the change?
- For combined amenity impacts: do other relevant EIA topics conclude a significant effect?
- How long will the impact last? (Is it temporary or permanent?)
- How regularly does it occur? At what times of day?

15.4.7 In considering the sensitivity of receptors to an effect the following types of questions would be considered:

- What is the scarcity of the affected resource and what is the availability of alternatives?
  - Are there alternatives within the relevant catchment area? Do they have spare capacity?
  - How easy would it be to replace / relocate the resource? How likely is re-provision?
  - How accessible are the alternatives to the users of the impacted resource?
- What is the capacity of the receptors to accommodate the impact?
- Who are the users? What is the catchment area? Does it provide a specialist facility / service? Are users from vulnerable or protected groups (e.g. elderly, disabled, ethnic minorities, etc.)?
- How many people are likely to be affected (including as a proportion of total people in the relevant community or user group)?

15.4.8 Significance is determined by assessing magnitude and sensitivity for each impact. Taken together these determine whether the effect is considered to be 'significant' or 'not significant'. Effects can be beneficial or adverse.

Table 15.1: Determination of Significance

Significance		**Sensitivity of receptor**		
		High	Medium	Low
Impact magnitude	High	Major adverse / beneficial - significant	Major adverse / beneficial - significant	Moderate adverse / beneficial - significant
	Medium	Major adverse / beneficial - significant	Moderate adverse / beneficial - significant	Minor adverse / beneficial – not significant
	Low	Moderate adverse / beneficial - significant	Minor adverse / beneficial – not significant	Negligible effect – not significant
	Negligible	Minor adverse / beneficial – not significant	Negligible effect – not significant	Negligible effect – not significant

15.5 Mitigation

15.5.1 The assessment will seek to identify suitable mitigation to reduce, remove or compensate significant negative impacts and to enhance identified positive impacts. Potential mitigation measures might include provision of a worker accommodation strategy and staging of appropriate construction periods to avoid peak holiday seasons.

16 NOISE AND VIBRATION

16.1 Introduction

16.1.1 The ES will address the potential for noise and vibration impacts from the proposed development and, where appropriate, prepare measures to mitigate such effects. Effects associated with the operational phase will be presented separately from the construction and decommissioning phase effects, which will be presented in the Construction emissions chapter.

16.2 Existing / Baseline Environment

16.2.1 The area of the proposed development is a predominantly rural area, with scattered dwellings and a limited number of small villages and hamlets nearby.

16.2.2 Existing noise sources include road noise, agricultural noise, industrial noise (from the Wynnstay Group plc agricultural feed and nutrition products factory located in Llansantffraid), noise from water in rivers, streams and culverts, and quarry noise.

16.2.3 Three initial background noise surveys have been carried to establish the prevailing background noise conditions in the area. The first survey was undertaken in June 2011 as part of a wider survey looking at the route corridor options, and the second and third surveys were undertaken in June and August 2013 along the overhead line sections of the draft route. Both were night-time surveys comprising attended 'spot' measurements of 5-minutes when the weather was calm and mild with negligible breeze and no rainfall. These conditions were considered ideal for obtaining representative measurements of the quietest background noise levels.

16.2.4 In general, the background noise levels recorded were very low and typical of rural areas.

16.3 Potential Effects of the Proposed Development

Construction

16.3.1 The main sources of potential noise impacts during the construction phase include the use of heavy earth moving plant, foundation works (including piling) and the movement of construction vehicles through adjacent areas.

16.3.2 Although lattice pylons generally do not require piled foundations, this is dependent on ground conditions. Therefore, there is the potential for piling to be required of some pylon foundations located in areas of softer ground. Any T-Pylons may need piled foundations. These sources of noise could impact nearby sensitive receptors, such as residential properties, community facilities (e.g. schools, nursing homes, etc.) and ecological receptors. These effects will be temporary, intermittent and highly localised.

16.3.3 Heavy earth moving plant, foundation works (including piling) and the movement of construction vehicles will also be required for the construction of the substation site, sealing end compounds and tee-in site. This will involve construction activities at specific locations for longer periods of time, potentially impacting on nearby sensitive receptors.

16.3.4 Certain construction activities have the potential to result in groundborne vibration effects, depending on the methodology employed and the equipment used. However, groundborne vibrations diminish in strength over distance, rarely reaching levels that can damage structures and buildings, but can achieve levels that are audible or cause sensation in buildings close by.

Operation

Noise and Vibration - Substation

16.3.5 At the proposed substation location, transformer and shunt reactor tank noise will be principal sources of audible noise. This noise will be continuous and tonal in nature, with a

fundamental frequency of twice the power supply frequency, i.e. 100Hz and associated harmonics, e.g. 200Hz, 300Hz, etc. Acoustic enclosures, likely to be part of the inherent design of the substation, would be designed to mitigate tank noise.

16.3.6 Substation auxiliary equipment, such as cooling fans and oil pumps associated with transformer and shunt reactor coolers, produces broadband noise. Operation of transformer coolers is usually infrequent and noise mitigation is usually not required. Shunt reactor coolers are likely to operate more frequently, and appropriate mitigation will be assessed.

16.3.7 Other auxiliary equipment associated with the substation with the potential to emit noise includes air conditioning units. However, these are generally acoustically controlled and/or located within a building and do not emit noise levels of any significance.

16.3.8 Switching noise from circuit breakers may also be emitted from the substation. This is usually heard as a dull thud when the circuit breaker is operated. These operations tend to be intermittent and infrequent. Noise mitigation is not normally required.

16.3.9 The substation will also include a standby diesel generator which will be run for short periods for operational testing but which will run for any appreciable length of time only during emergencies, and may be a potential source of noise emissions on an infrequent basis. Standby generators are either acoustically attenuated on installation or housed within a building. Noise from such assets is seldom discernible beyond the substation perimeter fence.

16.3.10 Transformers and other wound power equipment vibrate at twice the power supply frequency, i.e. 100Hz, and associated harmonic frequencies, e.g. 200Hz, 300Hz, etc. However, the effects are negligible and are countered by the use of industry standard mitigation techniques such as the use of vibration insulation pads to prevent transmission of groundborne vibration. Groundborne vibration has never been raised as an issue or resulted in any complaints at any of National Grid's other operational sites.

Noise and Vibration – Overhead Line

16.3.11 Overhead lines can emit audible noise. Noise from energised overhead lines is produced by a phenomenon known as 'corona discharge'. While conductors are designed and constructed to minimise corona discharge, surface irregularities caused by damage, insects, raindrops or pollution may locally enhance the conductors sufficiently for corona discharges to occur. This can be audible in certain conditions as a 'crackling' sound, occasionally accompanied by a low frequency hum. Weather conditions, such as damp or wet weather can also affect audible noise.

16.3.12 The level of noise produced by overhead lines depends on the operating voltage and the physical configuration of conductor bundles. Once the detailed design of the overhead line has been agreed, a detailed assessment of the likely levels of audible noise produced will be undertaken in line with TR(T)94 as outlined in National Policy Statement EN-5.

16.3.13 Overhead lines do not produce any vibrations of any discernible magnitude.

Noise and Vibration – Underground cables and cable sealing ends

16.3.14 Underground cables do not produce any audible noise or vibration.

16.3.15 Cable sealing end compounds do not produce any significant audible noise or vibration.

Decommissioning

16.3.16 The main sources of potential noise impacts during the decommissioning phase are likely to be similar to the construction phase, with the use of heavy plant and the movement of construction vehicles through adjacent residential areas, etc. resulting in potential nuisance and disturbance effects to nearby sensitive receptors. Similarly, these effects will be temporary, intermittent and highly localised.

16.4 Proposed Assessment Methodology

Construction

16.4.1 In order to assess the effects of construction noise, it will be necessary to conduct further sample background noise level surveys at representative locations in proximity to the draft route. Daytime measurements may be taken near to residential areas, and recreational facilities; such as football fields and golf courses. In relation to existing night-time background noise levels, these will be measured in the vicinity of appropriate local receptors, if determined as at risk of disturbance in the unlikely event that night-time working is required near sensitive receptors. All survey locations will be identified following discussion with Powys County Council and Shropshire Council.

16.4.2 The results of noise levels surveys will form part of the assessment of potential noise impacts associated with construction. Appropriate mitigation will be developed in order to minimise potential noise impacts on local receptors as a result of project delivery.

16.4.3 Construction noise levels will be based upon the prediction method detailed in BS 5228-1:2009. Where possible, a detailed itinerary of construction plant and the associated programme will be used to inform these predictions. However, if the desired level of detail is not available, indicative predictions will be performed using the BS 5228-1:2009 noise database, relating to generically similar plant and construction processes. The noisiest construction phases are expected to be during ground clearance, earth movements primarily for underground cable trenches and foundation work.

16.4.4 The predicted construction noise levels will be compared to measured existing ambient and background noise levels. The assessment will be undertaken in accordance with BS 5228-1:2009.

16.4.5 Predicted construction noise levels will be compared with both the measured existing background levels and with absolute noise level criteria, in order to gauge the degree of impact and the need, or otherwise, for specific noise controls.

16.4.6 Outputs from the traffic studies will be used to quantify traffic noise changes resulting from the movement of construction vehicles on the local road network. It is anticipated that mitigation measures identified and proposed during the EIA will be incorporated into a Traffic Management Plan (TMP).

16.4.7 Mitigation measures for construction effects identified and proposed during the EIA will be incorporated into a Construction Environmental Management Plan (CEMP). It is anticipated that local residents and others potentially affected by construction will be communicated with throughout construction.

16.4.8 Groundborne vibration during construction, including vibration from construction traffic, is not anticipated to be an issue, as effects diminish in strength over distance and rarely reach levels that can damage structures and buildings. In addition, construction activities that produce the most severe vibrations, i.e. rock cutting (controlled blasting) and impact pile driving, should they required, will be temporary, intermittent and highly localised. However, the potential effects of groundborne vibration would be considered as part of the EIA for completeness.

Operation - Substation

16.4.9 The assessment of the transformer and associated auxiliaries, such as cooling fans and oil pumps, will be made against contractual manufacturer's design sound power levels prior to installation. The assessment will determine if further mitigation is required, such as the incorporation of acoustic enclosures or acoustic barriers, or through changes to the design.

16.4.10 Predicted operational noise levels will be compared to measured existing night-time background noise levels, and an assessment of noise change at residential receivers will

be undertaken as well as an assessment of absolute noise level criteria, such as World Health Organisation (WHO) Night-time Noise Guidelines.

16.4.11 In relation to existing night-time background noise levels, these will be measured at locations representative of relevant local receptors.

16.4.12 The results of existing noise levels surveys will form an essential element in the assessment of potential noise impacts associated the operation of the proposed development. Appropriate mitigation will be developed, through design and the selection of equipment in order to avoid or minimise potential noise impacts on local receptors as a result of the project.

16.4.13 The study area will be defined by the locations of noise sensitive receivers in the area surrounding the proposed development.

Operation – Overhead Line

16.4.14 Predicted operational noise levels will be determined in line with the methods detailed in TR(T)94 as referenced in NPS EN-5.

Decommissioning

16.4.15 It is anticipated that the assessment of effects of decommissioning will be undertaken as per the assessment of the effects arising from construction effects.

16.5 Mitigation Measures

Construction

16.5.1 Details of measures to mitigate construction noise impacts will be mitigated within a Construction Environmental Management Plan (CEMP), as agreed between the planning authorities and the contractor(s). These agreements normally include clauses that specify working methods, days and hours of working and permitted noise levels by time of day. The general noise control methods outlined in BS 5228 are also often cited.

Operation - Substation

16.5.2 The ES will include an assessment of the effect of substation noise at sensitive receptors when appropriate noise mitigation such as acoustic enclosures and acoustic barriers have been included as part of the detailed design of the substation.

16.6 Issues to be Scoped Out

16.6.1 Operational noise is not produced by underground cabling, sealing end compounds and the tee-in compounds. As they do not produce any significant audible noise, they are scoped out from further assessment.

16.6.2 Groundborne vibration will also not be an operational issue for the substation, overhead lines, underground cabling, the cable sealing end compounds, or tee-in. As such, the consideration of operational vibration is also scoped out from further assessment.

17 OTHER EMISSIONS

17.1 Introduction

17.1.1 This section considers factors and procedures to be adopted in order to assess potential emissions to the land and air environments not already covered in the Air Quality, Water Quality & Resources, Noise & Vibration, and Sustainability sections, namely the potential for spillages and leakages, mud on roads, light pollution and waste management impacts associated with the proposed development.

17.1.2 The chapter of the ES will address the potential effects of the proposed development and, where appropriate, prepare measures to mitigate such effects. It is anticipated that effects would largely be confined to the construction and decommissioning phases of the development and, as such, will also include the assessment of the construction / decommissioning effects of air quality and noise and vibration.

17.2 Existing / Baseline Environment

Light Pollution

17.2.1 Satellite data shows that the Mid Wales and the Wales/England border in Shropshire have very dark skies. Light is measured on a scale from 0 to 255, with zero indicating no light detected by the satellite and 255 meaning that the satellite's detector is saturated by light. Mid Wales and the Wales/England border, including the Shropshire Hills, typically has a score of 0-1.7, with some areas within the 1.71-50 range (reference: CPRE Night Blight maps for the UK and for the West Midlands for 2000).

Waste

17.2.2 Information on landfill sites in the area will be identified during the EIA.

17.3 Potential Effects of the Proposed Development

Construction

Spillages and Leakages

17.3.1 During construction, there is the potential for spillages and leakages of fuels, oils and other potentially hazardous substances to occur from the plant, machinery and vehicles being used to construct the development, despite control measures that may be implemented. Should they occur, these spillages and leakages have the potential to affect the ground, groundwater and surface waters.

Mud

17.3.2 During construction there is the potential for mud to be generated from construction operations, particularly as a result of vehicles entering and leaving the site and moving along the working area or within working areas, depending on the prevailing weather conditions. These activities have the potential to affect sensitive receptors along the route corridor, such as residential properties, watercourses and habitats, and the local road network.

17.3.3 Potential effects with regard to mud may arise during periods of wet weather, particularly where bare ground is exposed. Silts and mud may runoff causing pollution of watercourses and other sensitive habitats. Mud may also be tracked onto local roads by site vehicles causing health and safety issues and nuisance effects.

Light Pollution

17.3.4 During the construction phase there is likely to be a requirement for certain areas and activities to be lit beyond daytime hours, for health, safety and security reasons, particularly during winter months. This lighting can be very bright, particularly in rural

areas and result in effects to nearby residential properties and sensitive receptors if not sensitively controlled.

Waste

17.3.5 During construction there is the potential for the generation of a variety of waste types. Typical wastes are likely to include: vegetation from clearance activities, surplus spoil, potentially contaminated made ground (if encountered), metal, concrete, domestic wastes from site compounds and welfare facilities and unplanned releases. Although the types and quantities of these wastes can be controlled through implementation of the Waste Hierarchy (Reduce–Reuse–Recycle), some wastes will remain that will require appropriate handling, treatment and/or disposal, thus effecting the environment.

17.3.6 Review and consultation with Natural Resources Wales (NRW) and the Environment Agency will also be undertaken to identify operational landfill sites and recycling centres within the area to which any construction phase waste that cannot be re-used may be sent for disposal or treatment.

Operation

Spillages and Leakages

17.3.7 Spillages and leakages of this type are unlikely to occur during the operational phase of the development, with measures to contain any spills or leakages from plant and equipment contained within the substation site, sealing end compounds and tee-in incorporated into the design. As such, this issue will not be addressed in detail in the ES, but will be included for completeness.

Mud

17.3.8 It is anticipated that there will be no post-construction operational effects arising from the generation of mud as no permanent bare earth surfaces are anticipated to be created. As such, this issue will not be addressed in the ES.

Light Pollution

17.3.9 It is anticipated that there will be no significant operational effects associated with light at new facilities. Although some external illumination will/may be required at these locations, night-time illumination is not anticipated other than at times when they are manned, i.e. during maintenance visits. In addition, where lighting is provided this will be designed to minimise effects of disturbance and light glare, in accordance with the Institution of Lighting Professionals Guidance for the Reduction of Obtrusive Light (ILP, January 2012), e.g. directional and/or shrouded high level lighting.

17.3.10 It is anticipated that lighting may be required at pylons, as a minimum, at locations in close proximity to airfields. If required, it is possible that the lights would be visible over comparatively long distances.

Waste

17.3.11 It is anticipated that there will be negligible effects arising from the generation of waste during the operational phase, which is likely to involve maintenance activities only. As such, this issue will not be addressed within the EIA (i.e. it has been 'scoped out' of the EIA).

Decommissioning

17.3.12 It is anticipated that effects of waste generation, spillages and leakages, mud and light pollution during the decommissioning phase will be similar to those of the construction phase.

17.4 Proposed Assessment Methodology

Construction

17.4.1 A review will be made of relevant legislation and policy with regard to waste.

17.4.2 A review will also be made of the construction methodologies to identify potential waste streams and estimate quantities of wastes likely to arise during the construction. This will include the identification of hazardous and non-hazardous wastes.

17.4.3 Best working practices and mitigation methods to control and minimise mud generation and prevent spills/leakages will be identified for utilisation during the construction phase. Mitigation measure identified will be both general and specific, where appropriate. Generic measures to be identified to control mud are likely to include, for example, use of road sweepers at egress locations from the site, and wheel washers at relevant locations, etc. These measures will be included within the CEMP.

17.4.4 A detailed review will be undertaken of Dark Skies maps and information pertinent to the draft route.

17.4.5 Sensitive properties and receptors located within 300m of the draft route will be identified and evaluated with regard to their likelihood to experience effects of disturbance from light pollution and, where necessary, consultation will be undertaken with Powys County Council and Shropshire Council and general advice sought.

17.4.6 Mitigation measures for construction effects identified and proposed during the EIA will be incorporated into a Construction Environmental Management Plan (CEMP).

Operation

17.4.7 Operational effects of spillages and leakages, mud on roads, light pollution and waste management impacts are considered to be insignificant and will not be assessed within the EIA.

Decommissioning

17.4.8 It is anticipated that the assessment of effects of decommissioning will be undertaken as per the assessment of the effects arising from construction effects.

17.5 Mitigation Measures

Construction

17.5.1 Measure to control and mitigate potential construction impacts arising from spillages and leakages, mud on roads, light pollution and waste will be incorporated within the CEMP.

17.6 Issues to be Scoped Out

17.6.1 It is anticipated that there will be no post-construction operational effects arising from the generation of mud, due to minimal activity. As such, this issue will not be addressed be addressed in the EIA.

17.6.2 It is anticipated that there will be no operational effects arising from the generation of waste, due to minimal activity. As such, this issue will not be addressed in the EIA.

18 CLIMATE CHANGE

18.1 Introduction

18.1.1 The Overarching National Policy Statement for Energy (EN-1, July 2011) states that 'climate change is likely to mean that the UK will experience hotter, drier summers and warmer, wetter winters. There is likelihood of increased flooding, drought, heat waves and intense rainfall events, as well as rising sea levels.'

18.1.2 The ES will address the potential climate impacts associated with the construction, operational and decommissioning phases of the project, to include associated mitigation measures, as appropriate. Climate change impacts considered are flood risk and changes to ground conditions.

18.1.3 Climate change impacts would be addressed within the technical chapters, where appropriate, such as within the Water Quality and Resources, including Flood Risk chapter.

18.2 Existing / Baseline Environment

Current Situation

18.2.1 Much of the land within the draft route has been identified by Natural Resources Wales (NRW) and the Environment Agency as being at risk of flooding, associated with the floodplains of several main rivers and other watercourses, including Afon Rhiw, Afon Banwy, Afon Banwy/River Vyrnwy, River Morda and the River Perry. Further information on flooding can be found in Section 9.

18.2.2 The substation site area is not within Flood Zone C1 or C2. The area has also been assessed as being of very low hazard for landslide and of no hazard from shrinking and swelling clays and running sand.

Likely Future Baseline Situation

18.2.3 Climate change over the next few decades is likely to mean wetter winters and hotter drier summers in the UK, with sea levels continuing to rise. These factors are likely to lead to increased flooding within the lifetime of transmission energy projects.

18.2.4 The Welsh Government, in the Climate Change Strategy for Wales (2010) document[22], uses UKCP09 information to state that Wales is likely to experience the following effects as a result of climate change:

- Temperature increases of between 2.0 and 2.5°C by 2050;
- Annual average rainfall is predicted to remain roughly the same as present, but there is likely to be a large difference in the patterns of summer and winter rainfall in the future; and
- Future sea level rise is likely to result in more severe coastal erosion, and inundation events more likely in low-lying coastal areas[23].

18.2.5 Shropshire Council's expectations are that climate is expected to change in several ways, including:

[22] Welsh Assembly Government, Climate Change Strategy for Wales, 2010.

[23] The quoted results are under the central estimate of the medium emissions scenario based on the 1961-1990 baseline. The central estimate is the 50% probability level - it represents an outcome that in qualitative terms, is as likely to happen as not.

- An increase in average maximum temperature of up to 4°C by the 2080s. Most warming will occur during the summer, although very cold winters will become less frequent;
- Summer rainfall to decrease by 25% by the 2080s;
- Winter rainfall to increase by 24% by the 2080s; and
- More short duration extreme weather events such as storms and floods.[24]

18.3 Issues and Concerns

18.3.1 The construction and operation of transmission infrastructure will lead to a minor increase in emissions through embodied energy in materials and transport. However this is not considered significant in comparison with the reductions in emissions to which it would contribute by connecting with renewable sources of electricity.

18.3.2 There is potential for contributions to localised flooding to occur both during and after the construction phase through the introduction of hard surfaces, e.g. at pylon foundations and/or plant and equipment storage locations, or changes to soil structure/permeability, e.g. at locations with underground cabling.

18.3.3 Another predicted effect of climate change is higher average temperatures which may lead to increased transmission losses. However, this is considered to be a fairly negligible effect when compared to other network losses. The main negative consequences are likely to be operational and maintenance issues associated with extreme weather conditions, particularly as a relatively small global temperature increase can change local climates, leading to a significant increase in the number of days with potentially damaging extreme weather. This will be less of an issue with underground cabling.

18.3.4 Similarly, earth movement or subsidence caused by flooding and drought is a concern for underground cables. This would also be informed by geological, hydrogeological and hydrological studies.

18.4 Proposed Assessment Methodology

18.4.1 The ES will consider the effects of a changing climate on the development, and the likely impacts of the development on an environment that is adapting to climate change, including identifying the sensitivities of topic specific environmental receptors to climate change. It will set out to what extent the proposed development is expected to be vulnerable and, as appropriate, how it would be resilient to:

- Flooding: This will be informed by the assessment carried out for Section 9: Water Quality and Resources and including consideration of the Severn River Basin Management Plan;
- Effects of wind and storms;
- Higher average temperatures leading to increased transmission losses; and
- Earth movement or subsidence caused by flooding or drought (for underground cables).

18.4.2 Any assumptions used or difficulties encountered in the climate change assessment will be included in the ES.

18.4.3 The assessment will also consider whole life effects including, but not limited to:

- Embodied energy in the manufacture of materials used for the development;

[24] http://www.shropshire.gov.uk/media/155641/Shropshire-Climate-Change-Strategy-2011.pdf

- Emissions related to construction – from materials delivery to on-site machinery; and
- Operational emissions related to the functioning of the development, including off-site emissions; and
- Decommissioning.

18.4.4 Further consultation with stakeholder bodies such as the NRW, Internal Drainage Boards, Environment Agency, Canal & River Trust (formerly British Waterways) and others will be undertaken as part of the EIA.

18.4.5 The EIA will also consider the principles given within the Wales and England biodiversity strategies, identifying how the proposed development potential effects on the natural environment will be influenced by climate change and how ecological networks can be maintained.

18.5 Potential Adaptation / Mitigation Measures

18.5.1 Adaptation measures will be based on the latest set of UK Climate Projections, the Government's latest UK Climate Change Risk Assessment (if available) and in consultation with the NRW and the Environment Agency.

18.5.2 Further adaption / mitigation measures are given in Section 9 (water quality and resources).

19 SUSTAINABILITY

19.1.1 Sustainability will be considered throughout the EIA, and addressed within each technical chapter.

19.1.2 National Grid's commitment to sustainability is set out in *"Our Contribution: A framework for environmental sustainability in National Grid"*[25] which defines the company's environmental sustainability ambition and sets out specific and measurable targets to achieve this ambition. National Grid's focus is on making significant progress in three main areas:

- ***Climate positive***: Facilitating the transition to a low-carbon energy economy and reducing our own carbon footprint.
- ***Positive about resources***: Removing waste and inefficiency from everything we do, minimising our impact on the environment.
- ***Enhancing ecosystems***: Using our land and our natural assets for good, benefiting biodiversity, ecosystems and communities.

19.1.3 The section on "Enhancing Ecosystems" is most pertinent – the Natural Grid.

- *"Our assets, operations and infrastructure have an impact on the natural environment. Regulations require us to mitigate this impact but through innovative approaches we have a real opportunity to create something special for our business, communities and society as a whole – the Natural Grid.*
- *As a landowner, we will work and partner with others to use our land and our natural assets for good, benefiting biodiversity, ecosystems and communities. We will engage with communities and our people to make sure we respect and preserve what we all value, and enhance what we have for future generations.*
- *Our aim is to provide a natural grid of better and bigger habitats, connecting them to create wildlife corridors and biodiversity stepping stones alongside our network of energy assets. The Natural Grid adds ecological value, connects habitats, species and ecosystems and makes our contribution to the preservation, restoration and enhancement of the natural environment."*

19.1.4 In addition to the National Grid's commitment to sustainability, sustainability will be assessed with reference to the following national sustainable development documents and guidance:

- Welsh Assembly Government (WAG): Sustainable Development Charter – One Wales: One Planet;
- WAG Guidance and advice to support the Sustainable Development Charter (May 2010);
- The National Planning Policy Framework; and
- Planning for a Sustainable Future: White Paper (May 2007).

19.1.5 Sustainability assessment will also include appropriate consideration of National Grid's seven themes for delivering their Environmental and Responsible Business commitments:

- Water conservation;
- Air quality;

[25] http://www.nationalgrid.com/NR/rdonlyres/C720793A-C277-4951-BDF5-B95735DA8819/60925/OurContributionBrochure2.pdf

- Greenhouse gas and climate change;
- Biodiversity;
- Contaminated land;
- Waste, resources and energy efficiency; and
- Compliance and environmental management systems.

19.1.6 The sustainability assessment will also include appropriate consideration of the potential effects on peat reserves along the draft route.

20 WELSH LANGUAGE

20.1 Introduction

20.1.1 This section of the Scoping Report considers the potential effects of the proposed development on the Welsh language and outlines the approach to be adopted in assessing potential effects as part of the EIA process.

20.2 Existing / Baseline Environment

20.2.1 According to the 2011 Census[26], 19.0% of people in Wales speak Welsh, with 18.6% (2001: 21.1%) of the population of Powys able to speak Welsh – a total of 23,990 (2001: 25,814) Welsh speakers.

20.2.2 A high percentage of Welsh speakers are young people. According to the 2011 Census, 42.3% of 5 to 15 years old are able to speak Welsh (2001: 44.7%)[27]. In 2001, in Powys, the highest percentages of Welsh speakers lived in wards in the Dyfi, Banw and Tanat valleys in Montgomeryshire.

20.2.3 Only around 5% of those born outside of Wales, but living in Wales speak Welsh[28]. In Powys, as across Wales, it can therefore be assumed that the majority of Welsh speakers are either those who have been born locally or who have moved from other parts of Wales.

20.2.4 Whilst the identity of Wales-born, Welsh-speaking people is more likely to be centred around their language, those who move in or who cannot speak Welsh often have a strong sympathy with the need to protect and enhance the language. The language is a part of the rich and diverse culture and heritage of the country, and is treasured by both Welsh speakers and non-Welsh speakers.

20.3 Legislative Context

20.3.1 Legislation to protect the language was introduced in 1967, and in 1993 a new Welsh Language Act gave the language official status and placed a duty upon the public sector organisations to put Welsh on an equal footing with English.

20.3.2 As a result of the Welsh Language (Wales) Measure 2011, full responsibility for the Welsh language was passed to the Welsh Government. The Welsh Language Commissioner is tasked with enforcing compliance with legislation and to protect the opportunities that are available to use the Welsh language.

20.4 Statutory Obligations

20.4.1 It is a statutory requirement that all local planning authorities in Wales to prepare a Local Development Plan (LDP). Technical Advice Note 20: Planning and the Welsh Language (October 2013) provides guidance to local planning authorities on how to consider the Welsh language in the preparation of their LDPs, including mitigating any effects of development, particularly where the protection and/or enhancement of the Welsh language has been identified as a priority for an area.

20.4.2 The TAN 20 states, with regard to the determination of planning applications, that decisions must be based on planning grounds only and be reasonable. It also states that planning applications should not be subject to Welsh language impact assessment as this

[26]Welsh Government Statistical Bulletin (SB 118/2012), December 2012: *2011 Census: First Results on the Welsh Language*

[27]https://statswales.wales.gov.uk/Catalogue/Welsh-Language/WelshSpeakers-by-LA-BroaderAge-2001And2011Census

[28]Jones, H. M, *A statistical overview of the Welsh Language*, 2012

would duplicate LDP processes. However, within Powys, the onus to undertake an assessment of the impact of a proposed development on the Welsh language has been placed on the developer for proposals within language sensitive areas.

20.5 Local Policy

20.5.1 An objective of the Emerging Powys LDP is to support the use of the Welsh language and promote inclusive (bilingual) communities within Powys. Strategic Policy SP9 – Welsh Language & Culture states:

> *'Development proposals shall promote and support the use of the Welsh Language. In language sensitive areas proposals must demonstrate that the impact of development on the Welsh language has been taken into consideration. Where a negative impact is identified, appropriate mitigation measures shall be provided.'*

20.5.2 No Language Sensitive Areas have yet been set, but these may include known Welsh speaking communities[29]:

- The Ystradgynlais area, near County border with Neath Port Talbot;
- North West Montgomeryshire, near the border with the Welsh speaking heartland in Gwynedd; and
- Western areas of Powys adjoining the Carmarthenshire border, mostly within the Brecon Beacons National Park.

20.5.3 The Mid Wales Connection Project is not located within these areas, the nearest being North West Montgomeryshire.

20.6 Potential Effects of the Proposed Development

Construction

20.6.1 The construction phase of the connection will result in the need for specialist construction workers from outside the area who are unlikely to be Welsh-speakers. These workers are likely to require temporary accommodation in the area, which is likely to be found in local towns, villages and tourist accommodation sites such as caravan parks. They are also likely to use local services, such as shops, post offices, public houses, etc., and will require English to be spoken and provided in written form.

20.6.2 However, the need for those construction workers will be temporary, lasting for the duration of the construction period. The proposed development is, therefore, likely to result in effects on the Welsh language of minor negative significance and of a temporary nature.

Operation

20.6.3 The operation of the connection will involve only a small number of inspection and maintenance workers working in the locality. These employees may well live locally and be Welsh-speakers, otherwise visits to the area by inspection and maintenance workers will be infrequent and of short duration. The operation of the development is, therefore, likely to result in negligible effects on the Welsh language.

Decommissioning

20.6.4 The decommissioning phase is anticipated to result in effects of a similar nature to the construction phase, i.e. temporary effects of minor negative significance.

[29] Powys LDP Draft Welsh Language and Culture Topic Paper (2011). http://www.powys.gov.uk/rep_2011-03-04ldp1_12c_en.pdf?id=47

20.7 Proposed Assessment Methodology

20.7.1 It is proposed not to undertake a full Welsh Language Impact Assessment but to prepare a Welsh Language Statement (WLS) as a stand alone document, with a summary for inclusion within the ES, to demonstrate that the Welsh language has been taken into consideration. The Statement would be prepared with reference to guidance set out in Appendix B of *Planning and the Welsh Language: The Way Ahead*, 2005.

20.7.2 The WLS will address potential effects of all phases of the proposed development on the Welsh language in terms of:

- Employment – particularly in terms of job creation during the construction and decommissioning phases and the skills requirements of the labour force.
- Housing – particularly in terms of the temporary accommodation needs of the construction and decommissioning phases.
- Education – this is unlikely to be an issue but will be included for completeness.
- Infrastructure – in terms of how the proposed development may improve accessibility into the area and reduce travel times from surrounding areas.
- General – in terms of local services such as shops, residential/community facilities that serve the development.

20.7.3 A number of important documents will be considered as part of the preparation of the WLS, including:

- Technical Advice Note 20: Planning and the Welsh Language, October 2013;
- Planning Policy Wales (particularly Section 4.13);
- Wales Spatial Plan;
- Welsh Government Draft Welsh Language Scheme;
- Welsh Government Welsh Language Strategy 2012-2017;
- Planning and the Welsh Language: The Way Ahead, 2005;
- A National Action Plan for a Bilingual Wales, 2003;
- Powys Welsh Language Scheme 2010-2013;
- One Powys Plan 2011-14;
- Powys Planning Policy (UDP);
- Emerging Powys Planning Policy (LDP); and
- Emerging Powys LDP: Draft Welsh Language and Culture Topic Paper (v2, Feb 2011)

21 GLOSSARY / ABBREVIATIONS

%	Percentage
£m	Million Pounds Sterling
<	Less than
>	Greater than
°C	Degrees centigrade
3D	Three Dimensional
AAIs	Areas of Archaeological Importance
Absorption	To take something in, especially gradually
AC	Alternating Current
ACHWS	Advisory Committee on Historic Wreck Sites
Additionality	The extent to which a new input (action or item) adds to the existing inputs (instead of replacing any of them) and results in a greater aggregate
Adit	An entrance to an underground mine which is horizontal or nearly horizontal, by which the mine can be entered
ADS	Archaeology Data Service
Agri-environment scheme / agreement	A UK government undertaking in which farmers are paid to farm in an environmentally sensitive way.
AIL	Abnormal Indivisible Load
AIMD	Active implantable medical device
AIS	Air Insulated Switchgear
ALC	Agricultural Land Classification
Alignment	The proposed or actual route of a connection associated with a route corridor
Alluvium	Material transported by rivers and deposited along its course
ALO	Agricultural Liaison Officer
Alternative pylon design	Alternative design to a conventional steel lattice pylon
AM	(Welsh Government) Assembly Member
Ancillary Works	Works which form part of the project but which are not development, but which can be included in part 2 of schedule 1 to the DCO.
Angle pylon	Pylons erected at an angle to allow for change in direction or to make a circuit into a manageable length. Because of the uneven load on one side of the pylons, deeper and heavier foundations are required on the less loaded side
AOD	Above Ordnance Datum (elevation of land above sea level at Newlyn)
Appropriate Assessment (AA)	Formal assessment by the Competent Authority of the impacts of a plan or project on the integrity of a Natura 2000 site (a Special Protection Area (SPA), proposed SPA, Special Area for Conservation (SAC) and Ramsar site

AQMA	Air Quality Management Area (AQMA). Designated zone where specific air quality management proposals (defined in an air quality action plan) are proposed by a local authority to improve air quality and ensure that Air Quality Objectives are met by 2005
AQO	Air Quality Objective (AQO). The maximum amount (limit) of a given pollutant that may be present in the air for a given time period, as defined in the Air Quality Regulations in the target year (2005)
AQS	Air Quality Standard (AQS). The maximum concentration (limit) of a given pollutant that may be present in the air for a given time period, as defined in the Air Quality Regulations at the current time
Aquifer	A body of permeable rock that is capable of storing significant quantities of water; is undertaken by impermeable material, and through which groundwater moves
Archaeological DBA	Archaeological Desk-based Assessment (DBA) – a study of existing records to identify known and potential archaeological sites
Archaeological FRS	Archaeological Field Reconnaissance Survey (FRS) – a site walkover survey by an experienced archaeologist to identify archaeological features and remains.
Area of Outstanding Natural Beauty (AONB)	An area designated by the Countryside Commission under the National Parks and Access to Countryside Act 1949 for its particularly attractive landscape and unspoilt character, which should be protected and enhanced as part of the national heritage
Area of Search	The term given to a wide area within which the route corridors are identified
ASIDOHL	Assessment of the Significance of Impacts of development on Historic Landscape areas (applicable in Wales)
Assart	To make arable by clearing trees
Associated Development	Development which is associated with a Nationally Significant Infrastructure Project. It is subordinate to and necessary for the development and effective operation of the NSIP
ATC	Air Traffic Control
Auger	A tool for boring holes
AUN	Automated Urban Network (the UK wide DEFRA Air Quality Monitoring Network)
AUN affiliate	A monitoring site which is owned and run by a local authority but which provides data to the DEFRA network
A-weighting, dB (A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies
B&B	Bed and Breakfast (accommodation)
BAP	Biodiversity Action Plan. A strategy for conserving and enhancing wild species and wildlife habitats in the UK. Now replaced by Country Biodiversity Strategies
Baseline	A study of existing environmental conditions
Bat fly-way	An approximately linear feature along which bats navigate
BBNP	Brecon Beacons National Park
BCT	Bat Conservation Trust

Benzene (C_6H_6)	A stable aromatic hydrocarbon present in petrol (in small quantities). Inefficient operation / poor tuning of vehicle engines releases benzene into the atmosphere as unburned fuel
Berm	A low man-made ridge used to divert surface water runoff away from watercourses, roads and other sensitive areas
BGS	British Geological Survey
BHS	British Horse Society
Billion	One thousand million
Biodiversity	The variety and abundance of species, their genetic composition, and the natural communities, ecosystems, and landscapes in which they occur
Birdstrike	The mortality caused to birds by collision with an overhead line or other above ground National Grid infrastructure
BIS	Biodiversity Information Service
Black smoke	Dark, small particulates (often of carbon or carbon derivatives) resulting from inefficient combustion processes.
Blockstone	Dimensional stone blocks used for construction
BM	British Museum / Bench Mark (note context)
BMV	Best and Most Versatile (soils)
BOAT	Byway Open to All Traffic
Borehole	A hole drilled in to the ground to tap an underground water-bearing layer of rocks for water supplies (or alternatively to investigate underlying layers of the ground)
Boulder clay	Obsolete term for till
Bronze Age	Prehistoric time period, c.2200 to 800 BC. Characterised by first use of Bronze, continued agricultural development, continued monument construction, votive deposition, and an increasingly hierarchical society
BS	British Standard
BTO	British Trust for Ornithology
Bund	An earth embankment
BW	Bridleway
CA	Conservation Area. Designated by local authorities on account of their special architectural or historic interest, the character and appearance of which it is intended to preserve and enhance
CAA	Civil Aviation Authority. The public corporation which oversees and regulates all aspects of civil aviation in the United Kingdom
Cable	An insulated conductor designed for underground installation
Cable sealing end	Structures used to transfer electrical circuits between underground cables and overhead line (see also Sealing End Compound / SEC)
Cadw	The historic environment service of the Welsh Government
CAMS	Catchment Abstraction Management Strategy
Carbon monoxide (CO)	Created and emitted by incomplete combustion of all compounds in an environment where oxygen supply is limited
Carboniferous	The fifth geological period of the Palaeozoic Era, dated between 362 and 290 Ma (million years ago)
CBA	Cost Benefit Analysis / Council for British Archaeology (note context)
CCI	Cable Consulting International

CCW	Countryside Council for Wales
Circuit	Discrete electrical connection between two points on an electricity network
CIRIA	Construction Industry Research and Information Association
CLA	Country Land and Business Association
Clawdd	Hedgebank, hedgerow, dyke, embankment (Welsh). Plural 'cloddiau'
CLVIA	Cumulative Landscape & Visual Impact Assessment
CO_2	Carbon Dioxide
Code of Construction Practice	Outlines the approach to environmental management throughout the construction phase, with the primary aim of reducing any adverse impacts from construction on local sensitive receptors. See also Construction Environmental Management Plan (CEMP).
Coir	The fibre from the outer husk of coconuts, put to many uses including making ropes, matting, etc.
Combined effects	Combined effects are those which relate to schemes within the wider Mid Wales Wind Farm context, i.e. combined effects of substation, 132 kV networks, 400 kV connection and wind farms. These effects can be temporal (e.g. construction phases occur at the same time) or spatial (e.g. the same area is affected)
Conductor	Used to transport electrical the power, usually installed in a set (or bundle) on both sides of pylons
Connection design	The design and position of the main elements of the proposed connection comprising overhead lines and/or underground cables including positioning of pylons and other installations such as substations and/ or underground sealing end compounds
Consideration	Features identified as potentially relevant to the choice of connection / technology, refined route corridor and / or alignment. These considerations may become potential constraints dependent on the details of the feature, e.g. reason for designation, proximity to potential development areas
Construction Environmental Management Plan (CEMP)	Outlines the contractors approach to environmental management throughout the construction phase, with the primary aim of reducing any adverse impacts from construction on local sensitive receptors. This document is sometimes referred to as a Project Environmental Management Plan (PEMP) or Code of Construction Practice
Construction phase	Activity taking place on site up until commissioning
Consultation strategy	The Consultation Strategy sets out how consultation will be undertaken in relation to the proposal. This document has been produced in accordance with Section 47(2) of the Planning Act 2008 and will feed into the production of a Statement of Community Consultation
Corona discharge	An electrical discharge resulting from the ionization of a fluid surrounding an electrically energized conductor. This discharge occurs when the strength (potential gradient) of the electric field around the conductor is great enough to form a conductive region, but not great enough to cause electrical breakdown or arcing to nearby objects
CP School	County Primary School
CPAT	Clwyd-Powys Archaeological Trust
CPRE	Campaign to Protect Rural England
CPRW	Campaign to Protect Rural Wales
CRCE	Centre for Radiation, Chemical and Environmental Hazards

CROW (Act)	Countryside and Rights of Way Act, 2000
CS	Core Strategy
CSS	Countryside Stewardship Scheme
Cumulative effects	The effects of other development schemes - in addition to those which pertain to combined effects - (whether underway, consented, or proposed) which, on an individual basis may be insignificant, but cumulatively with National Grid's proposed development, may have a significant effect. These effects can be temporal (e.g. construction phases occur at the same time) or spatial (e.g. the same area is affected)
Cursus	A long narrow rectangular earthwork enclosure of Neolithic date, usually defined by a bank and ditch and presumed to be of ceremonial function
CWS	County Wildlife Site
DBA	Desk-based Assessment
DBP	Defence of Britain Project
DC	Direct Current. Electricity that flows in one direction in a wire or cable. The voltage cannot be increased or decreased using transformers as it can with AC electricity. Converting from AC to DC and back takes place at a converter station
DCLG	Department for Communities and Local Government
DCMS	Government's Department of Culture, Media and Sport
DCO	Development Consent Order. The Order made under the Planning Act 2008 which authorises an NSIP
DECC	Department of Energy and Climate Change
Decibel (dB)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ($2x10^{-5}$Pa)
Decommissioning phase	Activity to remove the development from the environment once it is no longer in operational use
DEFRA	Department for Environment, Food and Rural Affairs
Designated area	Area designated and protected by national or international law for its landscape, biodiversity, or historic interest
Desktop study	A study undertaken to gather and analyse existing data from public domain, scientific and commercial databases, and available project sources
Development Consent	Permission for the Project to proceed in the sense used in the EIA Directive
De-watering	To remove water from the construction area, usually by pumping
Diffusion tube	A passive device for monitoring air quality and measuring pollutants
DMV	Deserted Medieval Village
DNO	Distribution Network Operator (e.g. SPEN)
Drift	A general name for the superficial as distinct from the solid formation of the earth's crust or material deposited by a glacier
DTM	Digital Terrain Model
Dust	Generic term used to describe larger non-respirable airborne particulates (typically those which are deposited rapidly and normally associated with soiling / marking of property, cars, vegetation, etc.)

EA	Environment Agency
Easement	Allowing another person to use your land for a specific purpose, such as installing utilities. Also the right over land for the benefit of adjoining land or utility
EAW	Environment Agency Wales
effect	The changes arising from the development that is being assessed (i.e. designed with built-in mitigation); the effect of the action. Note: the EIA Directive emphasises the identification of significant environmental effects and includes effects that are positive and negative, direct and indirect, long and short term, and reversible and irreversible, as well as cumulative effects
EC	European Commission
ECA	England Conservation Area
EcIA	Ecological Impact Assessment
Ecofact	A naturally produced object found on an archaeological site, such as the remains of animals or plants
EDM	Electronic Distance Measuring device
EH	English Heritage
EHO	Environmental Health Officer
ELB	England Listed Building and Grade
EIA	Environmental Impact Assessment. The process by which the impacts of a proposed development upon all aspects of the receiving environment are identified and analysed
ELF	Extremely Low Frequency. The UK power frequency is 50Hz which is, therefore, the principal frequency of the electro and magnetic fields produced. These electro and magnetic fields are also known as Extremely Low Frequency (ELF) EMFs
EMC	Electromagnetic Compatibility. The discipline of controlling emissions of, and immunity to, electromagnetic disturbances. It is the ability of equipment to function satisfactorily in its electromagnet environment without introducing intolerable electromagnetic disturbance to other equipment in that environment
EMFs	Electric and Magnetic Fields: Electric Field: a measure of the force experienced by a static electric charge in the presence of the other electric charges. Magnetic Field: a measure of the force experienced by a moving electric charge, due to the motion of other charges.
EMS	Environmental Management System
EN	English Nature (now Natural England)
EN-1	Overarching National Policy Statement for Energy
EN-5	National Policy Statement for Electricity Networks Infrastructure
ENMR	English Heritage National Monuments Record of sites and events
ENSG	Electricity Networks Strategy Group
Envirogeotechnical / Envirogeotec study	Desk based study investigating the physical geography and geology of an area
EPA	Environmental Protection Act (1990)

EPAQS	The Expert Panel on Air Quality Standards (EPAQS). An advisory panel of experts reporting to the Government on appropriate environmental standards for the main air pollutants
EPC	Engineer, Procure and Construct
EPO	Environmental Protection Officer
EqIA	Equalities Impact Assessment
ERDP	England Rural Development Programme
ERP	Emergency Response Plan
ERPG	England Registered Park and Garden
ES	Environmental Statement. Report documenting the outcome of an Environmental Impact Assessment
ESA	Environmentally Sensitive Area
ESM	England Scheduled Monument
EU	European Union
Eutrophication	The ageing of a lake or land-locked body of water that results in organic material being produced in abundance due to a ready supply of nutrients accumulated over the years
EWEA	European Wind Energy Association
Excavatability	The ease at which ground can be excavated
Façade	A sound field determined at a distance of 1m in front of a large sound reflecting object such as a building façade
Fault	A fracture in rock along which there has been an observable amount of displacement
FCA	Flood Consequence Assessment (Wales)
Field capacity	An area of soils is said to be at field capacity after draining under the influence of gravity has ceased
Floodplain	A floodplain is the area that would naturally be affected by flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas
Flood Zone A	Wales only: Considered to be at little or no risk of fluvial or tidal/coastal flooding. Used to indicate that justification test is not applicable and no need to consider flood risk further.
Flood Zone B	Wales only: Areas known to have been flooded in the past, evidenced by sedimentary deposits. Used as part of a precautionary approach to indicate where site levels should be checked against extreme (0.1%) flood level. If site levels are greater that the flood levels used to define adjacent extreme flood outline there is no need to consider flood risk further.
Flood Zone C	Wales only: Based on Environment Agency (in England) extreme flood outline, equal to or greater than 0.1% (river, tidal or coastal). Used to indicate that flooding issues should be considered as an integral part of decision making by the application of the justification test including assessment of consequences.
Flood Zone C1	Wales only: Areas of floodplain which are developed and served by significant infrastructure, including flood defences. Used to indicate that development can take place subject to application of justification test, including acceptability of consequences.

Flood Zone C2	Wales only: Areas of the floodplain without significant flood defence infrastructure. Used to indicate that only less vulnerable development should be considered subject to application of justification test, including acceptability of consequences. Emergency services and highly vulnerable development should not be considered.
Fluming	Temporary positioning of a pipe or pipes in a watercourse to maintain water flow crossing the spread/working area
Fold	A flexure in rocks, i.e. a change in the amount of dip of a bed, and also often a change in the direction of the dip
Formation	The basic unit of subdivision of geological strata, and comprises strata with common, distinctive, map-able geological characteristics
FP	Footpath
FRA	Flood Risk Assessment (England)
Free-field	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings
FRS	Field Reconnaissance Survey
FTE	Full Time Equivalents
FZ	Flood Zone
FZ1	England only: Areas outside of flood zones 2 or 3, i.e. where the risk of flooding from rivers or the sea is less than a 0.1 per cent (1 in 1000) chance of occurring each year
FZ2	England only: An area that could be affected by flooding, either from rivers or the sea, if there were no flood defences. These areas are likely to be affected by a major flood, with up to a 0.1 per cent (1 in 1000) chance of occurring each year
FZ3	England only: An area that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded: • from the sea by a flood that has a 0.5 per cent (1 in 200) or greater chance of happening each year; • or from a river by a flood that has a 1 per cent (1 in 100) or greater chance of happening each year.
GCR	Geological Conservation Review
GDP	Gross Domestic Product
Generator	Generator of electricity
Geotextile membrane	A permeable synthetic membrane specifically designed to be used as a construction material
GIL	Gas Insulated Line
GIS	Gas Insulated Switchgear / Geographic Information System (note context)
Glacial Till	An unsorted material, which may contain clay, sand, gravel, cobbles and boulders in varying quantities deposited as a result of global action. Historically referred to as boulder clay
GPS	Global Positioning System
GQA	General Quality Assessment Scheme
Grip	Ditch, which may be filled with a filter material, designed to intercept surface water runoff

Grits	A term applied to sedimentary rocks in which the particle shape is angular to sub-angular
Groundwater	Water flowing through or contained beneath the ground surface
GS6	An HSE Guidance Note for avoiding the danger posed by overhead electric power lines
GSP	Grid Supply Point
Gullying	Gullying is initiated when surface runoff erodes the soil zone and incises the underlying material. It tends to occur in bedrock such as shale or clay, or in weakly cohesive sediments such as loess and colluvium
GVA	Gross Value Added
GVLIA	Guidelines for Landscape and Visual Impact Assessment (Second Edition)
GW	Gigawatt. One billion (10^9) watts
GWhr	Gigawatt hours
ha	Hectare
HA	Highways Agency
Habitats Regulations Assessment (HRA)	Assessment undertaken in accordance with the requirements of The Conservation of Habitats and Species Regulations 2010. Also known as Appropriate Assessment (AA)
Head deposits	An earthy mass containing angular fragments produced as a result of solifluction in periglacial regions
HER	Historic Environment Record
Hertz (Hz)	Measure of frequency
HGV	Heavy Goods Vehicle
HIS	Habitat Suitability Index
HLA	Historic Landscape Assessment
HLC	Historic Landscape Characterisation
HLCA	Historic Landscape Character Area
HM	Her Majesty's
Holford Rules	Principles for overhead transmission line routeing specifically, formulated by the late Lord Holford and published in 1959
Horlock Rules	Guidance relevant to the siting of substations which establishes a set of seven important criteria to assist those responsible for the siting and design of new substations during the identification and appraisal of suitable substation sites
HPA	Health Protection Agency (Centre for Radiation)
HVDC	High Voltage Direct Current
Hydrocarbons (HCs)	Organic chemicals (normally petrol distillates)
Hz	Hertz
IBC	Intermediate Bulk Container
ICM	Interim Connect and Manage
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ICRCL	Intergovernmental Committee on the Redevelopment of Contaminated Land
ICT	Information and Communication Technology
IDB	Internal Drainage Board

IEMA	Institute of Environmental Assessment and Management
IET	Institution of Engineering and Technology
IfA	Institute for Archaeologists
ILE	Institute of Lighting Engineers
IMD	Index of Multiple Deprivation
Impact	The action of the development, for example, on the environment
Indirect (secondary) effects	Potential indirect effects of the proposed development, such as sediment runoff potentially affecting a down-gradient receptor
Insulator	Used to safely connect the conductors to pylons
Interbedded	Between two layers
Interfluve	The region of land between two watercourses
IPC	Infrastructure Planning Commission. Independent body that examines applications for Nationally Significant Infrastructure Projects, now superseded by the National Infrastructure Directorate of the Planning Inspectorate (NID) from 1st April 2012, as required under the Localism Act 2011
ISO	International Standards Organisation
Isochrone	A line drawn on a map which connects points at which things occur or arrive at the same time
Jurassic	Geological time period extending from 208 to 146 Ma
Karstic hollows / cavities	A hollow found in limestone formed by the dissolution of calcium carbonate
km	kilometre
km^2	square kilometre
kV	kilovolt (1000 volts)
kV/m	kilovolts per metre
L_{90} and L_{10}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise
$L_{Aeq,T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A – weighted fluctuating sound measured over that period
L_{Amax}	L_{Amax} is the maximum A – weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response
Landfill site	A disposal site for controlled wastes
LANDMAP	A national database of landscape information for Wales, devised by CCW to aid decision-making. It includes both objective and subjective information, including rock types, historical information and cultural interpretation
LBAP	Local Biodiversity Action Plan

LCA	Landscape Character Assessment
LDF	Local Development Framework
LDP	Local Development Plan
Leachability	The ease at which substances can be washed through the soil
Leachate	Liquid product of decomposition of (usually household) waste
Lead (Pb)	A heavy metal which is a metabolic poison and which cannot be removed by normal metabolic processes (bio-accumulates in animal tissue)
LEADER	A method of delivering support for rural development through implementing a local rural development strategy
LEAP	Local Environment Agency Action Plan
LEN	Local Electricity Network
LGV	Light Goods Vehicle
LHA	Local Highway Authority
LI	Landscape Institute
Likelihood	The chance that a potential effect would be realised (in the event that development was undertaken)
Life cycle analysis	The consideration of all environmental inputs and outputs of a product or process from construction / manufacture to decommissioning / disposal
Listed Building (LB)	A building of special architectural or historic interest which has been included on a list approved by the Secretary of State under the Planning (Listed Buildings and Conservation Areas) Act 1990 (known as the 'Statutory List of Buildings of Special Architectural or Historic Interest'). Buildings are classified in grades to show their relative importance as follows: • Grade I - Buildings of exceptional interest, • Grade II* - Particularly important buildings of more than special interest, • Grade II - Buildings of special interest, which warrant every effort being made to preserve them.
Lithology	Physical character of rock formations, and specifically focuses on macroscopic hand-sample or outcrop-scale description of rocks
Local Nature Reserve (LNR)	A site controlled by local authority, which offer people opportunities to study, learn or enjoy nature
LPA	Local Planning Authority
LS	Listed Structure
LSOA	Lower Super Output Areas
LVIA	Landscape and Visual Impact Assessment
Lynchet	A bank formed at the end of a field by soil which, loosened by the plough, gradually moves down the slope through a combination of gravity and erosion
m	metre / million (note context)
Ma	Million years ago
MAFF	Ministry of Agriculture, Fisheries and Food - now DEFRA
Magnitude of potential effect	The degree of change that a receptor is anticipated to experience as a result of the development
MAGIC website	Multi-Agency Geographic Information for the Countryside:

	www.magic.defra.gov.uk
Manege	An enclosure, usually sandy, used for the management and riding of horses
MAP	Montgomeryshire Against Pylons
MAPD	Major Accident Prevention Document
Marshalling substation	Part of an electrical generation, transmission, and distribution system. Substations transform voltage from high to low, or low to high, or perform other important functions
MCA	Minerals Consultation Area
Megalith	A stone or boulder that has been deliberately set upright in the ground
Mesotrophic soils	Soils with a moderate inherent fertility
Mesozoic	A geological era ranging in time from 245 to 65 Ma. It comprises the Triassic, Jurassic and Cretaceous systems
MGW	Maximum Gross Weight
Microlith	A small stone tool, usually made of flint or chert, typically of Mesolithic date
MHRA	Medicines and Healthcare Products Regulatory Agecny
MIPU	Major Infrastructure Planning Unit
Mitigation	Any process, activity or entity designed to avoid, reduce or remedy adverse environmental effects likely to be caused by a development project
MoD / MOD	Ministry of Defence
MP	Member of Parliament
MPGs	Mineral Planning Guidance Notes
MPPW	Minerals Planning Policy Wales
MPS	Minerals Policy Statement
MTAN	Mineral Technical Advice Note. Welsh supplementary planning guidance document
MVA	Mega Volt Ampere. This is a Standard Unit of Power and is used to describe physical capabilities of electrical equipment
MW	Megawatt. One million (10^6 / 1,000,000) watts
MWT	Montgomeryshire Wildlife Trust
NAQS	National Air Quality Strategy – published by the then Department of the Environment (DoE) in 1997 to present and implement the Air Quality Regulations 1997, under the Environment Act 1995
National Grid	National Grid Electricity Transmission plc.
National Monuments Record (NMR)	Unscheduled archaeological sites and features recorded by Cadw or English Heritage
National Electricity Transmission System (NETS)	High voltage network of electricity cables carrying power between generating stations and the local electricity supply networks of the regional Distribution Network Operators (DNOs). Owned and operated by National Grid. The system operates at 275 kV and 400 kV
Nationally Significant Infrastructure Projects (NSIP)	Large projects designated under the Planning Act 2008 that support the economy and vital public services, including railways, large wind farms, power stations, reservoirs, harbours, airports and sewage treatment works
NATS Ltd.	The body provides air traffic control services for aircraft flying in UK airspace and the eastern part of the North Atlantic (and was formerly the National Air Traffic Service)

Natura 2000 sites	A European-wide network of sites protected under the Habitats and Birds Directives, and made up of Special Areas of Conservation and Special Protection Areas
Natural Resources Wales or Cyfoeth Naturiol Cymru	An amalgamation of CCW, EAW and Forestry Commission Wales, operational from 1st April 2013
Navigable	In the context of this document, rivers / canals that can accommodate leisure craft and commercial boats
NB	Note well (Nota Bene)
NBN	National Biodiversity Network
Need Case	Document setting out the background requirements and need for extensions to National Grid's electricity transmission system in response to connection applications to ensure that National Grid complies with its licence standards
Neolithic	Prehistoric time period, c.4000 to 2200 BC. Characterised by the first use of pottery, development of a novel stone tool technology, earliest monument construction and the adoption of agriculture
NERC	Natural Environment and Rural Communities Act
NERL	ATS (En Route) Plc. ('NERL'). The body responsible for the safe and expeditious movement in the en-route phase of flight for aircraft operating in controlled airspace in the UK
NFU	National Farmers Union
NGR	National Grid Reference
NID	National Infrastructure Directorate of the Planning Inspectorate – replaces the role and function of Infrastructure Planning Commission (IPC) from 1st April 2012 (refer to Planning Inspectorate (PINS))
Nitric oxide, nitrogen monoxide (NO)	Clear, colourless gas produced by combustion process – not a primary air pollutant, but may be a contribution to photochemical processes giving rise to other pollutants, such as smog
Nitrogen dioxide (NO_2)	Reddish brown gas (in high concentrations), respiratory irritant and precursor to photochemical processes which produce other pollutants, photochemical smog and contribute to global warming
Nitrous oxide (N_2O)	Inert product of combustion, which does not contribute to local air pollution
NJUG	National Joint Utilities Group
NMP	National Mapping Programme
NNR	National Nature Reserve
Noise level indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways
Non-calcareous	Not containing or resembling calcium carbonate; non-chalky
NO_x	Collective expression to describe oxides of nitrogen (NO_2, NO, N_2O)
NPPF	National Planning Policy Framework. This document sets out the Government's national policies on different aspects of land use planning and explains statutory provisions. Local planning authorities must take the NPPF into account in preparing their development plans and the guidance may also be material to decisions on individual planning applications and appeals in England
NPS	National Policy Statement
NPV	Net Present Value

NRPB	National Radiological Protection Board
NRW	Natural Resources Wales
NSIPs	Nationally Significant Infrastructure Projects. Projects as defined under the Planning Act 2008, including above ground electricity lines, railways, large wind farms, power stations, reservoirs, harbours, airports and sewage treatment works
nT	nanotesla. One billionth (10^{-9}) of a tesla – a unit of magnetic flux density; also known as 'magnetic field'
NTS	Not to Scale / Non Technical Summary (note context)
NVC	National Vegetation Classification
NVZ	Nitrate Vulnerable Zones
OD	Ordnance Datum
OELS	Organic Entry Level Stewardship
Ofgem	Office of Gas and Electricity Markets. The regulatory body that is responsible for electricity and gas supply markets and networks
OFS	Organic Farming Scheme
OFWAT	Water Services Regulation Authority
OHL	Overhead power Line (or Conductor). The name given to the metallic wire strung from poles or pylons (pylons) carrying electric current
ONS	Office of National Statistics
Operation phase	Standard operation after commissioning
OS	Ordnance Survey
OWOP	One Wales – One Planet (Welsh Government sustainable development scheme)
Ozone (O_3)	Also called trioxygen. Consisting of three oxygen atoms, it is an allotrope of oxygen that is much less stable than the diatomic allotrope (O_2), breaking down with a half-life of about half an hour in the lower atmosphere, to normal dioxygen. Ozone is formed from dioxygen by the action of ultraviolet light and also atmospheric electrical discharges via complex photochemical reactions involving other air pollutants such as hydrocarbons and NO_x. In the context of this document, this is correctly termed 'tropospheric ozone' because it is only a pollutant in the troposphere
Palaeo-channel	Ancient relict watercourse
Palstave	A type of axe made of bronze, most typical to the Middle Bronze Age
Para.	Paragraph
PBG	Powys / Radnorshire Badger Group
PD	Permitted Development
Pedological	Relating to the study of soil
Pelo-stagnogley soil	Slowly permeable stagnogley soils that crack deeply in dry seasons
Peniarth Valley Route Corridor	A variation of the Preferred Route Corridor extending approximately south-west to north-east, between Gartheilin (north of Llanfair Caereinion) and Bwlch y cibau. This was identified due to the potential effect of a connection on the Meifod Valley.
Periglacial	A region adjacent to an ice sheet
Permeability	The property or capacity of a rock, sediment or soil for transmitting a fluid

Permeo-Triassic	The Permian system and the Triassic system considered together
Permian	Geological period between 290 and 245 Ma
Petrography	The microscopic study of rocks
Petrology	The study of rocks in general, including their occurrence, field relations, structure, origins & history, mineralogy and textures
PHE	Public Health England
Photogeomorphology	Study of aerial photographs for geological, hydrological and topographical information and ground condition
Photomontage	A collection of images used to create an overall image. The objective of a photomontage is to simulate the likely visual changes that would result from a proposed development, and to produce printed images of a size and resolution sufficient to match the perspective in the same view as would occur in reality
Pinch point	A location where physical constraints impose a restriction on the routeing of infrastructure
Planning Act	Planning Act 2008
Planning Inspectorate (PINS)	National Infrastructure Directorate of the Planning Inspectorate: replaces the role and function of Infrastructure Planning Commission (IPC) from 1st April 2012.
Pleistocene	From the Quaternary period, represented by local accumulations of glacial deposits
PM_{10}	Particulate matter with a diameter of 10 microns or less (also referred to as micrometers or 1/1000th of a metre): unit is 'µm'
$PM_{2.5}$	As above, but 2.5 microns or less in diameter
pp.	page (in a document)
PPG	Planning Policy Guidance Note / Pollution Prevention Guideline (Environment Agency publication) (note context)
PPS	Planning Policy Statement
PPW	Planning Policy Wales. This document sets out the Welsh Government's policies on different aspects of land use planning. Local planning authorities must take PPW into account in preparing their development plans and the guidance may also be material to decisions on individual planning applications and appeals within Wales
PROW	Public Right of Way
PSO	Preferred Strategic Option. This was identified during strategic optioneering: where options considered were appraised against technical, environmental and economic criteria to identify a PSO
PSR	Primary Surveillance RADAR
Pylon	A tower used to support conductors, e.g. for a transmission line - also known as a 'tower'
Q&A	Question and Answer (document)
QRA	Quantified Risk Assessment
Quaternary	The latest geological era ranging from 0 to 2 Ma
RADAR	Radio Detection And Ranging
RAF	Royal Air Force

Ramifying	Referring to the branched appearance of mineral veins, which are intruded into surrounding rock
Ramsar sites	Wetlands of international importance designated under the Ramsar Convention (Convention on Wetlands of International Importance, especially as Waterfowl Habitats) (1971) and ratified in the UK in 1976). The convention was held in the town of Ramsar, Iran
RBMP	River Basin Management Plan
RCAHMW	Royal Commission on the Ancient and Historical Monuments of Wales
RCS / RCSSS	Route Corridor and Substation Siting Study. An appraisal to of the high level planning and environmental constraints to identify potential route corridor and substation siting areas location options within a defined study area
Receptor	A component of the natural or man made environment such as water or a building that is affected by an impact
Red Data book	The IUCN (International Union for Conservation of Nature) Red List of threatened bird species categorised as Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened or Least Concern
Registered Park and Garden (RPG) / Register of Parks and Gardens	Parks and gardens are classified in grades to show their relative importance as follows: • Grade I – international historic interest, • Grade II* - exceptional historic interest, • Grade II – national historic interest
Reinstatement	The actions undertaken to return a temporary working area to its previous state, as far as reasonably practicable
Requirement	A requirement attached to a Development Consent Order, which is akin to a planning condition.
Residual effects	Effects remaining after mitigation measures have been implemented
Restoration	The state of the temporary working area having been returned to its previous state, as far as reasonably practicable.
RF	Radio Frequency
RHI	Renewable Heat Incentive
RHPP	Renewable Heat Premium Payments
RIBA	Royal Institute of British Architects
Ridge and furrow	An archaeological pattern of ridges and troughs created by a system of ploughing used in Europe during the Middle Ages
RIIO	A performance based model to set price controls to ensure consumers pay a fair price for secure and sustainable energy supplies (introduced by Ofgem)
Route corridor	Search area used to provide a degree of flexibility in which to develop a route proposal, usually approximately 1km wide
Route Corridor and Substation Siting Study (RCS / RCSSS)	An appraisal to identify potential route corridor and substation siting areas within a defined study area
RPG	Regional Planning Guidance Note / Registered Park and Garden (note context)
RSPB	Royal Society for the Protection of Birds
Ruderal	Species of plants that grow on waste ground

Running sand	A potential ground stability hazard, where uncemented, waterlogged sands, and some silts, will flow if allowed to do so, e.g. by being exposed through excavation
Runoff	The water derived from snow or rain falling on a surface which does not permeate into the soil
RUPP	Road used as a Public Path
SAC	Special Area for Conservation. Classified under the European Habitats Directive. A designated nature conservation site (protected under the UK Conservation of Habitats and Species Regulations 2010) to and provide rare and vulnerable animals, plants and habitats with increased protection and management
SAGE	Stakeholder Advisory Group on ELF EMFs
SAM / SM	Scheduled Ancient Monument (Wales) / Scheduled Monument (England). An archaeological site of national importance, which is included on a schedule compiled by the Secretary of State for National Heritage under the terms of the Ancient Monuments and Archaeological Areas act 1979 (as amended by the National Heritage Act 1983)
SAMDev	Site Allocations and Management of Development
SBG	Shropshire Badger Group
SCAS	Shropshire Council's Archaeology Service
Scoping	An early stage within the Environmental Impact Assessment (EIA) process where the significance of environmental issues and scope of the environmental studies are determined
Screening	Initial process by which project proposals are assessed to decide whether they require a formal Environmental Impact Assessment
Sealing end compound (SEC)	Transition location where high-voltage underground cable and an overhead line join. The overhead line finishes on a terminal pylon. Downleads bring the conductors down to join on to where the ends of the underground cables come out of the ground. There may also be some monitoring equipment, but usually no transformers or switchgear
Sedimats	Used to trap sediments in waterways that may be disturbed by construction activities
Sedimentary	Rocks formed by the accumulation of sediment
Seismic tomography	A methodology for estimating the Earth's properties. This comprises dividing the subsurface into a box grid, whose parts are illuminated by seismic rays and the physical character of each element is computed
Selection of Preferred Connection (SOP)	The report that sets out National Grid's preferred connection and substation siting area
SGT	Super Grid Transformer
Shales	Argillaceous rocks with well defined bedding planes
Shaw	A narrow belt of trees. The remains of woodland cleared to form agricultural fields
Shear strength	The maximum resistance of a material to applied stress
Sheet piling	A method used to prevent an earth bank from slipping/subsiding
Significance	The significance of effects considers the value of the receptor and the magnitude and likelihood of potential effects
Silt fencing	A semi permeable mesh erected to catch silt from run off, as part of reducing pollution

SINC	Site of Importance for Nature Conservation
Site of Special Scientific Interest (SSSI)	An area of land of special interest by reason of its flora, fauna, geology or physiographical features notified under Section 28 of the Wildlife and Countryside Act 1981
SMR	Sites and Monuments Record
SNCI	Site of Nature Conservation Importance
SO_2	Sulphur Dioxide
SOA	Super Output Area
SOCC	Statement of Community Consultation. As required by Section 47(2) of the Planning Act 2008. To be prepared to the agreement of Powys County Council and Shropshire Council, and which details the consultation stages undertaken during the preparation and formation of the proposal
Strategic Optioneering Report (SOR)	Strategic Optioneering Report. This report outlines the high level strategic options considered for the Mid Wales Connection Project
SOS	Secretary of State
Sound level	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure. The sound level is the sound pressure relative to a standard reference pressure of $20x10^{-6}$ Pascals on a decibel scale
SP	Scottish Power
SPA	Special Protection Area. Classified under the Birds Directive. Areas selected by the national government on the advice of DEFRA, designated for the protection of particularly sensitive bird species, or for regularly migrating birds: to help protect and manage areas which are important for rare and vulnerable birds because they use them for breeding, feeding, wintering or migration
Spatial scope	The physical area over which changes to the environment are likely to occur as a result of the development, i.e. the study area
Special Area for Conservation (SAC)	Areas selected by the national government on the advice of DEFRA, designated for the protection of particularly sensitive ecology
Special Landscape Area (SLA)	Non statutory designation used by some local authorities to categorise sensitive landscapes which are, either legally or as a matter of policy, protected from development or other man-made influences. An area recognised as being of County-level landscape importance. SLAs border Areas of Outstanding Natural Beauty (AONBs), protecting the landscape settings of these statutorily designated sites
Species-poor / species-rich	Species richness is a measure of biodiversity and is the number of species per unit area. Species-poor areas have low numbers of species; species-rich areas have high numbers of species (note use of hyphenation).
SPEN	Scottish Power Energy Networks
SPZ	Source Protection Zone (SPZ). A zone surrounding an aquifer where the contamination of the groundwater flow due to surface spills could pollute the aquifer
SQSS	Security and Quality of Supply Standard
SSA	Strategic Search Area - associated with Welsh Government Technical Advice Note 8
SSE	Scottish and Southern Energy
SSEPD	Scottish and Southern Energy Power Distribution
SSER	Scottish and Southern Energy Renewables

Stagnogley	Soil type is waterlogged for long periods
Stagnogleyic soil	Non-alluvial, non-calcareous loamy or clayey soils with a relatively impermeable subsurface horizon but without a humus or peaty topsoil
Subsoil	The soil which lies beneath that which is cultivated: it is usually infertile (between the topsoil and bedrock)
Substation	An assembly of equipment in an electric power system through which electric energy is passed for transmission, transformation, distribution or switching
SuDS	Sustainable Drainage System
Sulphur dioxide (SO_2)	A colourless acidic gas, which forms sulphurous acid on hydrolysis, and is one pollutant that causes acid rain
Supergrid transformer (SGT)	Power transformers which interconnect the 400 kV and 275 kV transmission system with the distribution systems (typically 132 kV or 66 kV)
Super Output Areas	A geography for the collection and publication of small area statistics. They are used on the Neighbourhood Statistics site and across National Statistics. There are currently two layers of SOA, Lower Layer Super Output Area (LSOA) and Middle Layer Super Output Area (MSOA).
Sustainable development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland Commission, 1997)
Sward	Mixture of grasses forming a turf
SWLP	Shropshire Waste Local Plan
SWT	Shropshire Wildlife Trust
TA	Transport Assessment
TAN	Technical Advice Note. Welsh Government supplementary guidance document on a number of planning policy matters including advice on the control of development and guidance on how Welsh local planning authorities should consider policy when preparing their development plans
TCF	Technical Construction File
Technical scope	The range of environmental topics that will be addressed as part the EIA
Temporal scope	The period of time over which changes to the environment are likely to occur as a result of the development, i.e. the life-cycle of the development
Temporary site compound	Temporary base of the construction phase of a development, used by site workers (offices, welfare facilities, etc.) and for storage of materials. Removed once the construction is complete
The Project	The Mid Wales Connection Project
Thixotropic	Property whereby certain gels become fluid when stirred and returning to a semisolid state upon standing
Till / glacial till	A poorly sorted mixture of sands, clays and boulders produced by the erosion of rocks by moving ice
TMP	Traffic Management Plan
Topography	The physical features or configuration of a land surface
Topsoil	The surface or upper part of soil, usually fertile
Total suspended particulates ($\mu g/m^3$)	Collective term for airborne particles, including PM_{10} and $PM_{2.5}$, as well as larger particulates such as dust – unit is micrograms per cubic meter (gravimetric or volumetric expression of concentration)

Tower	A transmission line support – also known as a 'pylon'
TPO	Tree Preservation Order
T-pylon	A type of electricity pylon (tower) designed by Bystrup and winner of a pylon design competition in 2011 - to see if a new design could be developed as an alternative to the familiar 400 kV steel lattice towers. The competition was launched by the Department of Energy and Climate Change, National Grid and the Royal Institute of British Architects (RIBA). Since 2011, National Grid has been working closely with Bystrup on all the detailed technical studies necessary to turn the concept into a reality that may be offered as an option by National Grid for its various new connection projects. This involves complex engineering including ensuring the design will withstand the extremes of British weather, through to adapting the design to turn corners when necessary, and identifying the construction and maintenance implications.
Transport Assessment / Traffic Impact Assessment	Examines the potential impact of a development on the surrounding transport network. Includes all transport modes such as walking, cycling, public transport and the private car
Triassic	The oldest geological period of the Mesozoic Era, dating between 245 and 208 Ma
TTA	Tactical Training Area
TWh	Terawatt hour (10^{12} watt hours). This is an often used unit for metering larger amounts of electrical energy to industrial customers and in power generation
UDP	Unitary Development Plan
UK	United Kingdom
UKBAP	United Kingdom Biodiversity Action Plan
UKHAP	United Kingdom Habitat Action Plan
UKTS	United Kingdom Tourism Strategy
Underfit / under-fit (stream)	A stream whose discharge is too small to be correlated with either existing channel characteristics, i.e. meander radius and wavelength and channel width, or valley size
UNESCO	United Nations Educational, Scientific and Cultural Organisation
uT / µT	microtesla. One millionth (10^{-6}) of a tesla, the unit of measure for magnetic fields
V	Volt
V/m	volts per metre, the unit of measure for electric fields
Vibration	Vibration is an oscillatory motion. The magnitude of vibration can be defined in terms of displacement how far from the equilibrium something moves, velocity (how fast something moves), or acceleration (the rate of change of velocity)
Vicus	A district, suburb or quarter of a town or village adjacent to a Roman fort, with the lowest legal status accorded to a built up area
Votive deposits	These are deposited, without the intention of recovery or use, in a sacred place for broadly religious purposes
VPS	Vantage Point Survey
WAG	Welsh Assembly Government (now named Welsh Government)
WCA	Wales Conservation Area

WHO	World Health Organisation
Widened Corridor / Widened Section	When referring to the widened section or widened corridor identified in the Statement of Preference (July 2012). This extends approximately south-west to north-east between Foel Fawr (north of Cefn Coch) and Tan-y-ffridd (west of Newbridge). This has been identified to offer more opportunity to reduce effects in the Powys uplands
Winterbourne	A watercourse which is spring fed and whose source is known to migrate up and down catchment depending on local groundwater levels
Wireline	Computer generated line drawing based on a digital terrain model, that illustrates the three dimensional shape of the landscape and any features within it
WNMR	Cadw (Wales) National Monuments Record of sites and events
WLB	Wales Listed Building and Grade
Working corridor / area	The area within which the construction takes place
WRLPG	Wales Register of Landscapes, Parks and Gardens
WSM	Wales Scheduled Monument
WSP	Wales Spatial Plan
Zone A	Flood zone within Wales - considered to be little or no risk of fluvial or tidal/coastal flooding
Zone B	Flood zone within Wales - areas know to have flooded in the past evidenced by sedimentary deposits
Zone C	Flood zone within Wales - based on Environment Agency extreme flood outline, equal to or greater than 0.1% (1 in 1000) chance of flooding (from river, tidal or coastal)
Zone C1	Flood zone within Wales - areas of floodplain having a high risk from flooding. They tend to be developed and protected by flood defences
Zone C2	Flood zone within Wales - areas of floodplain with a high risk from flooding but do not have a significant flood defence infrastructure
ZTV	Zone of Theoretical Visibility

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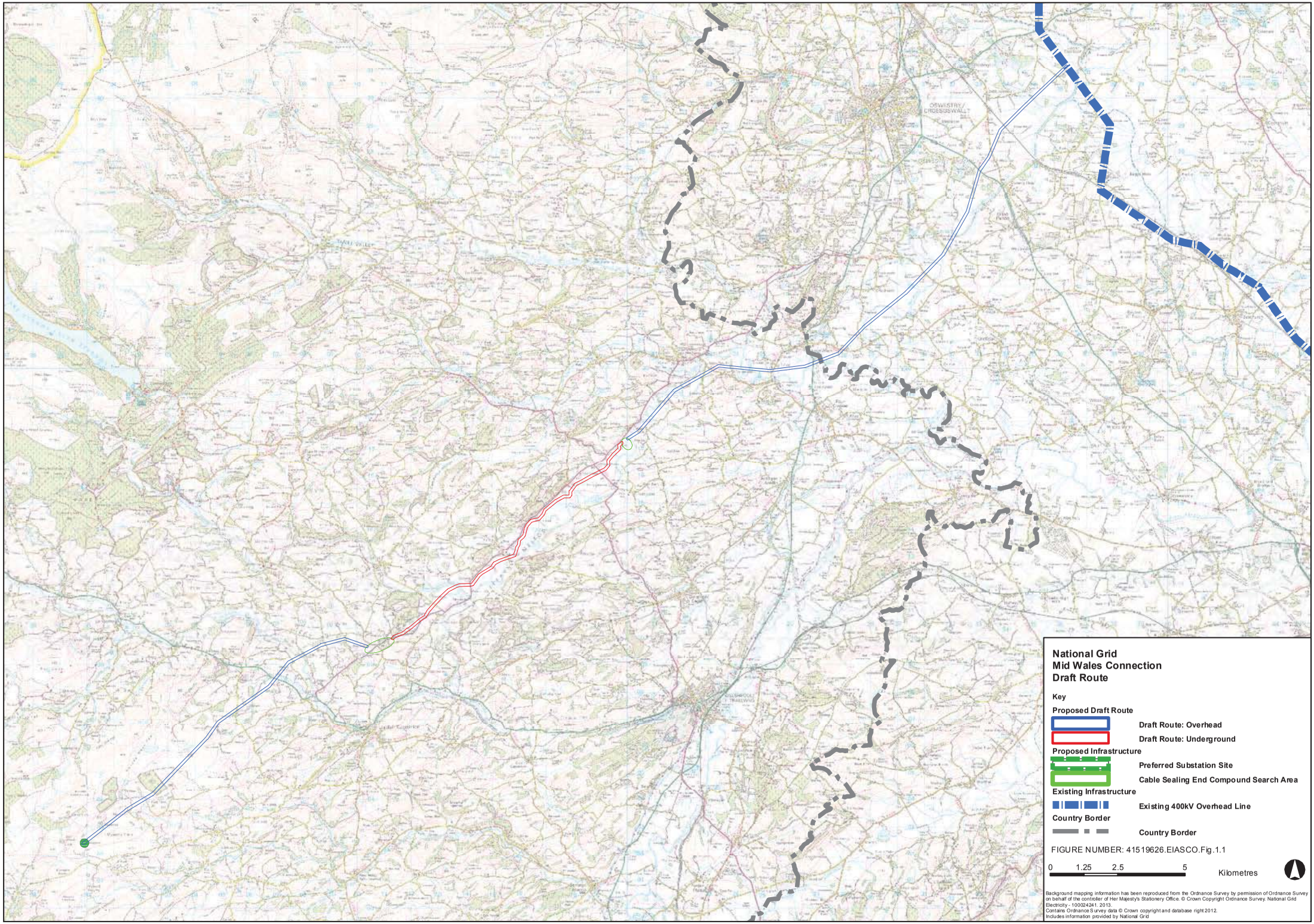
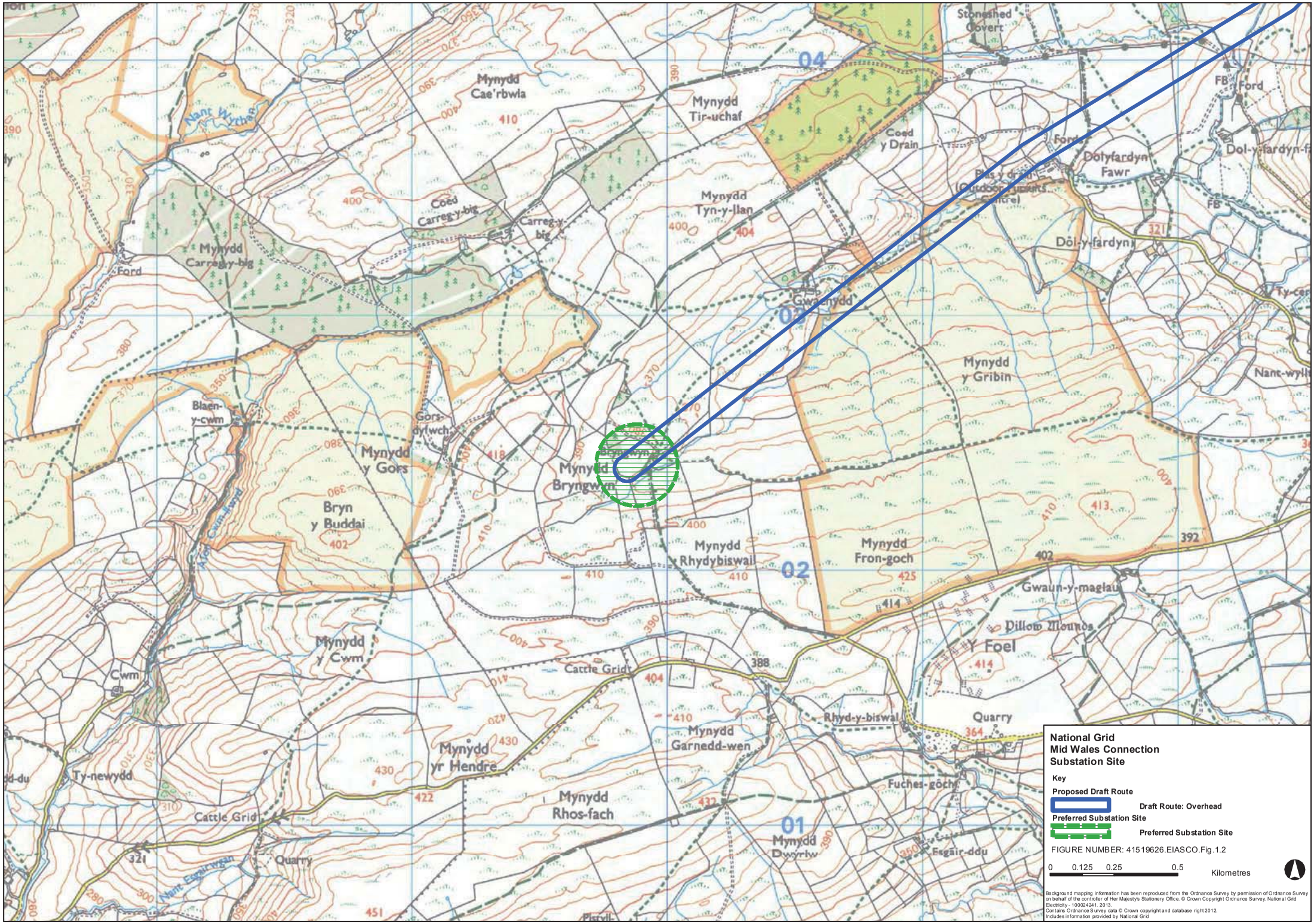
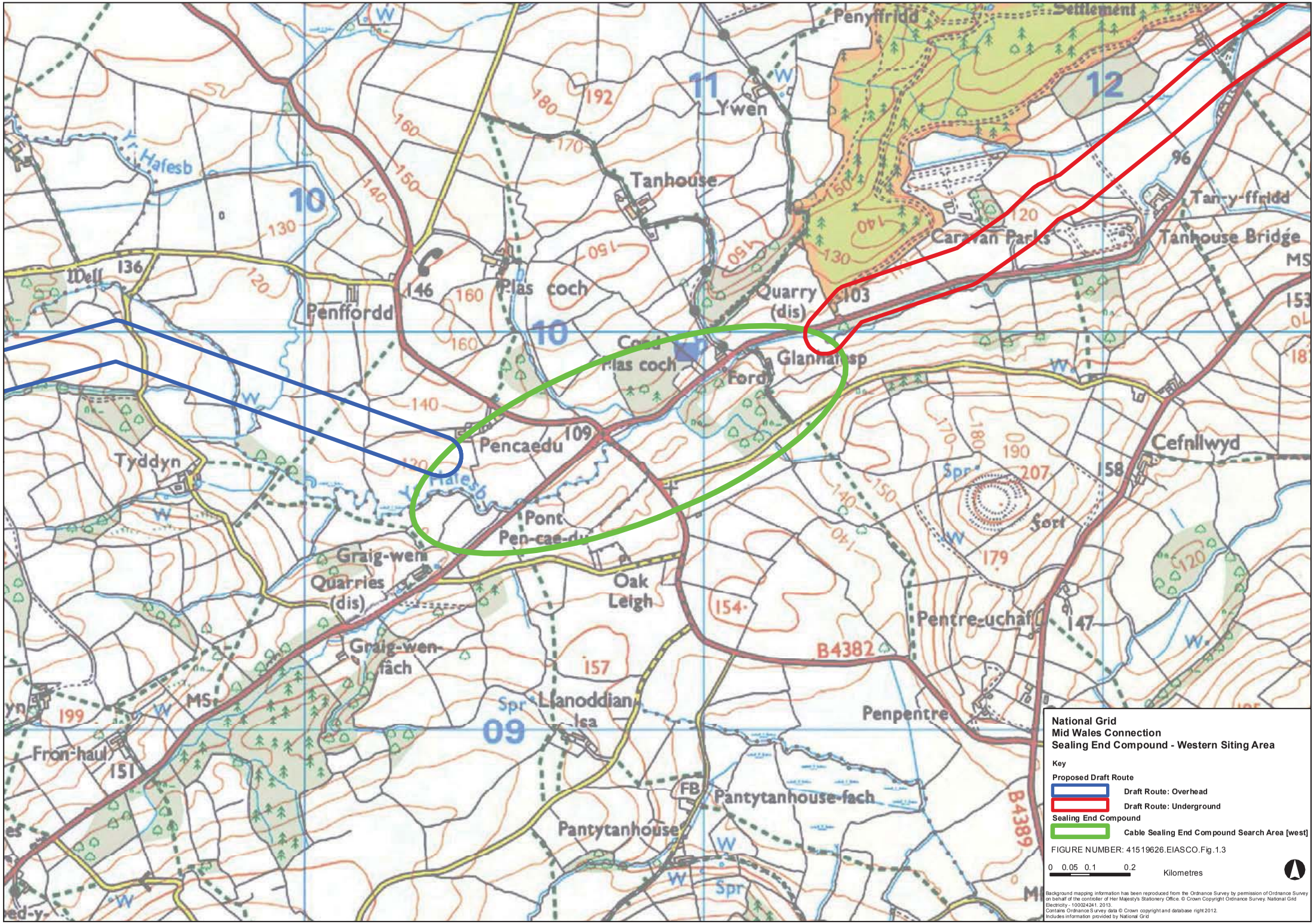
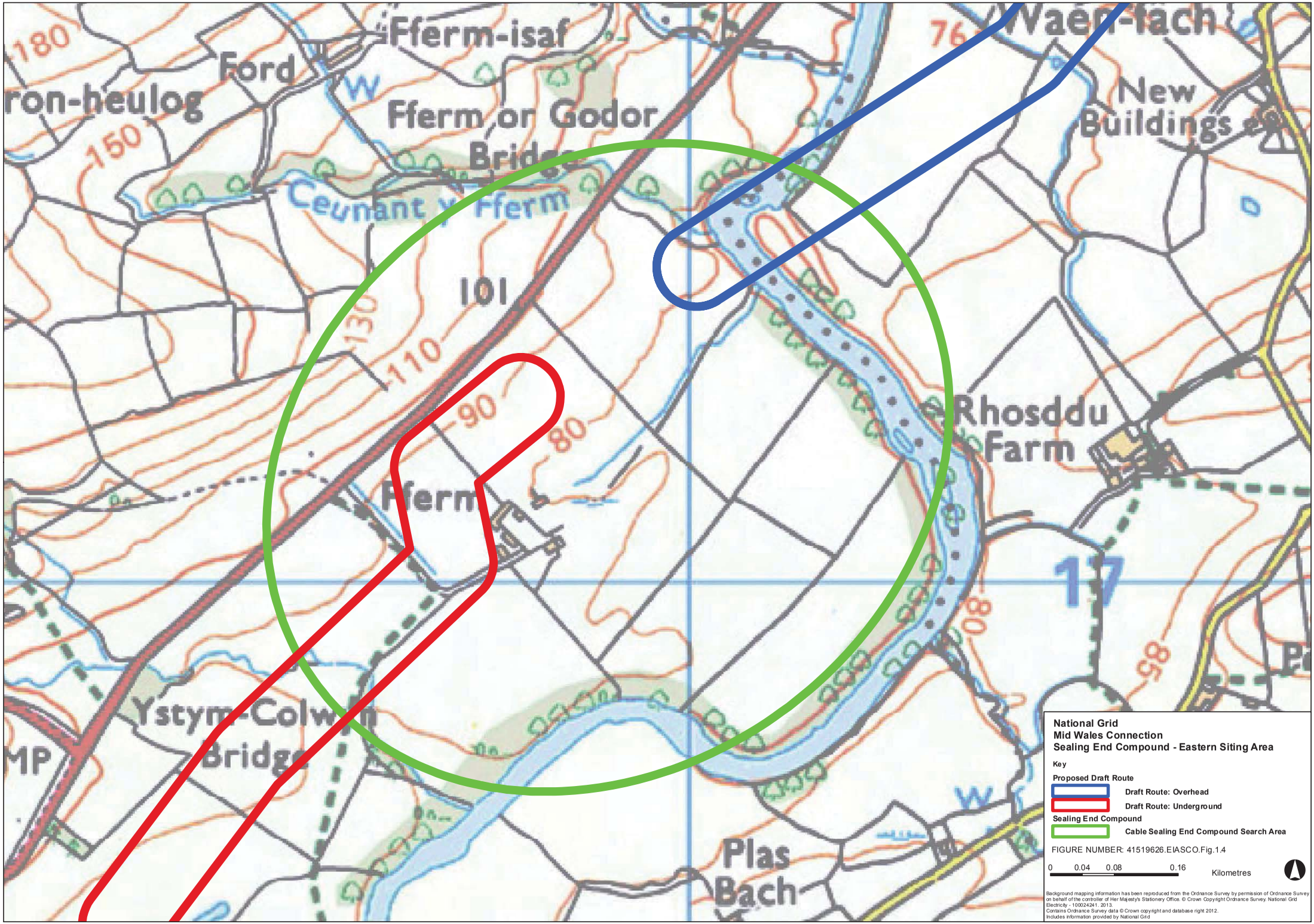
FIGURES





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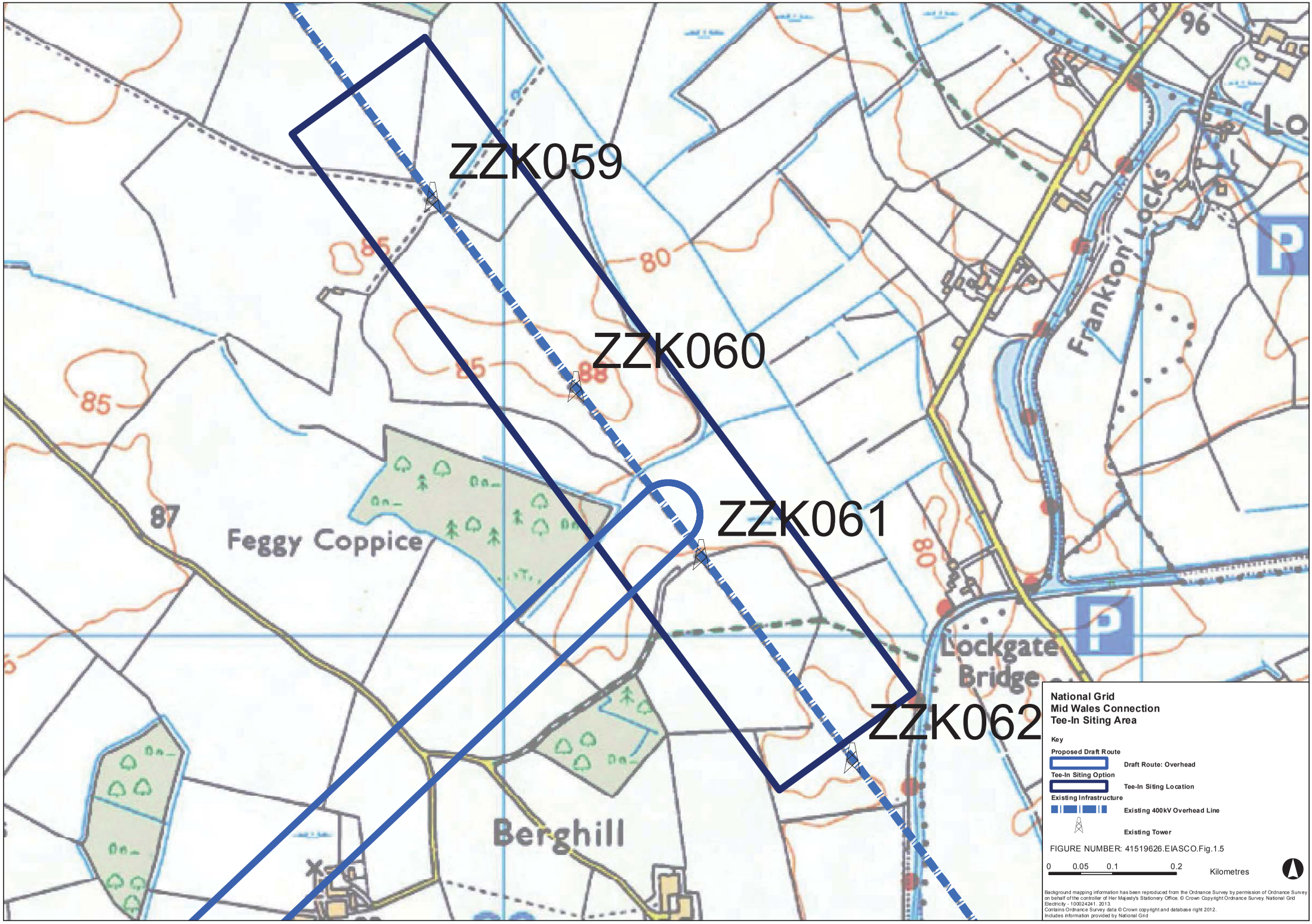
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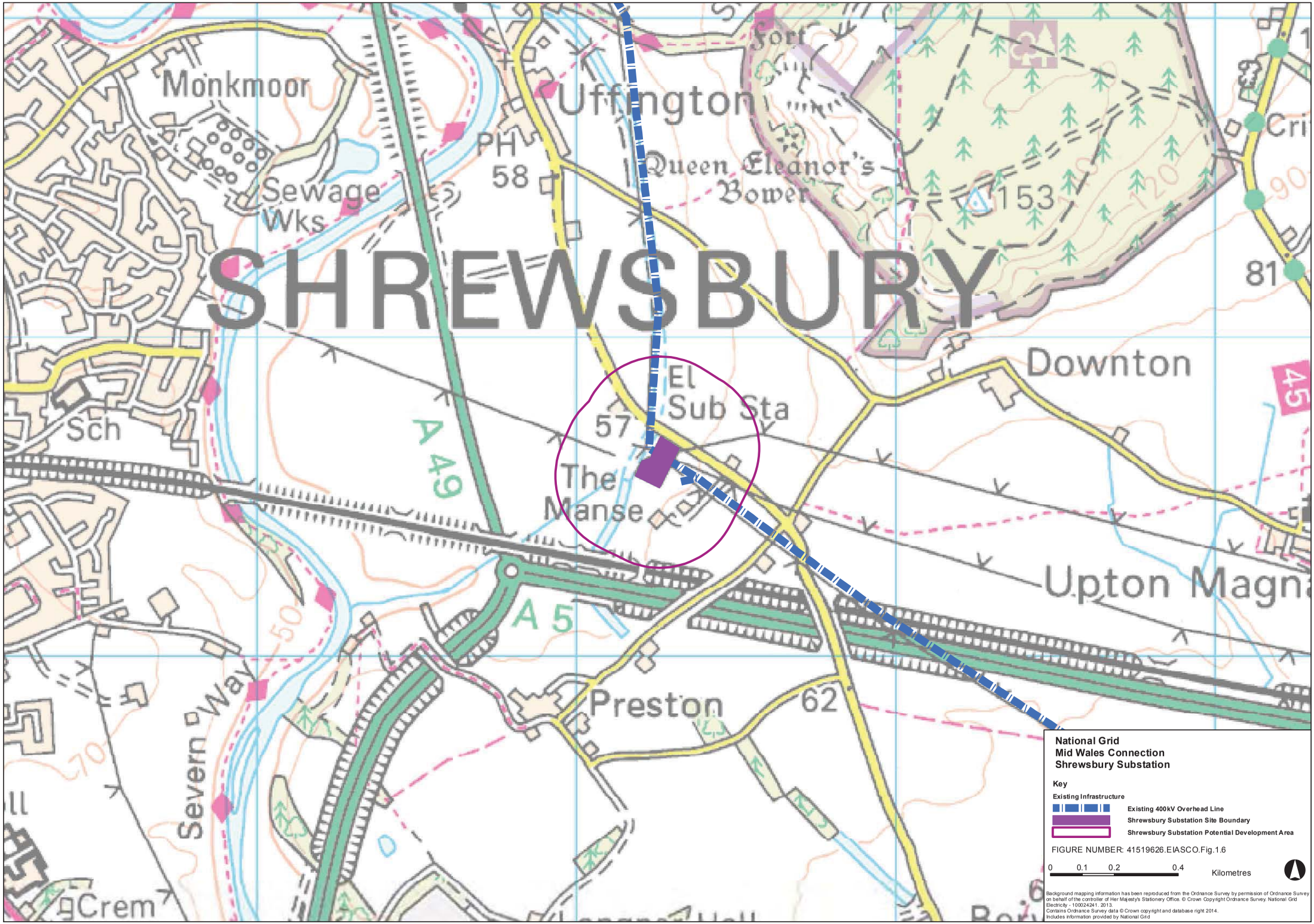
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APPENDICES

APPENDIX 4.1

List of Stakeholders who Submitted Feedback to the Stage One Consultation

Stakeholder category	Organisation
Local authorities	Shropshire Council
Emergency services	Hereford and Worcester Fire and Rescue Service
	Mid and West Wales Fire and Rescue Service
Governmental	Welsh Government
Non-departmental public bodies (NDPBs)	British Waterways
	Cadw
	Countryside Council for Wales (CCW)
	Design Commission for Wales
	English Heritage – West Midlands Region
	Environment Agency Wales (EAW) – Planning Liaison Officer on behalf of EAW and the Environment Agency
	Forestry Commission Wales (advisory NDPB, this body also has a role as a statutory undertaker, see below)
	Ministry of Defence (MOD) – Defence Infrastructure Organisation
	Natural England
	Shropshire Hills Area of Outstanding Natural Beauty (AONB) Partnership
	Water Services Regulation Authority (OFWAT)
Parish, community & town councils	Abermule with Llandyssil Community Council
	Alberbury with Cardeston Parish Council
	Carno Community Council
	Castle Caereinion Community Council
	Chirbury with Brompton Parish Council
	Cyngor Cymuned Llandrinio and Arddleen Community Council
	Cyngor Cymuned Llansantffraid and Deuddwr Community Council
	Forden with Leighton and Trelystan Community Council
	Great Ness and Little Ness Parish Council
	Kerry Community Council
	Kinnerley Parish Council
	Knockin Parish Council
	Little Ness Annual Parish Meeting
	Llanyblodwel Parish Council
	Llandysilio Community Council
	Llanerfyl Community Council
	Llanymynech and Pant Parish Council

Stakeholder category	Organisation
	Local Joint Committee Longden, Ford and Rea Valley
	Minsterley Parish Council
	Montford Parish Council (MPC)
	Montford Parish Steering Group
	Montgomery Town Council
	Oswestry Rural Parish Council
	Oswestry Town Council
	Pontesbury Parish Council
	Ruyton XI Towns Parish Council
	Shrewsbury Town Council
	Trefeglwys Community Council
	Tregynon Community Council
	Trewern Community Council
	Welshpool Town Council
	Westbury Parish Council
	Worthen with Shelve Parish Council
Statutory undertakers	Coal Authority
	Forestry Commission Wales
	Highways Agency
	Mid Wales Trunk Road Agency
	NERL Safeguarding
	Powysland Internal Drainage Board
National, regional and local organisations	Campaign for the Protection of Rural Wales (CPRW)
	Campaign to Protect Rural England (CPRE) Oswestry Branch
	Campaign to Protect Rural England (CPRE) Shropshire
	Country Land and Business Association (CLA)
	Clwyd-Powys Archaeological Trust (CPAT)
	Friends of the Earth Cymru
	Friends of the Montgomery Canal
	Institute of Rural Health
	Jodrell Bank Observatory, University of Manchester/e-MERLIN National Facility
	Montgomery Civic Society (House)
	Montgomeryshire Wildlife Trust
	National Farmers' Union (NFU) Cymru
	National Farmers' Union (NFU) West Midlands Region
	National Trust

Stakeholder category	Organisation
	National Union of Teachers
	Powys Castle Estate
	Rainbow Trails Project
	Ramblers Association Shropshire
	Royal Society for the Protection of Birds (RSPB) / RSPB Cymru
	RWE npower renewables
	Shrewsbury and District Riding Club affiliated to BHS. Nesscliffe Hills and District Bridleway Association. Shropshire Riding Carriage Driving Groups.
	Shropshire Union Canal Society
	Shropshire Wildlife Trust
	Scottish & Southern Energy (SSE) Renewables
	Scottish Power Energy Networks (SPEN)
	Wales Tourism Alliance
	Walford & North Shropshire College
Project-specific action groups	Abermule Hub Action Group
	Llanymynech Action Group
	MAP (Montgomeryshire Against Pylons)
	Melverley Against Pylons
	Montford Against Pylons
	Montgomery Against Pylons
	No Pylons in Rea Valley
	People Against Pylons
	STAG (Save Trannon Moor Action Group)
	STOP Group

APPENDIX 4.2

Stage One Consultation Summary - Feedback Specific to EIA Scoping

The representations received during the Early Engagement and Phase One (Stage One) Consultation have been systematically analysed and logged onto a database. Individual members of the public, statutory consultees and local organisations are referred to as stakeholders. At the end of the Stage One Consultation National Grid had received over 6,500 responses, including 4500 feedback forms and 1,500 letters, and received over 7,000 hits on the Project website. In addition, over 6,000 people attended the 54 public drop-in events. A further 200 responses were received after the close of consultation.

Most specialist bodies did not limit their opposition to one route or substation siting area in particular but also took the opportunity to outline their main concerns with the project. These concerns have been used within the EIA Scoping to ensure that the methodologies proposed for the assessment adequately address these issues.

Stakeholders were concerned with:

- the potential impact on local communities and it proximity to populated areas;
- the potential health risks;
- the potential for declining property values;
- the negative impact on the local economy;
- the potential impact on the tourism industry in the area;
- the visual impact of pylons, particularly the wirescape effects with other existing and proposed overhead lines;
- the potential impact on wildlife (e.g. specific species such as wildfowl and other birds, great crested newt and otter) and on designated areas (e.g. Sites of Special Scientific Interest;
- the potential impact on cultural heritage and designated sites;
- the potential for cumulative effects of other windfarms and from future expansion; and
- MoD and aerodrome specific safeguarding issues.

Consultation feedback ‘themes’ also included:

- Environment - Landscape, Views and Countryside, Cultural Heritage, Biodiversity, Designated Sites, Environment General (Including Climate Change) and Flood Risk
- Health - Health and Electric and Magnetic Fields (EMFs) and proximity to EMFs
- Mitigation – General Mitigation, Screening (Visual/Noise) and Community Benefit
- Socio-economics - Property Values, Impacts on Landowners / Farmers, Impacts on Recreation Uses, Impacts on Businesses/Tourism/Economy, Education and Local Facilities, Compensation, Community, and Stewardship/Future Generations
- Safety, Security and Operation – General Safety, Aviation, Noise, Electric and Magnetic Compatibility and Energy Security
- Other – Cumulative Effect

APPENDIX 6.1

Field Based Appraisal of Landscape and Visual Sensitivity

CONTENTS

Methodology for Assessing Field-Based Sensitivity of Landscape to 400 kV Overhead Lines

1.0 INTRODUCTION

Background to the Appraisal

1.1 In 2012, for the Mid Wales Connections Project, National Grid plc undertook a field based landscape sensitivity appraisal for the route corridor options being considered at the time. The output of this appraisal was discussed with statutory stakeholders and helped inform the route corridor comparative appraisal process.

1.2 As part of the formal environmental impact assessment (EIA) the landscape sensitivity appraisal will be revisited to ensure that it responds to the most up to date project design. The output will form the basis for the subsequent landscape assessment and will help inform the identification of mitigation measures. Further more detailed survey work will be undertaken to supplement data gathered as part of the ongoing detailed routeing process.

1.3 This document sets out the methodology for the appraisal, which has been updated since 2012 both to reflect publication of GLVIA3 and to ensure that it responds to emerging guidance on assessing the value of undesignated landscapes. At the request of Natural Resources Wales (NRW), to ensure a consistent approach across other major linear infrastructure projects in Wales, it has been developed alongside SP Manweb's field based sensitivity appraisal for its 132 kV overhead lines. Both NRW and Powys County Council (PCC) and their respective landscape advisors have been involved in further developing the methodology through a meeting held in April 2014.

1.4 Whilst the previous methodology followed the approach set out in '*Topic Paper 6*[1]*: Techniques and Criteria for Judging Capacity and Sensitivity*', published by Scottish Natural Heritage and the Countryside Agency in 2006, NRW[2] have advised that this has now been superseded by advice contained in the '*Guidelines for Landscape and Visual Impact Assessment, Third Edition'* (GLVIA3), published by the Landscape Institute and IEMA.

1.5 The aim of the appraisal remains the assessment of the relative sensitivity of the Mid Wales and Shropshire landscapes to a new 400 kV overhead line. The principal judgement it seeks to make is whether the landscape can satisfactorily accommodate a 400 kV overhead line without having unacceptable adverse effects on its character, the way that it is seen or perceived, and without compromising the values attached to it.

Type of Development being considered

1.6 Sensitivity is determined, not only by the particular aspects of the landscape likely to be affected by the change, but also by the exact form and nature of the change likely

[1] Scottish Natural Heritage and the Countryside Agency (2006). '*Techniques and Criteria for Judging Capacity and Sensitivity*'.
[2] Personal communication

to take place. The appraisal will therefore consider the sensitivity of the landscape to the particular type of overhead line support structure being considered:

- Steel Lattice Pylon circa (approximately 50m high);
- T-pylon (approximately 39m high); and
- Low height pylon (approximately 35m high).

1.7 The same criteria will apply irrespective of which support structure is used although it is recognised that most landscapes will typically be less sensitive to a pylon of lower height.

Definition of Landscape Character and Sensitivity

1.8 GLVIA3 (Glossary pages 157-158) defines landscape character and sensitivity as follows:

- Landscape character is *"a distinct and recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse."*

- Sensitivity is a "*term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor."*

1.9 Landscape sensitivity to 400 kV overhead line development is essentially the extent to which the landscapes of the area through which the proposed line will pass is vulnerable to change arising from this specific development. The underlying premise is that landscapes of lower sensitivity will have more scope to accommodate an overhead line than landscapes of higher sensitivity. Landscapes which are highly sensitive are at risk of having their key characteristics fundamentally altered potentially leading in extreme cases to a different landscape character.

Landscape Sensitivity

1.10 The sensitivity of the landscape to change arising from overhead lines is assessed by considering the following two factors:

- Susceptibility to change; and
- Value.

Susceptibility

1.11 Susceptibility to change is defined by GLVIA3 as:

"the ability of the landscape receptor (whether it be the overall character or quality/condition of a particular landscape type or area, or an individual element and/or feature, or a particular aesthetic and perceptual aspect) to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies". Para 5.40

1.12 Many factors contribute to the susceptibility of the landscape to the development of 400 kV overhead lines. Each landscape has its own key characteristics or combinations of elements and features which define its character and help to give an

area its particular characteristics or sense of place and each of these characteristics can have different susceptibilities to the type of change likely to arise.

Value

1.13 Landscape value is the relative value that is attached to different landscapes by society and is independent of any development proposal. It is defined by GLVIA3 as:

"the relative value that is attached to different landscapes by society, bearing in mind that a landscape may be valued by different stakeholders for a whole variety of reasons…Landscapes or their component parts may be valued at the community, local, national or international levels…" para. 5.19

1.14 As with susceptibility, value can apply to the landscape as a whole, to its individual elements and/or features, or to its particular aesthetic or perceptual aspects.

1.15 Whilst the usual basis for recognising highly valued landscapes is through the application of statutory landscape designations or local landscape designations and associated policies, the absence of designation does not necessarily imply that a landscape is not valued – just that other indicators of value have to be considered.

1.16 In undesignated landscapes the aim therefore is to identify the value of the landscape at a specific scale, identify the communities of interest to which it is important, and the reasons why the landscape is important to them. These can be based on existing evidence such as landscape character assessments, planning policies, landscape strategies and guidelines or from data derived from new survey and analysis.

1.17 The relationship between the value attached to the landscape and its susceptibility to change is complex. GLVIA (para. 5.4.6) notes that valued landscapes do not, automatically or by definition, have high susceptibility to all types of change. It is possible for a locally, nationally or even internationally important landscape to have relatively low susceptibility to change, by virtue of both the characteristics of the landscape and the nature of the proposal. The particular type of change or development proposed may not compromise the specific basis for the value attached to the landscape. Nevertheless, whilst value does not necessarily equate with suitability or lack of suitability of a particular landscape for a proposed development, it is an important contributing factor to understanding sensitivity.

2.0 METHODOLOGY FOR FIELD-BASED APPRAISAL

Classification

2.1 As explained above, the sensitivity or ability of the Mid Wales and Shropshire landscapes to accommodate a new 400 kV overhead line is determined by its susceptibility to change and by the value attached to it. Both susceptibility to change and value will be classified into one of three tiers as set out in Table 1 below:

Table 1: Indicative Landscape Susceptibility to Change and Value Criteria

Level	Susceptibility to Change	Landscape Value
High	The landscape is very vulnerable to change. There is little scope to accommodate a new overhead line without effects upon its overall integrity.	The landscape is highly valued. The value is recognised by statutory landscape designation. The landscape is of more than local/county importance.
Medium	The landscape has some scope to accommodate a new overhead line without effects on its overall integrity.	The landscape may be locally valued.
Low	The landscape is robust and can accommodate a new overhead line without effects upon its overall integrity.	The landscape has little or no recognised value.

2.2 The evaluation of susceptibility and value will then be considered together to provide an overall profile of landscape sensitivity. Each landscape will be classified into one of five tiers, high, medium-high, medium, medium-low, or low, between which there is a gradual transition. These will be determined by professional judgement, based on the indicative descriptions in Table 2.

Table 2: Categories of Landscape Sensitivity to a 400 kV Overhead Line

Sensitivity	Definition of Sensitivity to Change from Overhead Lines
High	A landscape whose overall character, its individual elements and/or features, or particular aesthetic or perceptual aspects are very vulnerable to change or loss and offer limited opportunities to accommodate a new overhead line. Typically includes: • Landscapes of particularly distinctive character and/or high scenic quality which may be statutorily designated; • Landscapes containing elements/features that are nationally scarce, including mature vegetation such as ancient woodland or veteran trees; and • Landscapes defined by very distinctive aesthetic or perceptual aspects.
Medium - High	
Medium	A landscape whose overall character, its individual elements and/or features, or particular aesthetic or perceptual aspects are reasonably robust, not particularly vulnerable to change or loss and offer some opportunities to accommodate new overhead lines. Typically includes: • Landscapes of positive character but with some evidence of alteration to/degradation of elements/features resulting in areas of more mixed character; • Areas of degraded character but which are valued by local communities; • Landscapes containing elements/features that are locally commonplace; • Landscapes containing elements/features that are rare or unusual locally but are in degraded or poor condition; and • Landscapes with aesthetic or perceptual aspects that do not contribute particularly to local distinctiveness and quality.

Sensitivity	Definition of Sensitivity to Change from Overhead Lines
Medium – Low **Low**	A landscape which is of low quality whose overall character, individual elements and/or features, or particular aesthetic or perceptual aspects are robust, tolerant to change and offer good opportunities to accommodate new overhead lines. Typically includes: • Landscapes of neutral character with few notable features; • Landscapes which have been adversely altered or degraded; • Landscapes containing elements/features that are nationally or regionally ubiquitous; • Landscapes containing elements/features that detract from landscape character e.g. other overhead lines, power stations, major roads; and • Landscapes whose key aesthetic or perceptual aspects are negative.

2.3 Because landscape characteristics and values do not readily lend themselves to scoring, and different criteria may carry different weights in different types of landscape and with different types and scales of development, each judgement will be accompanied by a narrative describing and justifying the sensitivity level ascribed.

Criteria

2.4 The assessment of landscape sensitivity in the field will be based on consideration of a range of criteria, each of which reflects aspects of the landscape which may be more, or less, affected by the development of overhead lines. These criteria are listed in Table 3, with a rationale which defines how they will be assessed in the field. Where appropriate, these criteria draw upon and are cross referenced to the routeing principles set out in the Holford Rules. Whilst the Holford Rules[3] relate specifically to high voltage lines supported on lattice steel towers, many of the principles can also be used as a guide to the routeing of lines supported on wood poles.

2.5 During field work, notes will be recorded against each of the criteria. Recording will take place at a number of publicly accessible locations both within and to either side of the draft route.

Table 3: Criteria Influencing Sensitivity

Susceptibility Criteria	Indicators of Higher/Lower Susceptibility	Holford Rules
Landform	Steep, dramatic or elevated landforms are generally more susceptible to a 400 kV overhead line than landforms that are smooth, regular and convex, or flat and uniform. This is because the former are often prominent and distinctive in character. Broad valleys and low rolling hills are typically less susceptible because the lines may be back clothed by the surrounding higher ground.	4 + 5
Landcover	Simple uncluttered landscapes with sweeping lines and extensive areas of consistent groundcover are less likely to be susceptible to a 400 kV overhead line than landscapes with a more complex, irregular or intimate landscape patterns (e.g. traditional field patterns), where pylons will be more prominent. Trees and woodlands, although adding to complexity, can provide screening opportunities and reduce	5 + 6

[3] Guidelines on overhead line routeing were first formulated in 1959 by Lord Holford. NPS EN-5 states that the Holford Rules form the basis for the approach to routeing new overhead line (para 2.8.7)

Susceptibility Criteria	Indicators of Higher/Lower Susceptibility	Holford Rules
	the apparent height of pylons.	
Scale	Scale may relate to landform e.g. an extensive plateau or to landcover e.g. field boundary pattern. Large scale landscapes where tall pylons appear more in proportion, are likely to be of lower susceptibility than small scale landscapes, where pylons are likely to be more dominant. Comparison of pylons with human scale' landscape features such as individual trees and buildings may also emphasise the size of pylons in particular.	N/A
Skylines	Landscapes that do not form a distinctive skyline or back cloth are typically less susceptible to a 400 kV overhead line than those in which open, uninterrupted skylines are a distinctive feature. A 400 kV overhead line may be prominent on skylines and may interrupt the relationship between settlements and their landscape setting.	4 + 5
Prominent Landscape Features	Landscapes with strong visual features and focal points such as distinctive landforms or man-made landmarks such as hilltop settlements, monuments of church spires, are more susceptible to a 400 kV overhead line than landscapes which have fewer visual foci. A 400 kV overhead line may detract from or conflict with these prominent landscape features.	4
Human Influence	The amount of human influence on the landscape (including nature of settlement and land use) may influence its susceptibility to a 400 kV overhead line. Pylons are less likely to be conspicuous in landscapes that are characterised by overt man-made structures or land use and/or by the presence of road or rail infrastructure. Commercial forestry may also introduce a man-made influence to upland landscapes that would otherwise seem natural. The presence of a 400 kV overhead line in settled and farmed landscapes may conflict with more traditional and farmed landscapes and erode their rural character.	N/A
Vertical Infrastructure	Landscapes that are already affected by vertical built structures such as communications masts, other pylons or chimneys, may be of reduced susceptibility to a 400 kV overhead line. However where these vertical structures are seen in close proximity to the line, there may be visual conflicts referred to as 'wirescapes' where multiple lines converge.	6
Perceptual Aspects	Landscapes that provide opportunities to experience a sense of relative wildness, remoteness and/or relative tranquility, including a lack of overt man-made structures, freedom from man-made noise and perceived naturalness are typically more susceptible to a 400 kV overhead line than landscapes that lack these qualities.	7
Value Criteria	**Indicators of Higher/Lower Value**	**Holford Rules**
Landscape Quality/Condition	The intactness of the landscape is a reflection partly of the presence of characteristic natural and man-made elements/features, which are generally in good condition and absence of significant incongruous or detractive elements/features.	N/A
Scenic Quality	General appeal of the landscape to the senses e.g. through combinations of some of the following: distinctive; dramatic or striking landform or patterns of landcover; strong aesthetic qualities which appeal to the senses, such as scale, form, colour and texture; and visual diversity which contributes to the appreciation of the landscape.	1 + 2

Susceptibility Criteria	Indicators of Higher/Lower Susceptibility	Holford Rules
Cultural Heritage Conservation Interests	Presence of Registered Historic Landscapes or Registered Parks and Gardens. Presence of built structures, archaeological features and designed landscapes that provide distinctive landscape features, including parks and gardens and designed landscapes. Visible presence of historic landscapes or landscape elements/features that provide evidence of time depth, including settlement pattern and field boundary patterns. Presence of traditional land management practices which contribute to scenic quality e.g. coppicing.	1 + 2
Natural Heritage	The presence of internationally or nationally designated nature conservation assets including: Ramsar sites, SACs; SPAs; SSSIs; and National Nature Reserves. Presence of striking geological or geomorphological features that contribute to distinctive sense of place or scenic quality. Presence of wildlife, habitats and individual species that contribute to distinctive sense of place or scenic quality.	1 + 2
Recreational Value	The extent to which experience of the landscape makes an important contribution to recreational use and enjoyment of the area, through provision of parks, visitor facilities such as toilets and car parks and density of rights of way network or extent of open access land designated under CRoW[4].	N/A
Perceptual Aspects and Tranquility	The extent to which the landscape provides opportunities to experience a sense of relative wildness, remoteness and/or relative tranquility. This may be influenced by a lack of overt man-made structures, visible and audible intrusion and perceived naturalness.	1 + 2
LANDMAP Overall Evaluation	The presence of an 'outstanding' overall evaluation for any of the five LANDMAP Aspects.	N/A

3.0 JUDGEMENT OF SENSITIVITY

3.1 Following completion of field work, an appraisal of the sensitivity of the landscape to the proposed 400 kV overhead line will be made, based on consideration of all criteria. Professional judgement will be applied to help understand whether a new overhead line would adversely affect the landscape or whether it could be satisfactorily accommodated, and the degree to which adverse effects could be mitigated. When comparing the different criteria, greater weight will be given to those which correspond to the Holford Rules, since these are the guiding principles for routeing.

Sensitivity Mapping

3.2 Judgement of sensitivity are likely to vary along the corridor, which will then be divided into a number of mapped sections, based on variations in the sensitivity of the landscape to the proposed 400 kV overhead line as observed in the field.

3.3 The sensitivity categories represent stages in a gradual transition (see Table 1). Similarly landscape sensitivity in most instances changes gradually and continuously across the landscape.

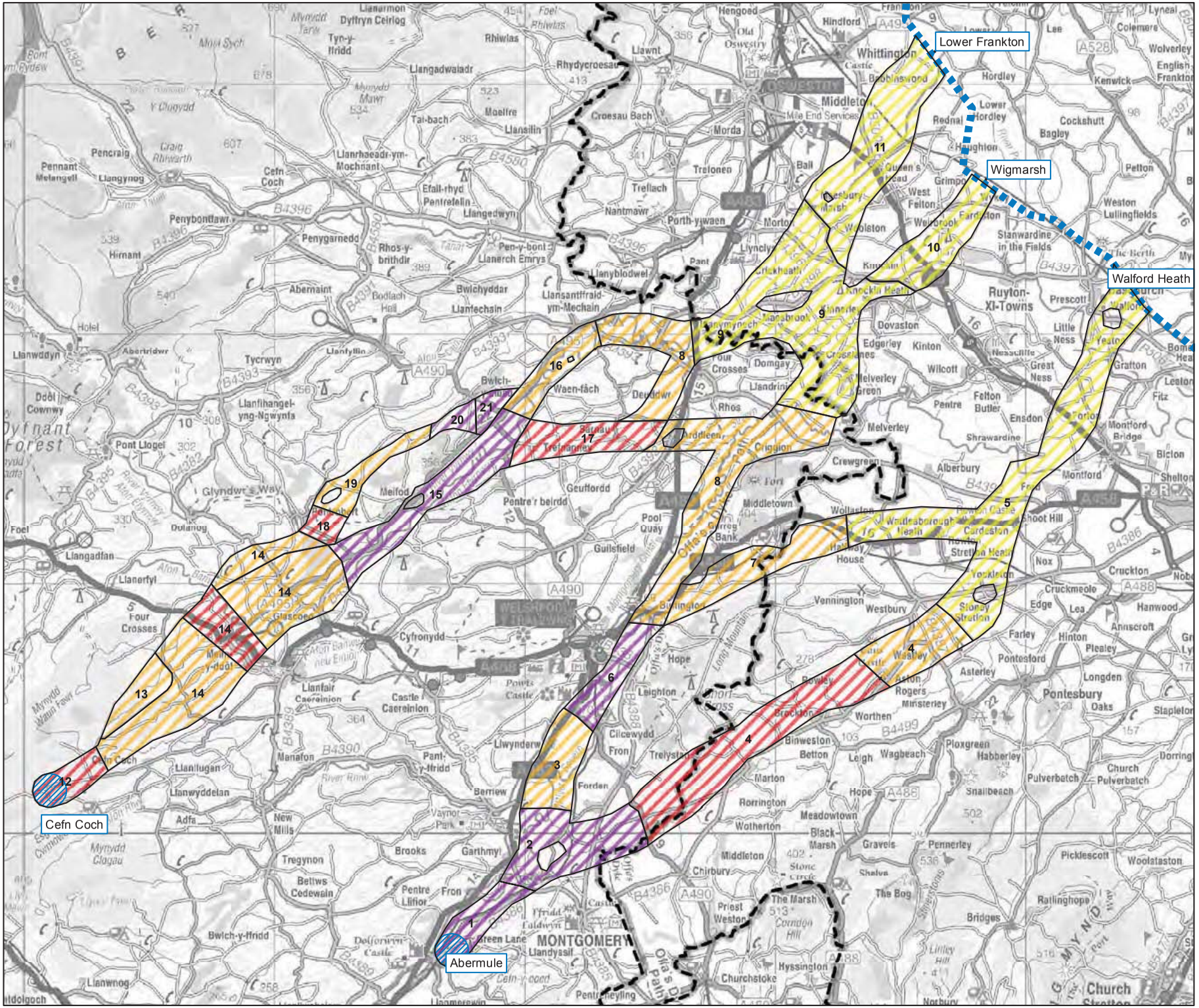
[4] Countryside and Rights of Way Act

Sensitivity Matrix

3.4 The mapped sections will form the basis for the field-based sensitivity matrix. For each section, the matrix will include notes against each criterion. The matrix will summarise the key implications and opportunities for routeing, and record the sensitivity category assigned together with a short justification.

4.0 CONCLUSION

4.1 The findings of the field-based landscape sensitivity assessment will reflect local variations observed in the landscape along the draft route and will be used as the basis for the assessment of landscape effects which will be included in the Environmental Statement (ES) for the Project.



Key

- Welsh / English Border
- Existing 400 kV Overhead Line
- National Grid Substation Siting Area (1km Diameter)
- Optional Route Corridors to existing 400 kV

Landscape & Visual Sensitivity

- Very High
- High
- Medium - High
- Medium
- Low-Medium
- Low

NG Route Corridor Character Areas

1 Severn Valley - Abermule to Garthmyl Hall
2 Severn / Camlad confluence
3 Severn Valley - Forden to Cilcewydd
4 Camlad / Rea Valley
5 Severn / Rea Floodplain
6 Severn Valley around Welshpool
7 Middletown Valley
8 Severn Valley: Buttington to Four Crosses
9 Severn Vyrnwy Floodplain
10 Knockin to Wigmarsh
11 Osbaston to Lower Frankton
12 Y Foel to Cwm
13 Foel Fawr / Einion Valley
14 Cefn Coch - Ffridd Mathrafal
15 Meifod Valley
16 Ystym Colwyn to Llansantffraid-ym-Mechain
17 Maerdy Brook
18 Vyrnwy Valley near Pontrobert
19 Peniarth Valley
20 Bwlch-y-cibau
21 Bwlch-y-cibau to A495

DRAFT

NORTH

Drawing No.:
M4618-20130205

Drawing Title:
Field Based Landscape & Visual Sensitivity to a 400 kV Overhead Line

Date:
05/02/2013

Drawn by:	Checked by:
WF	SG

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For Wales, the table includes the relevant LANDMAP description for each section of corridor. This data was not used in the assessment but is included for ease of reference. Note that the LANDMAP classifications apply to much wider geographical areas and do not necessarily accord with the following more detailed field based descriptions.
N/A – Not Applicable.

Section of Corridor (including wider landscape setting)	**1: Severn Valley: Abermule to Garthmyl Hall (Wales)**	**2: Severn / Camlad Confluence (Wales)**	**3: Severn Valley: Forden to Cilcewydd (Wales)**	**4: Camlad / Rea Valley (Mainly England)**	**5: Severn / Rea Floodplain (England)**
Powys Landscape Character Area Shropshire Landscape Type	*M31 Llandinam to Llandyssil Hillsides* *M9 Severn Farmlands*	*M18 Long Mountain / Breidden Hills* *M9 Severn Farmlands*	*M18 Long Mountain / Breidden Hills* *M9 Severn Farmlands*	*M18 Long Mountain / Breidden Hills* *Pasture Hills* *Principal Settled Farmlands* *Settled Pastoral Farmlands* *Riverside Meadows*	*Principal Settled Farmlands* *Enclosed Lowland Heaths* *Wooded Estatelands* *Enclosed Lowland Heaths* *Estate Farmlands* *Riverside Meadows*
LANDMAP Overall Evaluation (Wales only)	*LANDMAP VS50 – Mainly Moderate* *LANDMAP HL40 – Mainly Outstanding* *LANDMAP LH45 – High in valley with Moderate on valley sides* *LANDMAP CL40 – High*	*LANDMAP VS50 – Mainly Moderate* *LANDMAP HL40 – Outstanding in valley with High on valley sides* *LANDMAP LH45 – Mainly High* *LANDMAP CL40 – High with some Outstanding*	*LANDMAP VS50 – Mainly Moderate with High on the western valley side* *LANDMAP HL40 – Mainly Outstanding* *LANDMAP LH45 – Mainly High* *LANDMAP CL40 –Mainly High with some Outstanding*	*LANDMAP – N/A*	*LANDMAP – N/A*
Sensitivity Criterion					
1) Landform	*LANDMAP VS4 – Levels on valley floor with Rolling/Undulating on western valley side and Hills/Valleys on eastern valley side* The subtly rolling Severn Valley floor, although relatively narrow near Abermule widens out northwards towards Caerhowel. To the west the valley is enclosed by steep slopes, whilst to the east the valley floor initially merges into gently undulating sloping land, before rising steeply to form a prominent rounded ridge, broken by the shallow Llandyssil Valley near Green Lane.	*LANDMAP VS4 – Levels on valley floor with Rolling/Undulating on western valley side and Hill /Valleys on Long Mountain* The confluence of the rivers Severn, Rhiw and Camlad has created a broad floodplain which divides around Long Mountain; the Severn Valley continuing northwards past Welshpool, the Camlad Valley heading eastwards towards Marton. The wide valley floor is flat or undulating. Steeply rising hills enclose the valley to the west. To the south the floodplain initially merges into gently rolling rising land, before rising more steeply nearer Montgomery. To the north-east, the lower part of Long Mountain's	*LANDMAP VS4 – Levels on valley floor with Rolling/Undulating on western valley side and Hills/Valleys on Long Mountain* The broad, flat valley floor of the River Severn is enclosed by steep slopes to the west, whilst to the east the valley floor initially merges into gently rolling sloping land, before rising steeply up to the broad rounded plateau of Long Mountain.	*LANDMAP – N/A* Relatively broad, low-lying and undulating valley of the River Camlad and Rea Brook, which noticeably widens east of Worthen. To the south the valley is enclosed by the steeply rising slopes of the Shropshire Hills AONB. To the north, the valley floor initially merges into a broad area of undulating sloping land, before rising steeply to form a series of rolling hills, including Long Mountain, Walton Hill and Rowley Hill, incised by deep, wooded stream valleys flowing south-east to join the River Camlad and Rea Brook.	*LANDMAP – N/A* Gently rolling lowland that forms part of the wider River Severn and Rea Brook floodplains. The land around Wattlesborough Heath forms a low, undulating plateau above the River Severn floodplain, whilst north of the A5, there are some gentle hills and ridges. To the west, the corridor is overlooked by the eastern end of the Breidden Hills and distantly to the south, by the northern slopes of the Shropshire Hills AONB.

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Section of Corridor (including wider landscape setting)	1: Severn Valley: Abermule to Garthmyl Hall (Wales)	2: Severn / Camlad Confluence (Wales)	3: Severn Valley: Forden to Cilcewydd (Wales)	4: Camlad / Rea Valley (Mainly England)	5: Severn / Rea Floodplain (England)
		scarp slope creates an area of rolling topography. The more topographically complex valley of the River Rhiw cuts down through the western valley side to join the Severn at Berriew.			
2) Landcover & Landscape pattern	*LANDMAP VS5 – Field Pattern/Mosaic* *LANDMAP VS7 – Mixture in valley with Managed Hedge and Hedge with Trees on valley sides* Consistent pattern of steep wooded valley sides and relatively open, farmed valley floor. Mixed farmland with managed hedges and post and wire fences defining a pattern of medium to large dairy pastures and arable fields. There are few trees on the valley floor other than some linear belts of trees and shrubs along the river and railway. By contrast the valleys sides are more complex, with woodlands interspersed with small pastures and the occasional private gardens.	*LANDMAP VS5 – Field Pattern/Mosaic* *LANDMAP VS7 – Mixture in valley with Managed Hedge and Hedge with Trees on valley sides* Floodplain landscape on the valley floor, with managed hedges, occasional hedgerow trees and post and wire fences defining a pattern of medium to large dairy pastures and arable fields. These extend across the sloping land north of Montgomery and south of Forden. By contrast the western side of the Severn Valley is more complex, with small to medium sized pastures and a higher proportion of overgrown hedges, hedgerow trees and woodlands.	*LANDMAP VS5 – Field Pattern/Mosaic* *LANDMAP VS7 – Mixture in valley with Overgrown Hedges on western valley side and Managed Hedge and Hedge with Trees on valley sides* Consistent pattern of steep, wooded valley sides and relatively open, farmed valley floor. Floodplain landscape on the valley floor with managed hedges, occasional hedgerow trees and post and wire fences defining a pattern of medium to large dairy pastures and arable fields. By contrast the valleys sides are more complex. The western valley side comprises mainly pastures with a higher proportion of overgrown hedges, hedgerow trees and woodlands. To the east, the pastures on Long Mountain are distinguished from the surrounding farmland by a low incidence of individual or hedgerow trees and by a marked rectilinear field pattern. Mid Wales Airport occupies a section of valley floor near Cilcewydd.	*LANDMAP – N/A* More varied pattern of mixed farmland with medium to large fields enclosed by managed hedges giving way further east to pastures enclosed by moderately intact hedgerows with hedgerow trees on the steeper valley sides. At the eastern end of this section of corridor, fields are smaller as the valley floor becomes more undulating. Post and wire fences replace hedges in places, particularly on the higher slopes. Occasional blocks of woodland within the valley, but most are on the valley sides, with broadleaved and mixed woodland increasingly giving way to coniferous plantations on the higher slopes of Long Mountain. Small lakes and meres, although present along the valley floor, are not prominent landscape features.	*LANDMAP – N/A* More varied pattern of mixed farmland with various sized fields typically enclosed by hedges with scattered hedgerow trees. Tree cover is provided by hedgerow and field trees, with linear wet woodlands along watercourses. Occasional woodland blocks and copses tend to be located on the slightly higher ground where they can be prominent landscape features.

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3) Settlement Pattern	*LANDMAP VS6 – Mainly Mixture on valley floor with Clustered along A483 and Scattered Rural/Farm on western valley side* The expanding village of Abermule lies outside and to the south of the corridor. Elsewhere the corridor is typified by individual or small clusters of properties, typically located above the floodplain on the lower valley sides, particularly along the A483 on the western edge of the corridor. There are a few scattered properties on the higher valley sides and little settlement in the floodplain.	*LANDMAP VS6 – Mixture on valley floor with Clustered on valley sides and Scattered Rural/Farm around Forden* The largest settlement is the village of Forden, which is located to the north-east of the corridor on the undulating land flanking the southern end of Long Mountain. Elsewhere the corridor is typified by individual or small clusters of properties, which tend to be located above the floodplain on the lower valley sides, particularly along the A483 on the western edge of the corridor. There are some large farms on the valley floor and some scattered properties on the higher valley sides.	*LANDMAP VS6 – Mixture on valley floor with Scattered Rural/Farm on valley sides* The largest settlement is the village of Forden, which is located to the east of the corridor on the undulating land flanking the southern end of Long Mountain. Fron Bank and Cilcewydd are smaller linear settlements situated above the floodplain on the lower slopes of Long Mountain. Elsewhere the corridor is typified by individual or small clusters of properties, typically located above the floodplain on the lower valley sides, particularly along the A483 on the western edge of the corridor. There are some large farms on the valley floor and some scattered properties on the higher valley sides.	*LANDMAP – N/A* This is a settled farming landscape with villages and individual or small clusters of properties situated along the B4386 outside the southern edge of the corridor and on the lower valley slopes. These include the villages of Marton, Hampton Beech, Brockton and Worthen. Also on the B4386 is Westbury, which lies near the northern end of the corridor. There is little settlement on the lowest part of the valley floor, which lies to the south. Within the AONB to the south, the two large villages of Minsterley and Pontesbury have slightly elevated positions on the A488.	*LANDMAP – N/A* Clustered settlement pattern of villages and hamlets, including the villages of Westbury, Alberbury, Halfway House, Wattlesborough Heath, Stoney Stretton, Yockleton, Ford, Shrawardine, Montford Bridge and Baschurch. Elsewhere, large farms and individual or small clusters of properties are sparsely dispersed throughout the farmland.
4) Man-made Influences	*LANDMAP VS18 – Constant in valley with Infrequent on valley sides* The floor of the Severn Valley has more overt human influences with settlement, transport corridors (including the A483, mainline railway, Montgomery/Shropshire Union Canal) and a network of telegraph poles and low and high voltage (132 kV) overhead lines. This gives the valley floor a busier, more disturbed character than the more tranquil,	*LANDMAP VS18 – Constant in valley with Infrequent on valley sides* The floor of the Severn Valley has more overt human influences with settlement, transport corridors (including the A483, mainline railway, Montgomery/Shropshire Union Canal) and a network of telegraph poles and low and high voltage (132 kV) overhead lines. This gives the valley floor a busier, more disturbed character than the more tranquil,	*LANDMAP VS18 – Constant in valley with Infrequent on valley sides* The floor of the Severn Valley has more overt human influences with settlement, transport corridors (including the A483, mainline railway, Montgomery/Shropshire Union Canal) and a network of telegraph poles and low and high voltage (132 kV) overhead lines. This gives the valley floor a busier, more disturbed character than the more tranquil,	*LANDMAP – N/A* The A490 and B4386 provide important links between Welshpool, Montgomery and Shrewsbury and are visible but not dominant landscape features. These roads appear quieter than the main road along the Middletown Valley to the north. There are few detracting influences other than occasional large farm buildings, including tall tower silos, made from prominent	*LANDMAP – N/A* This section of corridor contains important transport corridors, which radiate out from Shrewsbury, including the busy A5, A458 and a mainline railway. North of Shrawardine, the large Nesscliffe MOD Training Ground has an influence on the local landscape as well as being a constraint to routeing. There are some large farm

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	undisturbed valley sides. There are designed parkland landscapes around Dolforwyn Castle and Cefn Bryntalch.	undisturbed valley sides. The Western end of the Camlad Valley, although farmed, displays fewer human influences, but there are some large farm buildings, including tall tower silos made from prominent reflective materials. There is designed parkland around Garthmyl Hall and Glansevern Hall.	undisturbed valley sides. The Mid Wales Airport doesn't have a strong visual presence in this area.	reflective materials.	buildings, including tall tower silos, made from prominent reflective material. Near Walford Heath, the existing 400 kV overhead line is a noticeable but not dominant landscape feature. Large historic houses and estates are a distinctive feature of this section of corridor and there are parkland landscapes around Rowton and Wattlesborough Castles, Loton Park, Cardeston Park, Winsley Hall, Yockleton Park, Adcote School, Yeaton Peverey and Walford Agricultural College.
5) Scenic Quality	*LANDMAP VS46 – Moderate in valley with High on valley sides* Attractive farmland overlooked by naturalistic wooded hillsides. The parkland landscapes around Dolforwyn Castle and Cefn Bryntalch contributes further to the scenic quality. The well-wooded valley sides and linear tree belts of the valley floor give this section of the Severn Valley a more verdant character than further to the north.	*LANDMAP VS46 – Moderate in valley with High on valley sides* Attractive farmland, offering expansive views to distant horizons and low skylines. The designed parkland landscapes around Garthmyl Hall and Glansevern Hall further contribute to the scenic quality. Tall tower silos locally detract from the overall scene as does the static caravan park south of Garthmyl village	*LANDMAP VS46 – Moderate in valley with High on valley sides* Attractive farmland overlooked by naturalistic wooded hillsides, with the designed parkland landscapes associated with Powis Castle and Leighton Hall increasingly exerting an influence on the landscape to the north.	*LANDMAP N/A* The highly managed farmland of the valley floor provides a contrast with the pastures and semi natural vegetation cover of the valley sides, including the northern edge of the Shropshire Hills AONB. Some of the large farm complexes locally detract from the overall scene.	*LANDMAP – N/A* Scenic farmland, which is pleasant but unremarkable. The landscape becomes more attractive north of the A5, where the designed parkland landscapes are of higher scenic quality.
6) Scale	*LANDMAP VS8 – Vast in valley with Medium on valley sides* Typically medium to large scale in the valley with smaller scale on valley sides and around the parklands.	*LANDMAP VS8 – Vast in valley with Medium on valley sides and Intimate around Garthmyl and Glansevern Halls.* Typically medium to large scale in the valley, becoming smaller	*LANDMAP VS8 – Vast in valley with Medium on valley sides* Typically medium to large scale in valley, becoming smaller on the surrounding valley sides.	*LANDMAP N/A* Typically medium to large scale in valley, becoming smaller on the surrounding hillsides and around the B4387 near Asterley.	*LANDMAP – N/A* Typically medium to large scale becoming smaller scale landscape around the villages and parklands.

MID WALES - OVERALL FIELD BASED LANDSCAPE & VISUAL SENSITIVITY TO 400 KV OVERHEAD LINE – FINAL DRAFT

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		scale on surrounding hillsides, along the Rhiw Valley and around the parklands.			
7) Perceptual Aspects	The settled valley floor is not remote and has been modified by development. The valley sides, with their narrow, hedgerow lined roads and woodlands have a secluded, more naturalistic feel.	The Severn valley is not remote and has been modified by development. The surrounding hillsides and Camlad Valley are quieter.	The settled valley floor is not remote and has been modified by development. The surrounding valley sides, with their narrow, hedgerow lined roads and woodlands have a quieter, more naturalistic quality.	The Valley has a settled, domestic character, which has been modified in places by development, but remains relatively quiet and unspoilt. The valley sides, with their narrow hedgerow lined roads and woodlands have a quieter, more naturalistic feel.	Although the farmland is heavily managed and despite proximity to Shrewsbury, the area has few detracting human influences and has a strongly rural quality. Parts of this corridor have the character of a traditional managed estate.
8) Condition	*LANDMAP VS27 – Unassessed on valley floor with Good on western valley side and Fair on eastern valley side* Typically well-managed farmland in good condition, although there has been some field enlargement and replacement of hedges with post and wire fences.	*LANDMAP VS27 – Unassessed on valley floor with Good on valley sides* Typically well-managed farmland in good condition, although there has been some field enlargement and replacement of hedges with post and wire fences.	*LANDMAP VS27 – Unassessed on valley floor with Good on eastern valley sides* Typically well-managed farmland in good condition, although there has been some field enlargement and replacement of hedges with post and wire fences. The western valley sides have a high proportion of overgrown hedges suggesting less intensive management.	*LANDMAP N/A* Typically good condition, particularly in the valley. Less well-managed on the higher slopes where pastures tend to be smaller and enclosed by overgrown hedges and post and wire fences.	*LANDMAP – N/A* Typically well-managed farmland in good condition, although there has been some field enlargement and replacement of hedges with post and wire fences.
9) Skylines & Settings	The valley sides form rolling ridgelines without prominent skylines. The valley provides the setting for settlements, including Abermule, although the latter is largely screened from the corridor by intervening landform and vegetation. Dolforwyn Castle is situated on a	Most of the surrounding hillsides form rolling ridgelines without prominent skylines. Some longer views to distant skylines, including the Shropshire Hills AONB. Although outside the immediate corridor, the small market town of Montgomery occupies a particularly prominent position on a rocky outcrop. Forden also has	The valley sides form rolling ridgelines without prominent skylines. The top of Long Mountain is a broad, rounded plateau. The village of Forden overlooks the Severn Valley from the south-west side of Long Mountain. The valley provides the setting for part of the Severn Way, which	To the north, the complex rolling skyline incorporates a number of local landmarks, including Long Mountain, Walton Hill and Rowley Hill, Aston Hill and Caus Castle. The valley provides the setting for settlements, including those situated in the north-western edge of the AONB. The valley provides part of the	Skylines are typically distant, low lying and well-wooded. The farmland provides the setting for many settlements. It also provides the setting for Rowton and Wattlesborough Castles, Loton Park, Cardeston Park, Winsley Hall, Yockleton Park, Adcote School, Yeaton Peverey and Walford Agricultural College. Many of which features occupy

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	wooded hilltop west of the Severn Valley. Cefn Bryntalch sits on a ridge directly above the valley floor. The valley provides the setting for part of the Severn Way, which runs alongside the Montgomery/Shropshire Union Canal. The Vale of Montgomery Registered Historic Landscape lies close to this section of corridor and the valley forms part of its wider setting.	an elevated setting overlooking the Severn Valley. Garthmyl Hall enjoys an attractive wooded setting on the western edge of the valley floor whilst Glansevern Hall occupies a low-lying situation at the confluence of the Severn and Rhiw. The Severn Valley forms the setting for a number of important cultural heritage sites, including the large Forden Gaer Roman Fort, located in the middle of the corridor, Ffridd Faldwyn Fort, Offa's Dyke, Hen Domen and Montgomery Castle. This section of corridor falls partly within the Vale of Montgomery Registered Historic Landscape. Offa's Dyke Path crosses the Camlad Valley near Forden and both the Camlad and the Severn Valleys form part of its wider setting. The Severn Valley provides the setting for part of the Severn Way, which runs alongside the Montgomery/Shropshire Union Canal.	runs alongside the Montgomery/Shropshire Union Canal. The Vale of Montgomery Registered Historic Landscape, lies partly within this section of corridor and the valley forms part of its wider setting. Offa's Dyke Path lies east of the corridor beyond Forden. The intervening topography means that it is unlikely to be affected by views of an overhead line through this section of corridor. The valley provides the setting for part of the Severn Way, which runs alongside the Montgomery/Shropshire Union Canal.	setting for the Shropshire Hills AONB, the hills forming a complex skyline to the south. Landmarks within the AONB include Corndon Hill and the Stiperstones, both of which are well known and popular vantage points. The valley provides part of the wider setting for Caus Castle, which is situated on the hillside north of Aston Rogers. Part of the valley falls within the Vale of Montgomery Registered Historic Landscape.	slightly elevated positions, which enhances their prominence in the landscape. Near Shrawardine, the farmland provides the setting for part of the Severn Way and Sustrans Cycle Route 81.
10) Enclosure	*LANDMAP VS9 – Open in valley with Enclosed on valley sides* The northern part of the corridor has a slightly more open character due to the broader valley floor and larger fields. By	*LANDMAP VS9 – Open in valley with Enclosed on higher valley sides* Typically open landscape, particularly on the valley floor and on the rolling farmland north of	*LANDMAP VS9 – Open in valley with Enclosed on higher valley sides* Typically open landscape, particularly on the valley floor, where only localised enclosure is	*LANDMAP N/A* The valley floor and lower slopes of the northern valley side are largely open and sometimes exposed, although hedges and woodlands locally impart a sense	*LANDMAP N/A* Enclosure varies – parts of the corridor are more enclosed because of the landform and high tree cover, whilst elsewhere, the larger fields and fewer trees

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	contrast, the southern section has steeper valley sides, woodlands and smaller fields which impart a more enclosed character.	Montgomery, where only localised enclosure is provided by hedgerow trees and linear tree and shrub belts along the river and railway. By contrast the valley sides, with their woodlands and smaller fields, are more enclosed.	provided by hedgerow trees and linear tree and shrub belts along the watercourses. By contrast the valley sides, with their overgrown hedges, woodlands and smaller fields, are more enclosed.	of enclosure. The southern, steeper valley sides with their smaller fields and denser tree cover have a more enclosed character.	impart a more open character. This is notable around Wattlesborough Heath where the landscape has an open, slightly elevated character.
11) Visibility & Views	The valley is experienced from settlements and roads, including the A483 and B4384, the railway, Montgomery/Shropshire Union Canal and the Severn Way. Longer north-easterly views towards distant hills are afforded from the northern section of the corridor. The southern section is narrower and more enclosed with views locally contained by the well-wooded valley sides and by the linear tree belts along the river and railway. Cefn Bryntalch has views across and along the valley, although these are partially contained by vegetation. Views out from Dolforwyn Castle are partially screened by its well-wooded surroundings.	The landscape is experienced from settlements and roads, including the A483, A490, B4390, B4388, B4385, B4386, the railway, recently constructed golf course, static caravan park, Montgomery/Shropshire Union Canal, Offa's Dyke Path, Severn Way, Garthmyl Hall, Glansevern Hall, Montgomery Castle and some large cultural heritage sites including Forden Gaer Roman Fort. Long views along and across floodplain are only locally contained by landform and vegetation. The surrounding higher land has elevated panoramic views to Kerry Ridgeway and Corndon Hill. In the Camlad Valley, this includes views to the Shropshire Hills AONB. Montgomery is situated on a rocky outcrop and has panoramic views across the Severn and Camlad Valleys, including from its castle, which sits on a rocky outcrop above the town. Elevated views from Forden tend to focus on the Severn rather than the Camlad Valley.	The landscape is experienced from settlements and roads, including the A483, A490, B4390, the railway, Montgomery/Shropshire Union Canal and the Severn Way. Views are contained by the steep, well-wooded valley sides. Longer views along the valley floor are framed and filtered by trees and by local variations in landform. The higher valley sides have panoramic views along and across the valley.	The valley is experienced from settlements and roads including the A490, B4386 and B4499, and the north side of the Shropshire Hills AONB. Views out from the valley are contained by the surrounding hillsides. Longer views along the valley floor are contained in places by landform and vegetation. Where not obscured by trees or landform, the north side of the AONB affords clear views across the valley to Long Mountain, the Severn Valley north of Montgomery and beyond.	The landscape is experienced from settlements and roads, including the A5, A45, B4386, B5067, B4393, the railway, Severn Way and Sustrans Cycle Route 81. Views vary from those which are locally contained by landform and tree cover, to longer more open views across the Shropshire and Welsh Hills and the Shropshire Plain. The eastern end of Long Mountain and north side of the Shropshire Hills AONB has elevated views across the farmland, although these become increasingly distant as the corridor travels northwards.

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		Garthmyl Hall and Glansevern Hall have views across and along the valley, although these are partially contained by mature vegetation within the grounds.			
12) **Routeing Considerations**	Although the mature vegetation along the railway and local variations in topography could help screen some views, the narrowness of the valley and size of the 400 kV pylons means that there is little scope for lessening the effects of an overhead line. The valley sides are high enough to provide a visual backcloth to help reduce their perceived visibility and the presence of tree belts could screen parts of the pylons, but because of the narrowness of the valley, they would remain prominent features. Proximity to an existing 132 kV distribution line creates the potential for cumulative landscape and visual effects. Cumulative effects may also arise from SPEN's proposed 132 kV lines, as they converge on the substation site near Abermule. Of particular note in this respect is SPEN's proposed overhead line from SSA B North, which joins the Severn valley near Berriew and enters the substation site from the north. This line would run parallel to a section of the proposed 400 kV overhead line.	The width of the corridor does offer some scope for routeing to lessen the effects on particularly sensitive residential receptors by locating pylons at a distance thereby reducing their perceived visibility. Similarly, the pylons could be located against the valley sides, which would help to reduce their perceived visibility. Proximity to an existing 132 kV distribution line creates the potential for cumulative landscape and visual effects. Cumulative effects may also arise from SPEN's proposed 132 kV lines, as they converge on the substation site near Abermule. Of particular note in this respect is SPEN's proposed overhead line from SSA B North, which joins the Severn valley near Berriew and enters the substation site from the north. This line would run parallel to a section of the proposed 400 kV overhead line.	There is some scope for lessening the effects of an overhead line by siting the pylons against the western Severn valley side to help reduce their perceived scale. In addition, the vegetation cover provides localised enclosure and potential screening. There is a pinch point at the northern end of this section created by the Mid Wales Airport, which is located in the middle of the floodplain. Proximity to an existing 132 kV distribution line creates the potential for cumulative landscape and visual effects. Cumulative effects may also arise at the southern end of this section of corridor from SPEN's 132 kV lines, as they converge on the substation site near Abermule. Of particular note in this respect is SPEN's proposed overhead line from SSA B North, which joins the Severn valley near Berriew and enters the substation site from the north. This line would run parallel to a section of the proposed 400 kV overhead line.	There is some scope for lessening the effects of an overhead line by siting the pylons against the high, well-wooded northern valley side. This would help reduce their perceived scale, particularly in views from the Shropshire Hills AONB, a sensitive landscape receptor. The use of alternative tower designs (including carefully selected colour) could further reduce the perception of the pylons.	The relatively flat landscape offers flexibility for routeing and scope to lessen the effect on sensitive receptors including the Shropshire Hills AONB. In addition, the vegetation cover provides localised enclosure and potential screening. This is evidenced at the northern end of the corridor by the existing 400 kV overhead line, which although visible, is not prominent except in close proximity. The concentration of parkland and settlement between Montford and Shrawardine and around Yeaton and Walford Agricultural College creates pinch points on the corridor, where it would be difficult to reduce adverse effects. There is potential for cumulative landscape and visual effects to arise from proximity to the existing 400 kV overhead line at the northern end of the corridor.

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Assessment of Sensitivity					
13) Overall Field Based Landscape & Visual Sensitivity to 400 kV Overhead Line	The influences of the A483, railway and existing overhead lines potentially reduce the sensitivity of this section of corridor and the tree belts could provide some screening. However, the relative narrowness of the valley and naturalistic, well-wooded valley sides, together with the presence of settlements, parks and gardens, Severn Way and Montgomery/Shropshire Union Canal, make it highly sensitive to a 400 kV overhead line. The line would be an extensive new linear feature which would draw the eye and have significant adverse landscape and visual effects over a wide area. **VERY HIGH**	The larger scale of the landscape, influence of the A483, railway, static caravan park and existing overhead lines potentially reduce the sensitivity of this section of corridor and the linear tree cover could provide some screening. However, this section of corridor forms the wider landscape setting for settlements, including Forden and Montgomery, parks and gardens, Forden Gaer Roman Fort, Offa's Dyke, Montgomery Castle, the Severn Way and Vale of Montgomery Historic Landscape. The line would be an extensive new linear feature which would draw the eye and have significant adverse landscape and visual effects over a wide area. **VERY HIGH**	Although there are a number of sensitive visual receptors in this section of valley, the scale of the landscape offers flexibility for routeing to help reduce the perceived scale of the pylons. The introduction of a new 400 kV overhead line would not fundamentally alter the character of the landscape, which already contains some large scale communications infrastructure, including a main road, mainline railway and an existing 132 kV overhead line. Nevertheless, it would introduce a new linear man-made feature with adverse landscape and visual effects. **MEDIUM / HIGH**	The large scale, well-treed farmland of this broad valley makes it inherently less sensitive to a new 400 kV overhead line. Significant landscape and visual constraints include the settlements and smaller scale, more complex landscapes of the valley sides. To the south, the northern slope of the AONB, lies within 1–2km of the edge of the corridor and would have clear views of an overhead line. Although the effects on the AONB could be lessened by using an alternative tower design and by routeing on the opposite side of the valley, it nevertheless remains a key constraint to this corridor. For this reason, the landscape is considered of high sensitivity. East of Worthen, the corridor widens out and views from the AONB become more distant. Hence the sensitivity of the corridor in this area is considered slightly lower. **HIGH and MEDIUM / HIGH**	Whilst the medium to large scale and rolling, low lying topography makes much of the corridor inherently less sensitive to overhead line development, the area has a number of attractive villages and parklands, which are of high scenic quality and a key constraint to routeing. Nevertheless, with the exception of the two pinch points mentioned above, the width of the corridor offers opportunities to avoid these sensitive receptors. The introduction of a new 400 kV overhead line would not fundamentally alter the character of the landscape, which already contains some large scale infrastructure. This includes a main road, mainline railway and an existing 400 kV overhead line. None of these exert a far reaching effect on the landscape, suggesting that the landscape could potentially accommodate some of the effects of a second overhead line. **MEDIUM**

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Powys Landscape Character Area Shropshire Landscape Type	M9 Severn Farmlands	M18 Long Mountain / Breidden Hills M9 Severn Farmlands *Settled Pastoral Farmlands* *Pasture Hills*	M9 Severn Farmlands	M9 Severn Farmlands *Riverside Meadows* *Enclosed Lowland Heaths* *Principal Settled Farmlands* *Settled Pastoral Farmlands*
LANDMAP Overall Evaluation (Wales only)	*LANDMAP VS50 – Mainly Moderate with High on western valley side* *LANDMAP HL40 – Outstanding* *LANDMAP LH45 – Moderate in valley and lower valley sides, with High around Welshpool and higher valley sides* *LANDMAP CL 40 – High*	*LANDMAP VS50 – Moderate* *LANDMAP HL40 – Outstanding and High* *LANDMAP LH45 – Mainly High* *LANDMAP CL 40 – High*	*LANDMAP VS50 – Moderate with High on higher ground west of Ardleen* *LANDMAP HL40 – Outstanding* *LANDMAP LH45 – Mainly High with some Moderate* *LANDMAP CL40 – Mainly High*	*LANDMAP VS50 – Moderate* *LANDMAP HL40 – Outstanding* *LANDMAP LH45 – Mainly High* *LANDMAP CL 40 - Mainly High*
Sensitivity Criterion				
1) Landform	*LANDMAP VS4 – Levels on valley floor with Rolling/Undulating on western valley side and Hills/Valleys With Plateau beyond on eastern valley side* Well defined, relatively narrow River Severn floodplain, which is enclosed by variable slopes to the west, whilst to the east the valley floor initially merges into gently undulating sloping land, before rising steeply up to the broad rounded plateau of Long Mountain.	*LANDMAP VS4 – Mainly Hills/Valleys* To the west of the A458 lies the flat, low lying floodplain of the River Severn, whilst to the east of the A458, the rising Middletown Valley comprises a series of corrugated ridges and valleys situated between the slopes of Moel y Golfa, Middletown Hill and Bulthy Hill to the north and the scarp slope of Long Mountain to the south.	*LANDMAP VS4 – Levels on valley floor with Rolling/Undulating on western valley side and Hills/Valleys with Plateau on eastern valley side* The well-defined Severn Valley gradually gives way to the broad, undulating floodplain of the Rivers Severn, Vyrnwy, Cain, Tanat and Morda, which forms a belt of lowland around the Montgomery Hills and the Breidden Hills. Ardleen and Four Crosses are situated on slightly higher ground between the Vyrnwy and Severn Valleys. To the east of the floodplain the land rises steeply up to Long Mountain and, the Breidden Hills. This series of hills is broken only by the rising, rolling and corrugated Middletown Valley north of Long Mountain. The quarried western face of Breidden Hill is particularly distinctive.	*LANDMAP VS4 - Levels* Flat or undulating, low lying floodplain around the confluence of the Rivers Vyrnwy and Morda. Away from the rivers, the land becomes slightly higher and more undulating. To the west the corridor is overlooked by Llanymynech Hill and, to the south, by Breidden Hill and Bausley Hill.
2) Landcover & Landscape Pattern	*LANDMAP VS5 – Field Pattern/Mosaic* *LANDMAP VS7 – Mixture in valley with Overgrown Hedges on western valley side and Managed Hedge on*	*LANDMAP VS5 – Field Pattern/ Mosaic with woodland on Middletown/Breidden Hill* *LANDMAP VS7 – Mixture at western end of valley with Managed*	*LANDMAP VS5 – Field Pattern/Mosaic with woodland on Middletown/Breidden Hill* *LANDMAP VS7 – Mixture in valley with Overgrown Hedges on western valley*	*LANDMAP VS5 – Field Pattern/Mosaic* *LANDMAP VS7 – Mixture* Lowland and floodplain landscapes with arable fields, pastures and

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	eastern valley side More complex pattern of topography, farmland, settlement and designed parkland landscapes. Mixed farmland with gappy hedges and post and wire fences defining a pattern of medium to large dairy pastures and arable fields. Tree cover in the valley comprises individual mature trees and linear tree and shrub belts along the railway and river. The western valley side comprises a mix of woodlands, Powis Castle and its associated parkland and residential development on the west side of Welshpool. The eastern valley side is a mix of woodlands, pasture and designed parkland associated with the Leighton Hall.	*Hedges at eastern end and valley sides and Overgrown Hedges on Breidden Hill* The western and middle section of this corridor typically comprises medium sized pastures enclosed by both managed and unmanaged hedges with a high prevalence of hedgerow trees and small woodland blocks. These give way at the eastern end to larger, flatter fields in more arable cultivation. The large semi-natural Moel y Golfa woodland covers a swathe of hillside above Trewern.	*side and combination of Overgrown Hedges and Managed Hedges on Breidden Hill* Mixed farmland with medium to large fields typically enclosed by hedges with only occasional hedgerow trees and post and wire fences. There are few woodlands on the valley floor other than some small linear woodlands along the watercourses. Some large woodland extends across the summits of Moel y Golfa and Breidden Hill.	waterside meadows. Various sized fields are enclosed by managed hedges with high numbers of individual mature deciduous trees. There are occasional small copses and linear belts of trees along watercourses, but the landscape is not well-wooded. Nearer the Vyrnwy, the fields tend to become larger and more regular, with fewer hedges and trees and more fences. This area reflects proximity to the MOD Nesscliffe Training area, with rough grassland and former munitions bunkers which are now overgrown or used for storage or activities such as paintballing.
3) Settlement Pattern	*LANDMAP VS6 – Mixture in valley with Scattered Rural/Farm on valley sides* The largest settlement is the historic town of Welshpool. Elsewhere settlement comprises scattered individual or small clusters of properties and villages, including Leighton and Cilcewydd, which lie just outside the eastern edge of the corridor. These tend to be situated above the floodplain on the lower valley sides. There are few properties on the higher valley sides.	*LANDMAP VS6 - Mixture at western end of valley with Scattered Rural/Farm at eastern end and valley sides and No Settlements on Middletown/Breidden Hill* The villages of Trewern and Middletown are located on the northern valley side. Elsewhere settlement comprises scattered properties and farms, which tend to be located on the valley sides.	*LANDMAP VS6 – Mainly Mixture with Scattered Rural/Farm on higher ground* The valley contains a number of settlements, including Buttington at the southern end of the corridor, Llansantffraid, Ardleen and the villages of Llanymynech, Llandysilio, Four Crosses, Rhos and Llandrinio, which are beginning to coalesce around the A483 and B4393. Elsewhere, large farms and individual or small clusters of properties are mainly situated on the lower valley sides. There are few properties situated in the floodplain or the higher valley sides.	*LANDMAP VS6 - Mixture* Medium to high density of dispersed farms and properties. Settlements include the small villages of Maesbrook, Melverley, Kinnerley and Crewgreen. The larger villages of Pant and Llanymynech are situated on the A483 above the floodplain. There is little settlement on the lowest parts of the floodplain.
4) Man-made Influences	*LANDMAP VS18 – Constant on valley floor / Infrequent on valley sides* The Severn Valley is an important communications route through the Welsh Borders with the busy A483,	*LANDMAP VS18 – Constant at western end with Infrequent elsewhere* Although the Severn Valley is an important transport corridor with the	*LANDMAP VS18 – Mainly Constant with Infrequent on higher ground* Four Crosses is situated at the junction of a number of roads, including the busy A483, B4393 and B4398. There is also a	*LANDMAP VS18 - Constant* Managed farmland, which in places displays a relatively high level of human influence, including the settlements, former MOD structures

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	mainline railway, the Montgomery/Shropshire Union Canal and a high voltage (132 kV) overhead line. This gives the valley floor a busier, more developed character with greater human influence. By contrast, the valley sides are less disturbed. Urban influences increase around Welshpool and the eastern side of the town is characterised by commercial development, including an industrial estate and business park. The parkland landscape of Powis Castle and Leighton Hall exert a strong influence on the landscape of the valley sides.	busy A458 Welshpool to Shrewsbury Road following its northern edge and a mainline railway along the valley floor, these features are not intrusive within the wider landscape. There is designed parkland around Maesfron.	newly constructed bypass around the village. The road infrastructure, together with the coalescing settlements (including Ardleen) and network of telegraph poles and low voltage overhead lines (including a 132 kV overhead line) give this section of corridor a more developed character with greater human influence. By contrast, the valley sides are less disturbed, although there is a prominent operational quarry on the northern and western side of Breidden Hill and former quarries on Llanymynech Hill, the latter dating back to prehistoric times. There are some large caravan parks in the Vyrnwy Valley east of Llansantffraid.	and dismantled railway.
5) Scenic Quality	*LANDMAP VS46 – Moderate in valley with High on valley sides* Attractive farmland overlooked by wooded hillsides. Less scenic on the eastern edge of Welshpool. The designed parkland landscape around Powis Castle and Leighton Hall contribute further scenic quality.	*LANDMAP VS46 – Moderate at western end of valley with High elsewhere* Attractive, enclosed farmland. The steep, well-wooded valley sides add visual interest and contribute to the overall scenic quality.	*LANDMAP VS46 – Mainly Moderate with High on higher ground* Pleasant, yet unremarkable, farmland scenery. Llanymynech and Breidden Hill contrast strikingly with the low lying floodplain. Breidden Hill is a dramatic focal point.	*LANDMAP VS46 – Moderate* Pleasant, yet unremarkable, farmland scenery. Llanymynech and Breidden Hill contrast strikingly with the low lying floodplain. Breidden Hill is a particularly dramatic focal point.
6) Scale	*LANDMAP VS8 – Vast on valley floor with Medium on valley sides and Intimate in Welshpool* Typically larger scale in the valley with medium to small scale on the surrounding hillsides.	*LANDMAP VS8 – Vast at western end of valley with Medium at eastern end and valley sides and Large on Middletown/Breidden Hill* Medium scale at the western end, becoming larger at the eastern end of the corridor.	*LANDMAP VS8 – Mainly Vast with Medium on higher ground west of Ardleen* Typically larger scale in valley, with medium scale on valley sides.	*LANDMAP VS8 – Vast* No dominant pattern, although fields tend to be larger nearer the River Vyrnwy.
7) Perceptual Aspects	The valley has a settled domestic character, which is busy in places. A sense of enclosure derives from the steep valley sides and its relative narrowness. The Leighton Hall appears secluded and private.	The valley has a sense of enclosure particularly in its central section. This derives from the steep valley sides and undulating valley floor. The A468, although not particularly busy, is a fast route through the valley. Despite this there is a strong sense of place, which is peaceful, undisturbed and quite separate from the busier more developed Severn Valley.	Although rural, the area is quite busy and disturbed due to the settlements, transport corridors and recreational activities including caravan parks. Away from the main valleys, the landscape becomes quieter and more tranquil.	The area has a settled domestic character, which is quite busy in places, yet remote and tranquil in others. The former wartime bunkers locally impart an air of neglect.

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8) Condition	*LANDMAP VS27 – Unassessed on valley floor with Good on western valley side and Fair on eastern valley side* Typically well-managed farmland in good condition, although there has been some field enlargement and replacement of hedges with post and wire fences. Slightly poorer condition around the eastern edge of Welshpool, with more post and wire fencing and the negative effects of commercial development.	*LANDMAP VS27 – Unassessed at western end with Good in central section and valley sides and Fair on Middletown/Breidden Hill* Typically well-managed farmland in good condition, although there has been some field enlargement and replacement of hedges with post and wire fences.	*LANDMAP VS27 – Mainly Unassessed with Good and fair on Breidden Hill* Typically well-managed farmland in good condition, although there has been some field enlargement and replacement of hedges with post and wire fences. Slightly poorer condition around some of the villages and at the foot of Breidden Hill, where there are quarry buildings and the derelict buildings of the former Criggion radio station. There is also a pocket of brownfield land on the site of the former brickworks between Buttington and Trewern.	*LANDMAP VS27 – Unassessed* Reasonable condition although gappy and overgrown hedges, relict rural buildings MOD bunkers and a number of dead or dying hedgerow trees suggest a lack of management.
9) Skylines & Settings	The valley sides form rolling ridgelines without prominent skylines. The top of Long Mountain is a broad, rounded plateau. The valley provides the wider setting for Welshpool with its residential western edge occupying the higher ground overlooking the valley. Both Powis Castle and Leighton Hall occupy elevated positions on either side of the valley. The spire of Leighton Church is a prominent local landmark in the farmland on the lower slopes of Long Mountain to the east of Welshpool. The valley provides the setting for Offa's Dyke Path, which drops down off Long Mountain to cross the corridor near Buttington. The valley provides the setting for the Severn Way, which runs alongside the Montgomery/Shropshire Union Canal and Sustrans Cycle Route 81, which drops down off Long Mountain and crosses the River Severn east of Welshpool.	Middletown Valley is enclosed to the south by the scarp slope and rolling ridgeline of Long Mountain. To the north, the well-wooded Breidden Hills create a more complex skyline. Middletown Hill is a prominent local landmark affording long views out across the valley and the setting for an Iron Age hillfort. Trewern and Middletown occupy elevated situations overlooking the valley. The western end of the valley provides the setting for Maesfron park and garden, which occupies a steeply sloping, south facing position looking towards Long Mountain on the opposite side of the valley.	This section of corridor forms the foreground to views of Llanymynech Hill and Breidden Hill, both of which are prominent landmarks. The valley provides the setting for a number of settlements, including Ardleen and Four Crosses. Llanymynech Hill and Breidden Hill have prehistoric hillforts on their summits. Intervisibility between these sites is an important feature of their setting. Llanymynech Hill is also the setting for the Llanymynech Heritage Trail. Views elsewhere are contained by rolling hills without prominent skylines. To the north-east there are long views out across the low lying Shropshire Plain. This section of corridor provides the setting for long sections of the Severn Way and Offa's Dyke Path, which run alongside the Montgomery/Shropshire Union Canal. Near Crewgreen, the valley provides the setting for a section of Sustrans Cycle Route 81 near Crewgreen.	Much of this section of corridor forms the foreground to views of Llanymynech Hill, Breidden Hill and Bausley Hill, as well as to the more complex skylines of the Montgomeryshire Hills west of the A483. Elsewhere, there are no prominent focal points and views fade into distant, low-lying horizons. The farmland does not contain any distinctive focal points although it provides the setting for a number of villages. Llanymynech Hill, Breidden Hill and Bausley Hill have prehistoric hillforts on their summits. Intervisibility between these sites is an important feature of their setting. Llanymynech Hill is also the setting for Llanymynech Heritage Trail. The area provides the setting for the Severn Way.

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	The Vale of Montgomery Registered Historic Landscape lies close to the southern end of this section of corridor and the valley forms part of its wider setting.			
10) **Enclosure**	*LANDMAP VS9 – Mainly Open in valley and on lower slopes of Long Mountain with Enclosed on western valley side and Exposed on higher eastern valley sides* Open landscape, particularly on the valley floor, where only localised enclosure is provided by hedgerow trees and linear tree and shrub belts along the river and railway. By contrast the valley sides are more enclosed.	*LANDMAP VS9 – Open* Open landscape within the valley with some enclosure is provided by the occasional small woodlands.	*LANDMAP VS9 – Open in valleys with Enclosed on higher ground to west* Open and expansive valley floor scenery that is strongly contained to the east by topography.	*LANDMAP VS9 – Open* Open and expansive scenery that is contained locally by topography and vegetation.
11) Visibility & Views	The valley is experienced from settlements and the A483, A458, B4388, railway, Montgomery/Shropshire Union Canal, Severn Way, Offa's Dyke Path, Sustrans Cycle Route 81, Powis Castle and Leighton Hall. Views are contained by the steep, well-wooded valley sides. Longer views along the valley floor are framed and filtered by trees and by local variations in landform. The higher valley sides including Powis Castle and Leighton Hall have panoramic views along and across the valley. Of particular note is the residential north-western edge of Welshpool, which occupies higher ground on the western valley side and has clear views across the valley towards Leighton Hall.	The valley is experienced from settlements, the A458, National Cycle Route 81 and the railway. Views out from the valley floor are contained by the valley sides. More extensive views along the valley floor are framed and filtered by trees and by the corrugated landscape of the valley floor. At the eastern end of the valley, there are long views out across undulating farmland, whilst at the western end, there are long views out across the low lying farmland of the Severn Valley. The higher valley sides afford broad panoramic views over the Welsh hills, the Shropshire Hills AONB and the Shropshire Plain. Maesfron near Trewern has panoramic views of Long Mountain, although these are partially contained by mature vegetation within its grounds.	The landscape is experienced from settlements, the A483, B4392, B4393, B4398, railway, Montgomery/Shropshire Union Canal, New Cut, Severn Way, Offa's Dyke Path, National Cycle Route 81, Llanymynech Heritage Trail, caravan parks, Llanymynech Hill and the Breidden Hills. To the north and south there are clear views to and from the prominent and well visited landmarks of Llanymynech Hill and Breidden Hill. These hills afford panoramic views over the Welsh Hills, the Shropshire Hills AONB and the Shropshire Plain.	The landscape is experienced from settlements, the A483, B4396, B4398, Montgomery/Shropshire Union Canal, Severn Way, Llanymynech Heritage Trail, Llanymynech Hill, Breidden Hill and Bausley Hill. Views vary from those which are locally contained by landform and tree cover, to longer, more open views across the Shropshire and Welsh Hills and Shropshire Plain. To the west and south there are clear views to and from the prominent and well visited landmarks of Llanymynech Hill and Breidden Hill. These hills afford broad panoramic views over the Welsh Borders.

Section of Corridor (including wider landscape setting)	6: Severn Valley around Welshpool (Wales)	7: Middleton Valley (Wales & England)	8: Severn Valley: Buttington to Four Crosses (Wales)	9: Severn & Vyrnwy Floodplain (Wales & England)
12) Routeing Considerations	Although the mature vegetation along the railway and local variations in topography could help screen some views, the narrowness of the valley and size of the 400 kV pylons means that there is little scope to lessen the effects of an overhead line. There is a pinch point on the eastern edge of Welshpool, where the overhead line would have to pass through a 1km wide open section of the Severn Valley floodplain, with the edge of Welshpool to one side and Long Mountain to the other. The visual issues this raises would be exacerbated by additional cumulative effects created by the presence of three high voltage overhead lines in close proximity. The existing 132 kV overhead line, proposed 132 kV Llandinam to Welshpool overhead line and the 400 kV line would potentially all have to pass through this constrained gap.	By locating the line along the southern edge of the corridor, where it would be backclothed against the landform, the effects on residential receptors, situated on the north side of the valley, including Middletown would be lessened. The low lying land at either end of the corridor means that pylons in these areas would potentially be skylined. This effect could be reduced by locating the pylons against a backdrop of trees.	The medium to large scale of the landscape could potentially absorb the perceived scale of an overhead line. The distribution of properties along the B4382 creates a significant pinch point around Ardleen. An overhead line would have to pass very close to properties, potentially giving rise to significant adverse effects. The open, lower lying land means that pylons would potentially be skylined. This effect could be reduced by locating the line along the base of the valley sides, although care would have to be taken not to diminish the sharp contrast between the flat valley floor and steeply rising slopes of Llanymynech and Breidden Hill.	The scale of the landscape and the adverse effects of the nearby MOD site offer flexibility for routeing to lessen the effects of an overhead line and scope to reduce the perceived scale of the pylons from sensitive receptors including Breidden Hill and Bausley Hill as well as from settlements. In addition, the vegetation cover provides localised enclosure and potential screening. The open, lower lying nature of the landscape means that pylons would potentially be skylined. This effect could be reduced by locating the line against a backdrop of trees.
Assessment of Sensitivity				

Section of Corridor (including wider landscape setting)	6: Severn Valley around Welshpool (Wales)	7: Middleton Valley (Wales & England)	8: Severn Valley: Buttington to Four Crosses (Wales)	9: Severn & Vyrnwy Floodplain (Wales & England)
13) Overall Field Based Landscape & Visual Sensitivity to a 400 kV Overhead Line	The urbanising influence of the A483, railway and existing overhead lines potentially reduce the sensitivity of this section of corridor. However, the narrowness of the corridor and surrounding unspoilt valley sides mean a new 400 kV overhead line would be an extensive linear feature which would draw the eye and have significant adverse landscape and visual effects over a wide area, interrupting both the linear open space of the floodplain and the contrast between the steeply sloping valley sides and flat valley floor, both of which are an important part of the valley's character. The adverse effects on the character of the landscape would be compounded by effects on the highly sensitive visual receptors, including the western residential edge of Welshpool, Powis Castle and Leighton Hall, Offa's Dyke Path, the Severn Way and National Cycle Route 81. **VERY HIGH**	A new 400 kV overhead line would be visually prominent new landscape feature in the attractive scenery and strongly rural character of the Middletown valley. However, other than at the western end of the corridor, there are fewer visual receptors compared to other sections of corridor, which reduces its overall visual sensitivity. The exceptions are near Trewern and Middletown, both of which occupy elevated positions on the northern valley side and remain constraints on this section of corridor. Although the effects on these villages could be lessened by using an alternative tower design, they nevertheless remain a key constraint to this corridor. **MEDIUM / HIGH**	The scale of the landscape offers scope for routeing to lessen the effects of an overhead line on sensitive visual receptors. The introduction of a new 400 kV overhead line would not fundamentally alter the character of the landscape, but would add to the overall development in the area. There are also some sensitive visual receptors which increase the overall sensitivity. These include, firstly the section of the Vyrnwy Valley between the B4393 and the A483 which is considered more sensitive due to proximity to the village, Llanymynech Hill with its Heritage Trail, Offa's Dyke Path, National Cycle Route 81 and some caravan parks. Secondly around Ardleen there is a significant pinch point due to ribbon development along the B4392. An overhead line would potentially dominate views from a number of properties. Finally, the section of corridor from Buttington to Melverley is considered more sensitive due to proximity to Breidden Hill and because a stretch of Offa's Dyke Path and the Severn Way runs parallel to the corridor. **MEDIUM / HIGH**	The open, expansive nature of the scenery and relatively high number of mature trees offers scope for sensitive routeing to reduce the perceived scale of the pylons. The introduction of a new 400 kV overhead line would not fundamentally alter the character of the landscape, which contains a large MOD training site and redundant wartime structures. **MEDIUM**

Section of Corridor (including wider landscape setting)	10: Knockin to Wigmarsh (England)	11: Osbaston to Lower Frankton (England)	12: Y Foel to Cwm (Wales)	13: Foel Fawr / Einion Valley (Wales)
Powys Landscape Character Area Shropshire Landscape Type	*Riverside Meadows* *Settled Pastoral Farmlands* *Estate Farmlands* *Principal Settled Farmlands* *Enclosed Lowland Heaths* *Sandstone Hills*	*Riverside Farmlands* *Settled Pastoral Farmland* *Principal Settled Farmlands* *Estate Farmlands* *Lowland Moors*	M14 Esgair Cwmowen	M14 Esgair Cwmowen
LANDMAP Overall Evaluation (Wales only)	*LANDMAP N/A*	*LANDMAP N/A*	*LANDMAP VS50 – High* *LANDMAP HL40 – High* *LANDMAP LH45 – High* *LANDMAP CL 40 – High*	*LANDMAP VS50 – Moderate & High* *LANDMAP HL40 – High & Low* *LANDMAP LH45 – Moderate & High* *LANDMAP CL 40 - High*
Sensitivity Criterion				
1) Landform	*LANDMAP – N/A* Gently undulating or rolling landform around a tributary of the River Morda..	*LANDMAP – N/A* Undulating lowland, forming part of the River Perry floodplain. To the north and east of the corridor, the landform rises and becomes more rolling.	*LANDMAP VS4 – Rolling/Undulating* Undulating plateau with a series of gentle ridges and valleys separated by shallow depressions.	*LANDMAP VS4 – Rolling/Undulating* Broad upland valley of the River Einion, a small stream which flows off the upland plateau and wraps around the distinctive rounded knoll of Foel Fawr.
2) Landcover & Landscape Pattern	*LANDMAP – N/A* Medium to large, mainly arable fields that are enclosed by relatively intact and well-maintained hedgerows with mature hedgerow trees and post and wire fences in places. The variations in topography and occasional mixed woodland blocks and copses add diversity to what is otherwise a relatively simple landscape pattern. The busy A5 crosses the corridor, whilst the Crewe to Shrewsbury mainline railway forms its northern boundary. There is a disused airfield near Haughton.	*LANDMAP – N/A* Variable pattern of mixed lowland farmland with medium to large pastures and arable fields defined by hedgerows with mature hedgerow trees, and post and wire fences. Occasional blocks of woodland, including small plantations and coverts are typically located on the slightly higher ground and along the canal. Designed parkland landscapes are associated with Halston Hall and Woodhouse. The busy A5 and the Crewe to Shrewsbury mainline railway crosses the corridor. The Montgomery/Shropshire Union Canal lies within and parallel to much of the corridor.	*LANDMAP VS5 – Open Land* *LANDMAP VS7- Fences* Simple pattern of open moorland, rough upland grazing and marshy grassland. Fields enclosed by post and wire fences and remnant stone walls. There is an absence of trees and woodlands other than geometric blocks of coniferous plantation and occasional linear shelterbelts.	*LANDMAP VS5 – Mainly Open Land with some Field Pattern/Mosaic on lower slopes* *LANDMAP VS7- Mainly Fences on higher ground with some Managed Hedge* Simple pattern of variable sized (including unenclosed) semi improved upland pastures and marshy grassland. Field boundaries where present are typically post and wire fences, with degraded dry stone walls and gappy hedgerows with stunted hedgerow trees. Some small groups of trees on steeper slopes.

Section of Corridor (including wider landscape setting)	10: Knockin to Wigmarsh (England)	11: Osbaston to Lower Frankton (England)	12: Y Foel to Cwm (Wales)	13: Foel Fawr / Einion Valley (Wales)
3) Settlement Pattern	*LANDMAP – N/A* Scattered properties and isolated farms with no particular concentration or pattern. The large villages of Kinnerley and Knockin are located on the southern boundary this section of corridor. Elsewhere the settlement pattern is one of individual and small clusters of properties.	*LANDMAP – No Settlements* Clustered pattern of villages and hamlets, often located at crossroads on the slightly higher ground, with large estate farms and halls scattered throughout. Larger villages include Maesbury, Maesbury Marsh, Woolston, West Felton and Lower Frankton. Oswestry and the historic village of Whittington lie some 3km to the north-west.	*LANDMAP VS6 – No settlements* Sparsely populated with only occasional, isolated farms and cottages.	*LANDMAP VS6 – No Settlements on higher ground with Scattered Rural/Farm on lower slopes* Sparsely settled with only occasional, scattered and isolated farms and cottages. The small village of Cefn Coch lies to the east.
4) **Man-made Influences**	*LANDMAP – N/A* Managed farmland, which is locally disturbed by the A5 corridor but still has a distinctly rural quality. Designed parkland landscapes around Pradoe and Tedsmore Hall occupies the higher ground outside the corridor. At the northern end of the corridor, the existing 400 kV is a noticeable but not dominant landscape feature.	*LANDMAP – N/A* Managed farmland, which although locally disturbed by the A5 corridor and Crewe to Shrewsbury mainline railway, retains a distinctly rural character. The Montgomery/Shropshire Union Canal cuts through the area. Designed parkland landscapes around Halston Hall, Aston Hall and Woodhouse occupies slightly higher ground outside the corridor. At the northern end of the corridor, the existing 400 kV is a noticeable but not dominant landscape feature.	*LANDMAP VS18 – Occasional* The landscape is characterised by commercial upland activities, including the nearby Mynydd Clogau wind farm, Tan y Foel Quarry and blocks of coniferous forestry plantation.	*LANDMAP VS18 – Occasional or Infrequent* Few human influences other than views of nearby turbines.
5) Scenic Quality	*LANDMAP – N/A* Pleasant but unremarkable farmland, which is quite intensively managed. Nearby parklands and occasional longer views to distant hills create visual interest.	*LANDMAP – N/A* Pleasant but unremarkable farmland, which is quite intensively farmed. Nearby parklands create visual interest.	*LANDMAP VS46 – High* Scenic but unremarkable upland landscape enhanced by views to distant hills. Commercial forestry and wind turbines provide a strong visual focus in what otherwise would be a simple landscape.	*LANDMAP VS46 – Mainly High with some Moderate* Pleasant but unremarkable upland valley landscape, with few distinctive features.

Section of Corridor (including wider landscape setting)	10: Knockin to Wigmarsh (England)	11: Osbaston to Lower Frankton (England)	12: Y Foel to Cwm (Wales)	13: Foel Fawr / Einion Valley (Wales)
6) **Scale & Openness**	*LANDMAP – N/A* Typically medium to large scale. Smaller scale landscape around parklands and villages.	*LANDMAP – N/A* Typically medium to large scale. Smaller scale landscape around parklands and villages.	*LANDMAP VS8 – Large* Large scale extensive landscape.	*LANDMAP VS8 – Mainly Large with some Medium* *LANDMAP VS9 - Open* Larger scale on the higher ground at edge of plateau gives way to small or medium scale as the valley descends.
7) **Perceptual Aspects**	Farmed, mainly arable, landscape, which is quite rural and tranquil, away from the immediate influence of the A5.	Managed farmland, with drainage channels, coverts, halls, designed parkland and farmland all indicative of a working landscape. Parts of this corridor have the character of a traditional managed estate.	This is a working upland landscape. The wild and remote character is tempered by man-made influences, including quarrying, forestry and wind farms.	Transitional landscape between the high moorland plateau and fertile farmland of the Banwy Valley. Whilst this landscape is not remote, it feels very secluded. Settlement is sparse and, apart from glimpsed views of turbines, there is little modern development.
8) **Condition**	*LANDMAP – N/A* Typically well-managed farmland in good condition, although there has been some field enlargement and replacement of hedges with post and wire fences.	*LANDMAP – N/A* Typically well-managed farmland in good condition, although there has been some field enlargement and replacement of hedges with post and wire fences.	*LANDMAP VS27 - Unassessed* Marginal farmland, with little obvious management, other than plantations. Large areas of rough grazing.	*LANDMAP VS27 – Unassessed or Fair* Marginal farmland, displaying a decline in management with remnant drystone walls, poorly maintained hedges, bracken and rough grassland.
9) **Skylines & Settings**	Skylines comprise low hills with well-treed skylines. On clear days, there are some long views to more complex skylines west of the A483. The farmland provides the setting for a number of settlements including the larger villages of Kinnerley and Knockin. The farmland also provides the setting for Pradoe and Tedsmore Hall and Boreatton Park.	Few skylines other than the gently rolling well-wooded hills on which the parklands are situated. The farmland provides the setting for a number of villages, including Welsh Frankton which occupies an elevated situation north of the corridor and the existing 400 kV overhead line. The church spire at Welsh Frankton provides a local landmark, where it is seen on the higher ground surrounded by mature trees. The farmland also provides the setting for Halston Hall, Aston Hall and Woodhouse.	Long undulating skylines interrupted only by plantations and wind turbines.	The rounded knoll of Foel Fawr is a prominent local landmark. Otherwise skylines comprise undulating, rough grazed pastures. Cefn Coch is located on a ridgeline to the east but is not visible from the lower parts of the valley.
10) **Enclosure**	*LANDMAP – N/A* Slightly more enclosed landscape due to low hills and higher proportion of	*LANDMAP – N/A* Enclosure varies. North of the A5 the large fields and fewer trees give the	*LANDMAP VS9 - Open* This is typically an open landscape with limited tree cover. Enclosure is afforded	*LANDMAP VS9 - Open* Increasingly enclosed on descent into the Einion Valley.

Section of Corridor (including wider landscape setting)	10: Knockin to Wigmarsh (England)	11: Osbaston to Lower Frankton (England)	12: Y Foel to Cwm (Wales)	13: Foel Fawr / Einion Valley (Wales)
	hedges and hedgerow trees, copses and woodlands.	landscape a more open character. South of the A5, there is a more enclosed character due to the more undulating landform and higher proportion of hedges and hedgerow trees, copses and woodlands.	mainly by the ridgelines and plantations.	
11) Visibility & Views	The landscape is experienced from settlements, the A5, B4397, the railway, Pradoe and Tedsmore Hall and Boreatton Park. Views vary from those which are locally contained by landform and tree cover, to longer, more open views across the Shropshire and Welsh Hills and Shropshire Plain. The parks are situated on higher ground and have views out across the corridor, although these are partially contained by mature trees within their grounds.	The landscape is experienced from settlements, the A5, B5009, the railway, Montgomery/Shropshire Union Canal, Whittington Castle, Aston Hall, Halston Hall and Woodhouse. Longer views focus on the hills west of the A483 above Oswestry. The parks are situated on higher ground and have views out across the corridor, although these are partially contained by mature trees within their grounds.	The landscape is experienced from the relatively few properties, minor lanes and Open Access Areas. Views are variable. The rolling ridgelines afford long views across the uplands, whilst in the shallow valleys views are contained by landform and plantation.	The landscape is experienced from relatively few properties and users of the minor lane. Views become increasingly contained lower down the valley.
12) Routeing Considerations	This relatively flat landscape offers flexibility for routeing and scope to lessen effects on sensitive receptors including the nearby parklands. In addition, the vegetation cover provides localised enclosure and potential screening. This is evidenced at the northern end of the corridor by the existing 400 kV overhead line, which although visible, is not prominent except in close proximity. The two villages of Kinnerley and Knockin create a pinch point at the southern end of this section of corridor. There is potential for cumulative landscape and visual effects arising from proximity to the existing 400 kV overhead line at the northern end of the corridor.	This large scale, relatively flat landscape offers flexibility for routeing and scope to reduce the effect on sensitive receptors, including the nearby parklands. This is evidenced by the existing 400 kV overhead line, which although visible, is not prominent except in close proximity. The two villages of Maesbury Marsh and Woolston create a pinch point at the southern end of this section of corridor. There is potential for cumulative landscape and visual effects arising from proximity to the existing 400 kV overhead line at the northern end of the corridor. Particular care would have to be taken to avoid landscape and visual effects on the Montgomery/Shropshire Union Canal, which is a sensitive receptor running through much of the corridor.	This section of corridor lies close to TAN 8 SSA B, close to an active quarry and in an area of commercial forestry and existing and proposed wind farm development. A 400kV overhead line would have to cross part of the plateau and drop down the exposed plateau edge where it would potentially be visible across a wide area. There is little opportunity for vegetation or topography to provide backclothing to lessen the effects of an overhead line. There is potential for pylons to conflict and give rise to visual clutter when seen against the simplicity of the wind turbines. The use of an alternative, simpler tower design may help to visually integrate pylons with the turbines and lessen these overall effects. Cumulative landscape and visual effects may also arise from proximity to SPEN's proposed 132 kV lines, as they converge on the substation site.	This section of corridor lies close to the edge of TAN 8 SSA B. It is secluded and not prominent in distant views. The valley location offers scope to reduce the perceived scale of the pylons by locating them against the valley sides and reduces the likelihood of cumulative landscape and visual effects arising from interaction with nearby wind farm infrastructure, including overhead lines.

Section of Corridor (including wider landscape setting)	10: Knockin to Wigmarsh (England)	11: Osbaston to Lower Frankton (England)	12: Y Foel to Cwm (Wales)	13: Foel Fawr / Einion Valley (Wales)
Assessment of Sensitivity				
13) Overall Field Based Landscape & Visual Sensitivity to a 400kV overhead line	The relatively large scale, well-treed character of the farmland offers scope and flexibility for sensitive routeing. The existing 400 kV is visible near Wigmarsh but does not dominate the landscape. The introduction of a new 400 kV overhead line would not fundamentally alter the character of the landscape, which already contains some large scale infrastructure. This includes a main road, mainline railway and an existing 400 kV overhead line. None of these exert a far reaching effect on the landscape, suggesting that the landscape could potentially accommodate some of the effects of a second overhead line. **MEDIUM**	The relatively large scale well-treed character of the farmland offers scope and flexibility for sensitive routeing. The existing 400 kV is visible near Lower Frankton but does not dominate the landscape. The introduction of a new 400 kV overhead line would not fundamentally alter the character of the landscape, which already contains some large scale infrastructure. This includes a main road, mainline railway and an existing 400 kV overhead line. None of these exert a far reaching effect on the landscape, suggesting that the landscape could potentially accommodate some of the effects of a second overhead line. **MEDIUM**	This is a commercial upland landscape, with activities likely to intensify in the future as wind farm development increases. However, the open elevated aspect, relatively simple composition of the landscape and appearance of the turbines, combined with a lack of mitigation opportunities, means that a new 400 kV overhead line supported on steel lattice pylons would be a new linear feature, which would draw the eye and have adverse landscape and visual effects over a wide area and conflict with the simple appearance of the existing and proposed wind turbines. **HIGH**	A 400 kV overhead line would be a new man-made feature in this rural valley landscape. However the wider influence on the landscape and on views would be limited as the Einion valley is visually well contained. There are opportunities to reduce the perceived scale of the pylons through backclothing against the high valley sides. This and the very few sensitive receptors reduce the landscape and visual sensitivity of this section of corridor. **MEDIUM – HIGH**

Section of Corridor (including wider landscape setting)	14: Cefn Coch – Ffridd Mathrafal (Wales)	15: Meifod Valley (Wales)	16: Ystym Colwyn to Llansantffraid–ym-Mechain (Wales)	17: Maerdy Brook (Wales)
Powys Landscape Character Area / Shropshire Landscape Type	M13 Tregynon / Llanerfyl M12 Banwy Valley M7 Pont Llogel	M9 Severn Farmlands	M9 Severn Farmlands M10 Guilsfield	M9 Severn Farmlands M10 Guilsfield
LANDMAP Overall Evaluation (Wales only)	*LANDMAP VS50 – Moderate / High* *LANDMAP HL40 – High* *LANDMAP LH45 – Moderate / High* *LANDMAP CL 40 - High*	*LANDMAP VS50 – Moderate in valley / High on valley sides* *LANDMAP HL40 – Outstanding* *LANDMAP LH45 – Moderate* *LANDMAP CL 40 – Moderate on valley floor / High on valley sides*	*LANDMAP VS50 – Moderate* *LANDMAP HL40 – Outstanding* *LANDMAP LH45 – Moderate* *LANDMAP CL 40 - High*	*LANDMAP VS50 – Mainly High* *LANDMAP HL40 – Mainly High* *LANDMAP LH45 – Moderate* *LANDMAP CL 40 - High*
Sensitivity Criterion				
1) Landform	*LANDMAP VS4 – Combination of Rolling/Undulating, with Plateau and Levels*	*LANDMAP VS4 – Levels on valley floor with Rolling/Undulating on valley sides*	*LANDMAP VS4 – Levels on valley floor with Rolling/Undulating on valley sides* Broad gently undulating floodplain	*LANDMAP VS4 – Rolling/Undulating* Shallow, undulating or gently rolling valley linking the Meifod and Severn

Section of Corridor (including wider landscape setting)	14: Cefn Coch – Ffridd Mathrafal (Wales)	15: Meifod Valley (Wales)	16: Ystym Colwyn to Llansantffraid–ym-Mechain (Wales)	17: Maerdy Brook (Wales)
	Complex hill and valley landform, comprising rolling, often steep ridgelines with a broadly south-west to north-east orientation. Bisected by the undulating valley floor of the River Banwy (with its tributary the Einion), which becomes narrower, steeper sided and more wooded near Llanfair Caereinon.	Distinctive narrow floodplain across which the River Vyrnwy meanders. There is a dramatic contrast between the flat fields of the valley floor and the steep valley sides, which slope up to rolling ridgelines, broken by deeply incised stream valleys and large woodland blocks.	rising gently to rounded hills with only occasional steep slopes. Widening out further where the River Cain joins the Vyrnwy south of Llansantffraid-ym-Mechain.	Valleys.
2) Landcover & Landscape Pattern	*LANDMAP VS5 – Field Pattern/Mosaic* *LANDMAP VS7 – Fences on higher ground with Hedge with trees and Mixture on lower slopes and valley floor* A simple pattern of medium to large pastures enclosed by post and wire fences giving way to a smaller, more complex pattern of hedged pastures, occasional arable fields and woodland on the lower slopes. The Banwy Valley floor comprises small to medium sized, regular fields supporting arable and dairy farming. The lower lying fields are enclosed by a strong hedgerow pattern with a high prevalence of mature hedgerow trees. Mixed deciduous woodlands along the water courses and occasional small blocks of coniferous plantation. Large caravan parks are a feature of the Banwy Valley.	*LANDMAP VS5 – Field Pattern/Mosaic* *LANDMAP VS7 – Mixture on valley floor with Overgrown Hedges on valley sides* The valley floor has a simple pattern of medium to large sized pastures and arable fields enclosed by managed hedges with occasional hedgerow trees and some fences. By contrast the valley sides are more complex, with woodlands, small pastures, occasional properties and minor lanes, the latter following some of the minor stream valleys.	*LANDMAP VS5 – Field Pattern/Mosaic* *LANDMAP VS7 - Mixture on valley floor with Overgrown Hedges and Hedge with Trees on valley sides* The valley floor has a relatively simple pattern of well-defined medium to large arable fields and pastures enclosed by managed hedges, with mature hedgerow trees and fences. Fields become smaller and less regular on the slopes above the valley floor. The floodplain has more individual trees than the previous section of corridor, but woodlands are mainly confined to the valley sides.	*LANDMAP VS5 – Field Pattern/Mosaic* *LANDMAP VS7 – Overgrown Hedges* Well defined pattern of small to medium sized arable fields and pastures enclosed by managed hedges, with mature hedgerow trees. Occasional small woodlands and coverts, but typically not well-treed.
3) Settlement Pattern	*LANDMAP VS6 - Combination of No Settlements, Scattered Rural/Farm with Villages in the valley* Dispersed pattern of individual and small groups of properties, including the small village of Cefn Coch,	*LANDMAP VS6 – No Settlements in floodplain with Clustered and Scattered Rural/Farm on valley sides* Small villages, situated just above the northern edge of the floodplain include Dyffryn, Meifod, Pentre and Main. Elsewhere the settlement pattern is sparse with individual or small clusters of properties, tending to be situated above the floodplain on the lower valley sides, particularly along the A495, which runs along the northern edge of the valley.	*LANDMAP VS6 – No Settlements in floodplain with Clustered and Scattered Rural/Farm on valley sides* The largest settlement is the village of Llansantffraid-ym-Mechain. Elsewhere settlement comprises individual or small clusters of properties, which tend to be situated above the floodplain on the lower valley sides.	*LANDMAP VS6 – Clustered at western end of valley with Scattered Rural/Farm at eastern end* Two small villages, Trefnanney and Sarnau lie within the valley and the larger village of Ardleen is situated on slightly higher ground to the east. Elsewhere the farmland is sparsely settled with scattered individual properties and farms.

Section of Corridor (including wider landscape setting)	14: Cefn Coch – Ffridd Mathrafal (Wales)	15: Meifod Valley (Wales)	16: Ystym Colwyn to Llansantffraid–ym-Mechain (Wales)	17: Maerdy Brook (Wales)
4) Man–made Influences	*LANDMAP VS18 – Occasional south of Banwy Valley, with Constant on valley floor and Infrequent north of Banwy Valley* Human influences increase along the road network, particularly along the A458 and B4385 near Llanfair Caereinon, where there are more properties and a large caravan park. The A458, although not particularly busy, is a main arterial transport route through the valley.	*LANDMAP VS18 – Constant in valley with Infrequent on valley sides* The Meifod Valley is unspoilt and there is little development outside of the villages. The A495, although not particularly busy, is a fast route through the valley.	*LANDMAP VS18 – Constant in valley with Infrequent on valley sides* The valley is generally unspoilt and there is little development outside of the village of Llansantffraid-ym-Mechain. The A495, although not particularly busy, is a fast route through the valley.	*LANDMAP VS18 – Constant at western end of valley with Infrequent at eastern end* The valley has a strong rural character with few detracting man-made influences.
5) Scenic Quality	*LANDMAP VS46 – High on higher ground with Moderate on lower slopes and in valley* Attractive diverse landscape with the higher ground affording long views out across the Montgomery Hills.	*LANDMAP VS46 – High on higher valley sides with Moderate on lower slopes and in valley* High scenic quality with few detracting features. The flat farmland of the floodplain contrasts strongly with the steep landform and semi natural character of the valley sides.	*LANDMAP VS46 – Mainly Moderate with High on higher valley sides* Attractive farmland with some visual diversity and wider views, although lacking the dramatic contrasts of the valley near Meifod.	*LANDMAP VS46 – Moderate at western end of valley with High at eastern end* High scenic quality with few detracting features.
6) **Scale**	*LANDMAP VS8 – Large on higher ground and on valley floor with Medium and Small on lower slopes* Variable with a mix of medium to large scale with pockets of small scale.	*LANDMAP VS8 – Vast on valley floor with combination of Small, Medium and Large on valley sides* Medium scale, becoming larger scale to the north as the valley floor widens out. Smaller scale on the valley sides. .	*LANDMAP VS8 – Vast on valley floor with Small on western valley side and Large on eastern valley side* Medium to large scale, with some smaller scale on the valley sides.	*LANDMAP VS8 – Large at western end of valley with Medium at eastern end* Small to medium scale landscape.
7) Perceptual Aspects	Remote and exposed on the higher ground, but merging into a traditional settled farming landscape in the Banwy Valley.	Settled domestic character with a strong sense of place.	Traditional settled farming landscape, which has a transitional character between the Montgomery Hills to the west and the expansive, low lying floodplains further east.	Settled domestic character which feels quite separate from the more populated main valleys.
8) Condition	*LANDMAP VS27 – Mainly Unassessed with fair on higher ground* Typically good condition, particularly in the valley, where pastures and	*LANDMAP VS27 – Unassessed* Well-managed farmland in typically good condition.	*LANDMAP VS27 – Unassessed* Well-managed farmland in typically good condition.	*LANDMAP VS27 – Unassessed* Well-managed farmland in typically good condition.

Section of Corridor (including wider landscape setting)	14: Cefn Coch – Ffridd Mathrafal (Wales)	15: Meifod Valley (Wales)	16: Ystym Colwyn to Llansantffraid–ym-Mechain (Wales)	17: Maerdy Brook (Wales)
	properties are well maintained. Less well-managed on the higher ground, where pastures tend to be bound by post and wire fences.			
9) Skylines & Settings	The higher ground affords expansive views of rolling ridgelines. Elsewhere views vary depending on whether hedges are overgrown or managed and on the proportion of tree cover. There are long open views across the Banwy Valley floor. Travelling into Wales along the A458, these views focus on the distinctive rounded form of Moel Bentyrch. Llanfair Caereinion lies in a deep wooded section of the Banwy Valley. The steep wooded slopes and hedge banked lanes afford limited views and create a sense of seclusion and intimacy. To the north-east, the Banwy Valley provides the setting for Mathrafal Castle, which is situated near the junction of the A495 and B4389.	The well-wooded valley sides form complex skylines, which incorporate local landmarks such as Allt y Main, Broniarth Hill and Clolyn Hill. Views along the valley and from the higher valley sides focus on distant hills. The valley provides the setting for Meifod, which is prominently situated at its narrowest point and has clear views across to Broniarth Hill and Clolyn Hill. Glyndwr's Way crosses the Meifod Valley near Meifod and both the village and valley form part of its wider setting.	The gently sloping valley sides form a mix of simple rolling ridgelines without prominent skylines and more steeply sloping wooded valley sides with more complex skylines. Higher vantage points have long views out across rolling farmland. The valley forms the setting for Llansantffraid-ym-Mechain.	Gently sloping valley sides form rolling ridgelines without prominent skylines. Higher vantage points have long views out across rolling farmland. The valley provides the setting for Trefnanney and Sarnau.
10) Enclosure	*LANDMAP VS9 – Open on higher ground with Enclosed on lower slopes and in valley* The higher ground at either end of this section of corridor is more open in character with long views across a succession of rolling ridgelines. On descent into the Banwy Valley, the landscape becomes increasingly contained, particularly around Llanfair Caereinon where the steep wooded valley sides impart a strong sense of enclosure. North of the Neuadd Bridge, as the Banwy and the Einion diverge, the landscape becomes much more open and expansive.	*LANDMAP VS9 – Open in valley with Enclosed on higher ground to east* The central section of the valley is strongly contained by the steep valley sides, but the landscape is more open at either end of the valley as it widens and its sides slopes slacken.	*LANDMAP VS9 – Open in valley with Enclosed on higher valley sides* The broad valley floor is largely open, with only localised enclosure provided by vegetation. By contrast, the valley sides are more enclosed.	*LANDMAP VS9 – Open at western end of valley with Enclosed at eastern end* Open within the valley, contained only by the valley sides and occasional trees.
11) Visibility & Views	The landscape is experienced from settlements, roads including the A458, A495, B4382, B4385, B4389	The landscape is experienced from settlements and roads including the A495, A490, and Glyndwr's Way.	The landscape is experienced from settlements and roads including the A495, A490 and the B4393.	The landscape is experienced from settlements and the minor lane network.

Section of Corridor (including wider landscape setting)	14: Cefn Coch – Ffridd Mathrafal (Wales)	15: Meifod Valley (Wales)	16: Ystym Colwyn to Llansantffraid–ym-Mechain (Wales)	17: Maerdy Brook (Wales)
	and caravan parks. Of these, the A458 is an important tourist route linking the Welsh Borders with Dolgellau and West Wales. Views vary considerably, from those which are locally contained by landform and tree cover, to panoramic views from the higher ground across distant upland areas. There are longer views along the Banwy Valley floor north of Neuadd Bridge.	Views out from the valley floor are contained by the surrounding hillsides. There are clear views along the flat open fields of the floodplain. The higher valley sides have panoramic views along and across the valley.	Views out from the valley floor are contained by the surrounding hillsides. There are some longer views along the valley floor and where the valley widens out at the confluence of the River Vyrnwy and Cain near Llansantffraid.	Views out from the valley are contained by the surrounding hillsides. Longer views along the valley floor are contained in places by vegetation. The higher valley sides have panoramic views along and across the valley.
12) Routeing Considerations	The openness of the more elevated sections of corridor, especially near Cefn Coch offers few opportunities for flexible routeing and little scope to reduce the perceived scale of the pylons and lessen effects on sensitive receptors. Near Cefn Coch there is also the possibility of cumulative effects arising from proximity to turbines and 132 kV overhead lines, as they converge on the substation site. Elsewhere the rolling landform offers some flexibility for routeing to lessen the effects of the overhead line and scope to reduce the perceived scale of the pylons from sensitive receptors. In addition, the relatively high tree cover provides localised enclosure and potential screening. Whilst the narrow well-wooded section of the Banwy Valley near Llanfair Caereinion offers more scope for screening, there are a high number of sensitive visual receptors, including residents in and around the village, visitors to the caravan parks and travellers on the A458 tourist route. North of Neuadd Bridge the Banwy Valley opens out and the lower lying land offers little scope to reduce the effects of the overhead line, which would have to cross the open valley and potentially be skylined. It would also potentially affect views of Moel Bentyrch for residents and travellers on the A458 tourist route. Whilst it	The narrowness and openness of the Meifod Valley offers little scope to screen the pylons other than by setting them against the valley sides to help reduce their perceived scale and lessen effects on sensitive receptors. The broader northern end of the valley and the more open landscape at the confluence of the Vyrnwy and the Hafesb near Mathrafal means that the pylons would potentially be skylined. This effect could be reduced by locating the line against a backdrop of trees. There is a pinch point near Meifod caused by narrowing of the valley and the edge of the settlement.	The large scale of the landscape as the valley widens out offers flexibility for routeing and scope to reduce the perceived scale of the pylons and lessen effects on sensitive receptors. The open low lying nature of the landscape means that the pylons would potentially be skylined. This effect could be reduced by locating the line against a backcloth of trees.	Although the valley sides are high enough to avoid skylining, the narrowness and openness of this shallow valley gives little scope to reduce the perceived scale of the pylons and lessen the effects on sensitive receptors. Properties in Sarnau would have clear middle distance views across to the tops of pylons. The low lying land at either end of the corridor means that pylons in these areas would potentially be skylined. This effect could be reduced by locating the pylons against a backdrop of trees.

Section of Corridor (including wider landscape setting)	14: Cefn Coch – Ffridd Mathrafal (Wales)	15: Meifod Valley (Wales)	16: Ystym Colwyn to Llansantffraid–ym-Mechain (Wales)	17: Maerdy Brook (Wales)
	may be possible to lessen the effect of the pylons on these views through careful siting, the cables would remain highly visible.			
Assessment of Sensitivity				
13) Field Based Landscape & Visual Sensitivity to 400 kV Overhead Line	Whilst there are some opportunities to sensitively locate pylons to lessen the effects of an overhead line, the rural character of this section of corridor means that the pylons would be an intrusive new landscape feature, which could give rise to adverse landscape and visual effects. However, with the exception of the Banwy Valley, there are fewer visual receptors compared to other sections of corridor, which slightly reduces its overall sensitivity. The exception is the Banwy Valley with its relatively high number of visual receptors, presence of the A458 tourist route and the distinctive landform of Moel Bentyrch, has a higher overall landscape and visual sensitivity. **HIGH and MEDIUM / HIGH**	The Meifod Valley offers few opportunities for lessening the effects of an overhead line. The line would be an extensive new linear feature which would draw the eye and have significant adverse landscape and visual effects over a wide area and interrupt the linear open space of the floodplain, which is an important part of the area's character. The vertical scale of the valley would be diminished and the elevated views from the valley sides would be adversely affected. An overhead line would change the fundamental characteristics of this section of the Meifod valley, with significant adverse landscape and visual effects. **VERY HIGH**	Although the open and relatively expansive nature of the landscape gives some scope to reduce the perceived height of the pylons, the balanced composition of this attractive, strongly rural landscape means that a new 400 kV overhead line would be an intrusive feature which could give rise to adverse landscape and visual effects. **MEDIUM / HIGH**	A new 400 kV overhead line would be an extensive new linear feature which would draw the eye and have significant adverse landscape and visual effects over a wide area. Because the valley is only shallow, properties on the higher valley sides would have close range, eye height views of the pylons. Although the effects on properties could be lessened by using an alternative tower design, they nevertheless remain a key constraint to this corridor. However, overall there are fewer visual receptors compared to other sections of corridor, which slightly reduces its overall landscape and visual sensitivity. **HIGH**

Section of Corridor (including wider landscape setting)	**18: Vyrnwy Valley near Pontrobert (Wales)**	**19: Peniarth Valley (Wales)**	**20: Bwlch-y-cibau (Wales)**	**21: Bwlch-y-cibau to A495 (Wales)**
Powys Landscape Character Area / Shropshire Landscape Type	M7 Pont Llogel M9 Severn Farmlands	M8 Llanfyllin Farmlands	M8 Llanfyllin Farmlands M9 Severn Farmlands	M9 Severn Farmlands
LANDMAP Overall Evaluation (Wales only)	*LANDMAP VS50 – Moderate* *LANDMAP HL40 – Outstanding / High on southern valley side* *LANDMAP LH45 – Moderate in valley / High on valley sides* *LANDMAP CL 40 – High*	*LANDMAP VS50 – Moderate / High on southern valley side* *LANDMAP HL40 – Outstanding* *LANDMAP LH45 – Moderate* *LANDMAP CL 40 –High*	*LANDMAP VS50 – High* *LANDMAP HL40 – Outstanding* *LANDMAP LH45 – Moderate / High* *LANDMAP CL 40 - High*	*LANDMAP VS50 – Moderate* *LANDMAP HL40 – Outstanding* *LANDMAP LH45 – Moderate* *LANDMAP CL 40 - High*
Sensitivity Criterion				
1) Landform	*LANDMAP VS4 – Levels on valley floor with Rolling/Undulating elsewhere* Deep, relatively wide valley of the River Vyrnwy. There is a strong contrast between the flat fields of the valley floor and the steep well-wooded southern valley side. By contrast, the northern valley side is more open and irregularly sloping.	*LANDMAP VS4 – Rolling/Undulating* Irregularly undulating area of higher ground with a broadly south-west to north-east orientation lying to the west of Allt Fawr and Allt y Main. Some distinctive rounded hills include Coed Gelli (318mAOD) and Pen-y-Garth (265mAOD). The Peniarth Valley is a narrow upland valley running along the high ground. It becomes better defined in a north-easterly direction. The area is drained by meandering streams, including Colwyn Brook, which flow off the higher ground into the Rivers Vyrnwy and Severn. There is a large pond/small lake at Tanllwyn.	*LANDMAP VS4 – Rolling/Undulating* Around Grwnamlwg, the landscape changes as the corridor runs into the valley of Colwyn Brook. This is a shallow upland valley, which wraps round the north side of Allt y Main in a broadly south-west to north-east orientation and widens out as it approaches Bwylch-y-cibau. Bwylch-y-cibau is situated in a gap between surrounding higher ground.	*LANDMAP VS4 – Rolling/Undulating* Relatively steeply sloping land which forms part of the western side of the Meifod Valley. Bisected by the narrow steep sided valley of Ceunant Mawr which drops off the hillside south of Bwylch-y-cibau into the Meifod Valley.
2) Landcover & Landscape Pattern	*LANDMAP VS5 – Field Pattern/Mosaic* *LANDMAP VS7 – Hedge with Trees on southern valley side with Mixture on valley floor and Overgrown Hedges on northern valley side* The valley floor has a simple, well-defined pattern of medium to large scale arable farmland with well-maintained hedgerows and few trees.	*LANDMAP VS5 – Field Pattern/Mosaic* *LANDMAP VS7 – Overgrown Hedges* An irregular pattern of small to medium scale pastures and rough grazing with occasional arable fields bounded by gappy and overgrown hedges infilled with post and wire fences. The landscape is well treed due to the many small blocks of mixed	*LANDMAP VS5 – Field Pattern/Mosaic* *LANDMAP VS7 – Overgrown Hedges* *Hedge with Trees on valley sides* Mixed farmland with small to medium sized pastures and rough grazing, with occasional arable fields. Fields are bounded by hedges, which are gappy and overgrown in places, with occasional hedgerow trees. Woodland cover increases and fields become	*LANDMAP VS5 – Field Pattern/Mosaic* *LANDMAP VS7 – Hedge with Trees* Small to medium pastures bounded by hedges which are overgrown and gappy in places with mature hedgerow trees. The Ceunant Mawr Valley is well wooded.

Section of Corridor (including wider landscape setting)	18: Vyrnwy Valley near Pontrobert (Wales)	19: Peniarth Valley (Wales)	20: Bwlch-y-cibau (Wales)	21: Bwlch-y-cibau to A495 (Wales)
	This gives way to a more complex pattern of pastures and extensive woodland, including coniferous plantation on the southern valley side and a less regular pattern of medium scale arable fields, woodland and pastures on the northern valley side.	deciduous and coniferous woodland and overgrown hedgerow trees.	smaller and less regular on the valley sides.	
3) Settlement Pattern	*LANDMAP VS6 – Scattered Rural/Farm on southern valley side with Mixture in valley and Clustered on northern valley side* Other than a few farms, there are few properties in this section of corridor, although these include the Grade II* listed Dolobran Hall which occupies a prominent position on the northern valley side. The nearest settlement is the large village of Pontrobert, which is nestled in a steeper, narrower section of the valley to the north-west of the corridor.	*LANDMAP VS6 – Scattered Rural/Farm* Sparsely populated with only occasional farms and individual properties situated within the valley and served by narrow, poorly used lanes.	*LANDMAP VS6 – Scattered Rural/Farm* This section of the corridor is typically sparsely populated with only occasional farms and individual properties mainly situated along the narrow lane running between Pentre to Bwlch-y-cibau. There are, however slightly more properties than in the previous section of corridor. The small nucleated village of Bwlch-y-cibau lies at the northern end of the corridor, clustered around the junction of the A490 with a number of minor lanes.	*LANDMAP VS6 – Scattered Rural/Farm* There are a couple of large farms within this short section of corridor.
4) Man–made Influences	*LANDMAP VS18 – Constant on valley floor with Infrequent elsewhere* Man-made influences include agricultural activity, the occasional farms and forestry plantations. The road leading from the A495 through the valley to Pontrobert, although not particularly busy, is a fast route through the valley and creates some disturbance. An existing low voltage overhead line cuts a swathe through the woodlands on the southern valley side, but isn't a dominant landscape feature.	*LANDMAP VS18 – Infrequent* Generally very limited apart from occasional farmsteads, agricultural activity and small coniferous plantations. The valley is not intensively farmed. The lanes are typically small, not well-used and are often bounded by tall hedges.	*LANDMAP VS18 – Infrequent* Outside of Bwlch-y-cibau, man-made influences are limited to scattered farms, properties and agricultural activity.	*LANDMAP VS18 – Infrequent* Scattered farms and views of properties and agricultural activity in the Meifod Valley. The A490 runs through the Ceunant Mawr Valley but despite its classification, this is a minor road and its influence is very contained by the topography.
5) Scenic Quality	*LANDMAP VS46 – High on southern valley side with Moderate elsewhere* Attractive farmland, although lacking the dramatic quality of the Meifod valley.	*LANDMAP VS46 – High* Pleasant upland pastoral landscape.	*LANDMAP VS46 – High* Attractive farmland with some visual diversity. The parkland landscape associated with Bryngwyn exerts an influence on the landscape around Bwlch-y-cibau.	*LANDMAP VS46 – Moderate* Pleasant farmland which is unremarkable in its own right, but contributes to the wider scenery of the Meifod Valley.
6) **Scale**	*LANDMAP VS8 – Small on southern*	*LANDMAP VS8 – Vast on valley floor*	*LANDMAP VS8 – Medium*	*LANDMAP VS8 – Small*

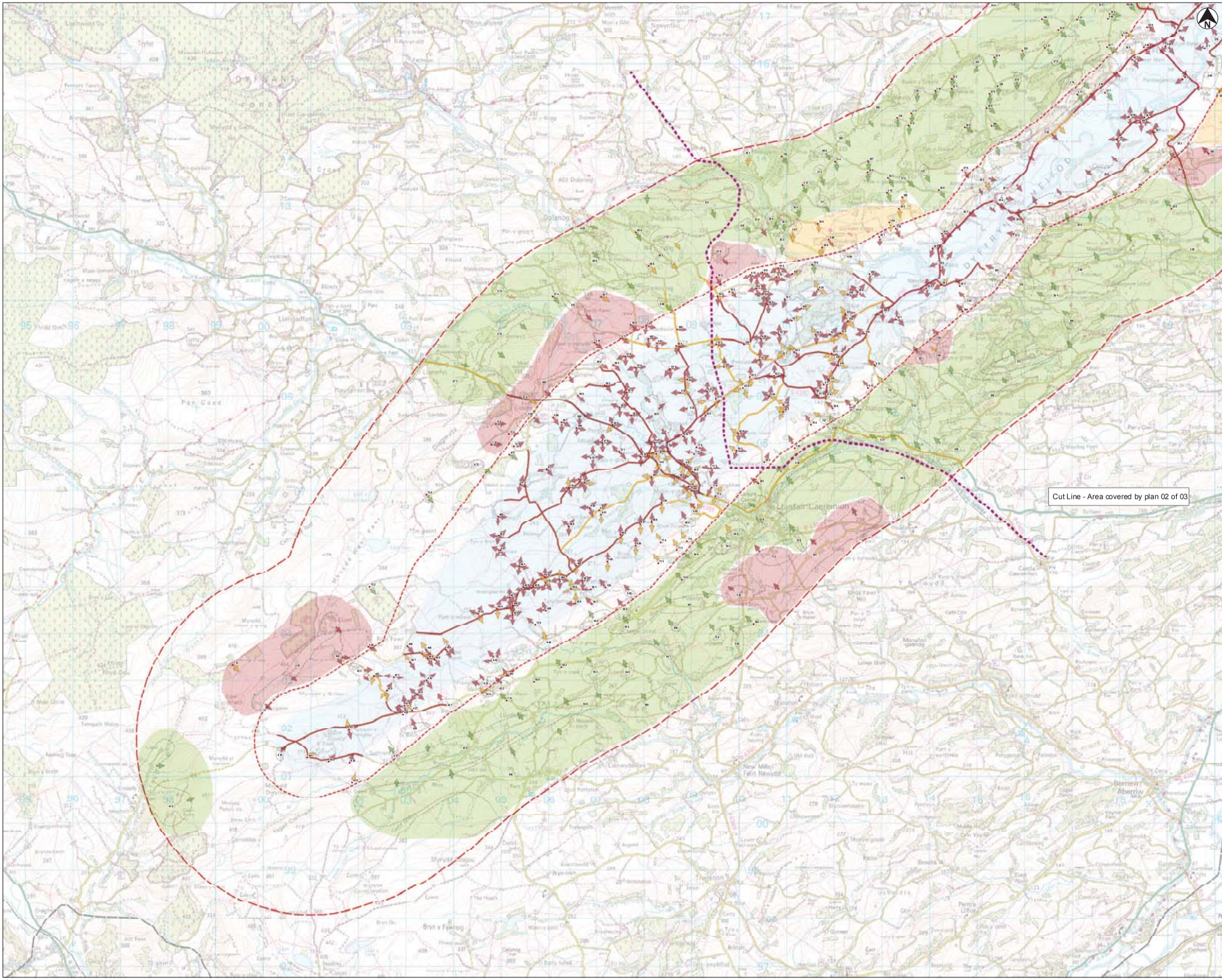
Section of Corridor (including wider landscape setting)	18: Vyrnwy Valley near Pontrobert (Wales)	19: Peniarth Valley (Wales)	20: Bwlch-y-cibau (Wales)	21: Bwlch-y-cibau to A495 (Wales)
	valley side, Vast on valley floor and Large on northern valley side Typically medium to large scale on the valley floor and northern valley side, with smaller scale on the southern valley side.	*with combination of Small, Medium and Large on valley sides* Variable - small to medium scale depending on the degree of enclosure afforded by the trees and hedgerows.	Small through to medium scale, with no dominant pattern, although fields tend to become larger as the valley widens out to the north-east.	Small to medium scale. The Ceunant Mawr Valley creates a locally intimate scale.
7) Perceptual Aspects	Settled domestic character which remains quiet and relatively remote. The only disturbance comes from the traffic disturbance.	The area is remote, tranquil and very rural. It has a sense of being 'off the beaten track'.	Quiet rural valley, becoming more settled and domestic in character nearer Bwlch-y-cibau.	Settled domestic character – strongly linked to the Meifod Valley.
8) Condition	*LANDMAP VS27 – Unassessed* Typically well-managed farmland in good condition.	*LANDMAP VS27 – Unassessed* Managed farmland in variable condition. Some parts have an unkempt quality due to the roadside bracken, rough pastures and overgrown hedges.	*LANDMAP VS27 – Unassessed* Managed farmland, which is in reasonably good condition.	*LANDMAP VS27 – Unassessed* Typically well-managed farmland in good condition.
9) Skylines & Settings	The valley sides form undulating skylines broken by woodlands, including coniferous plantations. The valley also provides the setting for Pontrobert although the village is largely screened from the corridor by intervening landform and vegetation. Glyndwr's Way runs from Pontrobert along the northern valley side, above Dolobran Hall. This section of corridor forms part of its wider setting. The area also provides the setting for two local walks in the booklet *Walks Around Meifod*.	The irregular undulating landform creates complex skylines, which incorporate prominent rounded hills such as Pen-y-Garth and Coed Gelli. Occasional longer views to distant skylines particularly from the higher southern end of the valley. The area provides the setting for a number of local walks outlined in the booklet *Walks Around Meifod*.	The valley sides form undulating poorly defined ridgelines without prominent skylines. To the north the well-wooded parkland associated with Bryngwyn creates a complex skyline. The farmland provides the setting for the small village of Bwlch-y-cibau, which is situated adjacent to Bryngwyn a large park and garden. Two local walks in the booklet *Walks Around Meifod* start from Bwylch-y-cibau.	The farmland provides the setting for cottages on the eastern edge of Bwlch-y-cibau, and the A495 in the Meifod Valley. Woodlands associated with Bryngwyn cover the hillside overlooking the farmland. The farmland also provides the setting for Bwlch-y-cibau Dyke, a linear earthwork which cuts across the sloping fields on the north side of the Meifod Valley.
10) Enclosure	*LANDMAP VS9 – Enclosed on southern valley side with Open elsewhere* Typically an open landscape on the valley floor and northern valley side. By contrast the southern valley side is more enclosed because of the high woodland cover.	*LANDMAP VS9 – Open* Despite the elevation, the farmland has an enclosed quality due to the overgrown roadside hedges, high woodland cover and undulating landform. There are only occasional long views out towards distant hills.	*LANDMAP VS9 – Open* Varied depending on the landform and vegetation cover, but typically more open than enclosed.	*LANDMAP VS9 – Enclosed* Open hillside forming part of the Meifod Valley.

Section of Corridor (including wider landscape setting)	18: Vyrnwy Valley near Pontrobert (Wales)	19: Peniarth Valley (Wales)	20: Bwlch-y-cibau (Wales)	21: Bwlch-y-cibau to A495 (Wales)
11) Visibility & Views	The landscape is experienced from properties (very few), including the Grade II* listed Dolobran Hall, the road leading from the A495 to Pontrobert and Glyndwr's Way. Views out from the valley floor are contained by the valley sides. Views along the valley floor towards Pontrobert and Mathrafal are largely screened by intervening landform and vegetation. Longer views from the higher valley sides are locally contained by the tree cover.	The landscape is experienced from the very few properties and the small lanes. Views are variable. Occasionally there are long views out across the uplands, but views are generally contained by the undulating landform and high tree cover. Views from the lanes are frequently contained by the tall roadside hedges.	The landscape is experienced from Bwlch-y-cibau, the scattered properties, minor road network and from the A490 which is a tourist route to Lake Vyrnwy and Snowdonia from the Borders. Some long views to the north-east towards Breidden Hill, but views typically contained by the surrounding landform, woodlands and hedgerow trees.	The landscape is experienced from cottages on the edge of Bwlch-y-cibau, properties in the Meifod Valley, users of the A490 and A495 and footpaths in the parkland associated with Bryngwyn. The rising landform affords long views along the Meifod Valley particularly to the north-east.
12) Routeing Considerations	Although an overhead line would have to cross the valley, the width of the valley floor at this point means that pylons could potentially be located at the base of each valley sides. This would help reduce the perceived scale of the pylons and lessen effects on sensitive receptors. The cables would however remain highly visible and would affect views for users of the valley road. Particular care would have to be taken to lessen effects on Glyndwr's Way, which the line would have to cross and on Dolobran Hall. An existing 33 kV overhead line descends through the woodland on the southern valley side and crosses the valley floor before rising up through the fields on the northern valley side. Undergrounding this existing 33 kV line could potentially offer a route for the 400 kV line.	The broadly south-west to north-east orientation of this undulating landscape offers a potential route for an overhead line. The landform and woodland cover offers flexibility for routeing and scope to lessen the effect on the few sensitive receptors. The use of lower height pylons through this section may help minimise any effects on distant views.	The openness of the landscape as the Colwyn Valley widens out, combined with proximity to sensitive receptors including Bwlch-y-cibau, Bryngwyn and Bwlch-y-cibau Dyke means that an overhead line in this area would potentially be very prominent. The narrowness and openness of the shallow valley, gives little scope to reduce the perceived scale of the pylons and lessen the effects on these sensitive receptors, although the use of lower height pylons through this section may help minimise any effects on distant views.	This open sloping farmland offers little scope to lessen the effects of an overhead line on sensitive receptors, including Bwlch-y-cibau, Bwlch-y-cibau Dyke, Bryngwyn and the Meifod Valley. The pylons would be backclothed by the valley side and by woodland associated with the estate, but they would potentially be visible over a a wide area.
Assessment of Sensitivity				
13) Field Based Landscape & Visual Sensitivity to 400kV Overhead Line	This section of the Vyrnwy Valley offers some scope to lessen the effects of a new 400 kV overhead line,	The rural character of this section of corridor means that a new 400 kV overhead line would be an intrusive	A new 400 kV overhead line would be a prominent new. Because the valley is only shallow, there is little scope to	The elevation, openness and visibility of this section of corridor and proximity to sensitive receptors including Bwlch-

Section of Corridor (including wider landscape setting)	18: Vyrnwy Valley near Pontrobert (Wales)	19: Peniarth Valley (Wales)	20: Bwlch-y-cibau (Wales)	21: Bwlch-y-cibau to A495 (Wales)
	including the possibility of adopting an existing 33 kV corridor. Nevertheless a 400 kV overhead would be an intrusive new large scale feature crossing the valley. The cables would interrupt open views along the valley for road users. Although there are relatively few visual receptors, although these include Glyndwr's Way and the Grade II* listed Dolobran Hall, which increases its overall landscape and visual sensitivity. **HIGH**	landscape feature, which could give rise to adverse landscape effects. However there are fewer visual receptors compared to other sections of corridor, which reduces its overall sensitivity. The undulating landform and high tree cover offers scope to locate pylons so that their combined effect on the wider landscape and on views is lessened. The use of low height pylons would further help lessen the effects of the line on distant views. **MEDIUM - HIGH**	help reduce the perceived scale of the pylons. The adverse effects on the character of the landscape would be compounded by similar effects on highly sensitive visual receptors including Bwlch-y-cibau, Bryngwyn and Bwlch-y-cibau Dyke. **VERY HIGH**	y-cibau, Bwlch y cibau Dyke and Bryngwyn make it highly sensitive to a new 400 kV overhead line. **VERY HIGH**

APPENDIX 6.2

Visibility Overview Map



Key:

- Visual Receptor within the study area. Refer to supporting table for summary of nature of views
- Visual Receptor within the study area (group). Refer to supporting table for summary of the nature of views
- Visual Receptors have an open view of part of the area shaded in blue (Route Corridor) and would therefore potentially see a new 400kV line within the corridor
- Visual Receptors have a filtered view of part of the area shaded in blue (Route Corridor) and would therefore potentially have a filtered view of a new 400kV line within the corridor
- Visual Receptors have no/negligible view of any part of the area shaded in blue (Route Corridor) and therefore are unlikely to be affected by a new 400kV line within the corridor
- Users of roads (or key footpaths/canals) have an open view of part of the area shaded in blue (Route Corridor) and would therefore potentially see a new 400kV line within the corridor
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- Receptors within the zones shown typically have open views of part of the area shaded in blue (Route Corridor) and would therefore potentially see a new 400kV line within the corridor
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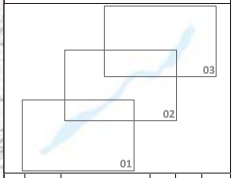
- Preferred Route Corridor
- Existing 132kV overhead line
- Existing 400kV overhead line
- Preferred route corridor - 0.5km Buffer
- Preferred route corridor - 3km Buffer

Note: Typical zones are indicative based on receptor analysis and desk based analysis. These have been defined for the wider area outside the 0.5km buffer and relate to distant views.



Rev	Date	Detail	Made	Chk'd	App'd

Project:
M4906-6
Mid Wales EIA-Visibility Overview

Drawing Title:
Visibility Appraisal -
Preferred Route Corridor
Plan 03 of 03

Drawn:	WF	Sheet Size:	A0 (1189mm x 841mm)
Checked:	SH	Date:	25/10/2012
Approved:	SG	Scale:	1:25,000

Drawing File Location:
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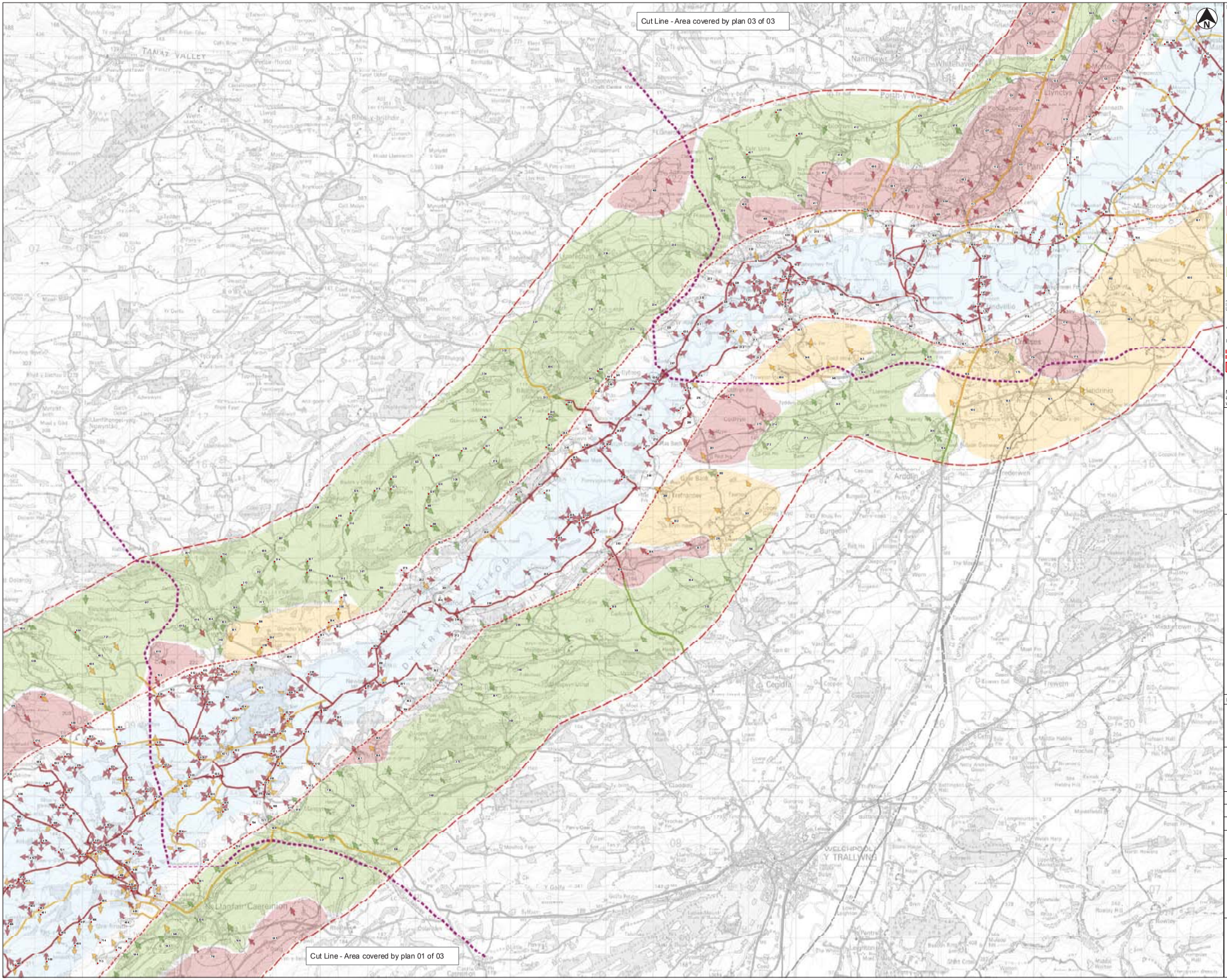

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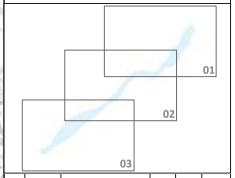
Note: Typical zones are indicative based on receptor analysis and desk based analysis. These have been defined for the wider area outside the 0.5km buffer and relate to distant views.



Rev	Date	Detail	Made	ChKd	Apg'd

Project:
M4906-6
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Drawing Title:
Visibility Appraisal -
Preferred Route Corridor
Plan 02 of 03

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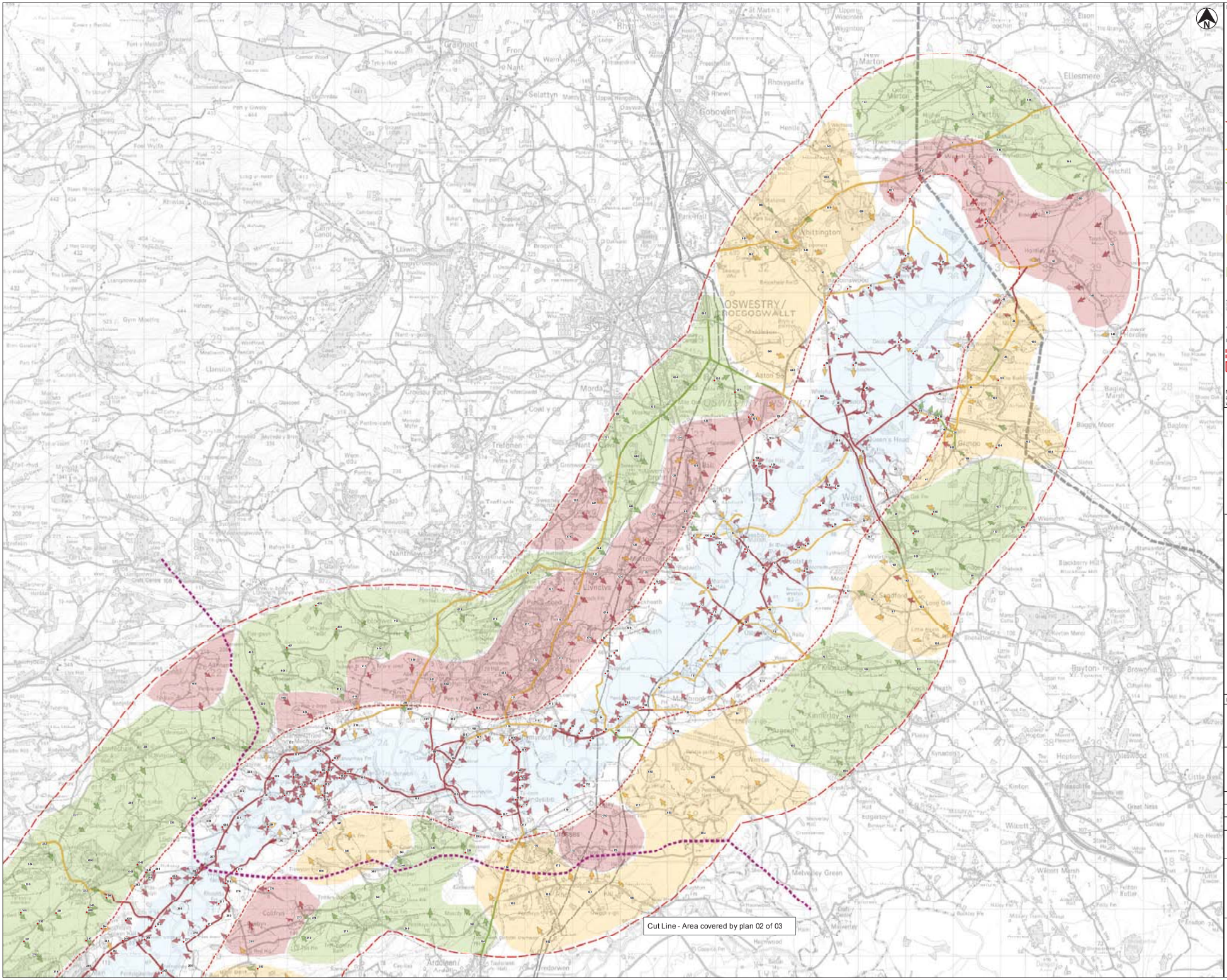

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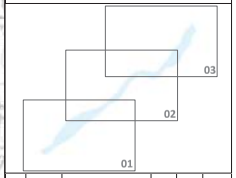

Rev	Date	Detail	Made	Chk'd	App'd

Project:
M4906-6
Mid Wales EIA-Visibility Overview

Drawing Title:
Visibility Appraisal -
Preferred Route Corridor
Plan 03 of 03

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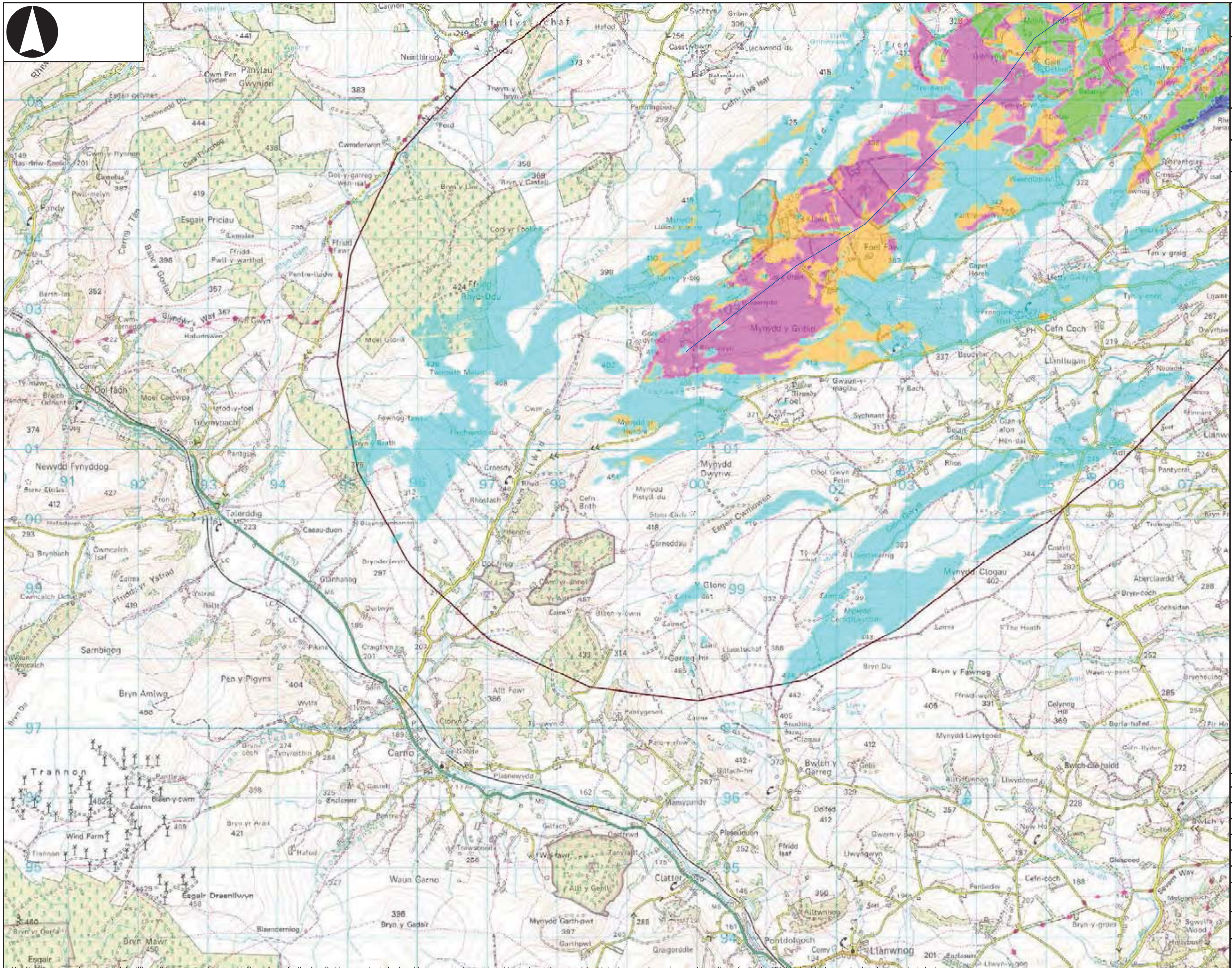
APPENDIX 6.3

Zone of Theoretical Visibility



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Rheoliad / Regulation:

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Teitl / Title:

5km ZTV (Zone of Theoretical Visibility)

Allwedd / Legend:

KEY:

Proposed Route Option

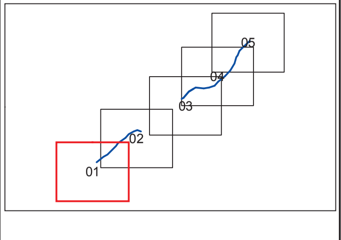
ZONE OF THEORETICAL VISIBILITY (ZTV) TECHNICAL NOTES:

ZTV layer created using OHL Route option, based on L8 tower locations and individual tower heights

ZTV Radius: 5,000m - Beyond this distance it is considered that effects would not be significant. A 10km ZTV will be undertaken on the final alignment to understand potential distant views.

Elevation information used for the production of ZTV layers based on Nextmap 5m resolution Synthetic Aperture RADAR (SAR) generated Digital Terrain Model (DTM) with a height accuracy of +/-1m.

- 1-6 Towers Visible
- 7-12 Towers Visible
- 13-18 Towers Visible
- 19-24 Towers Visible
- 25-30 Towers Visible
- 31-36 Towers Visible



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Cyfeirnod Lluniad National Grid / National Grid Drawing Ref:
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Cyfeirnod Lluniad y Cychwynnydd / Originator Drawing Ref:
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Tynnwyd / Drawn:	Gwiriwyd / Checked:	Cymeradwywyd / Approved:	Fersiwn / Version:	Dyddiad / Date:
PL	HJ	HJ	A	21/05/2014

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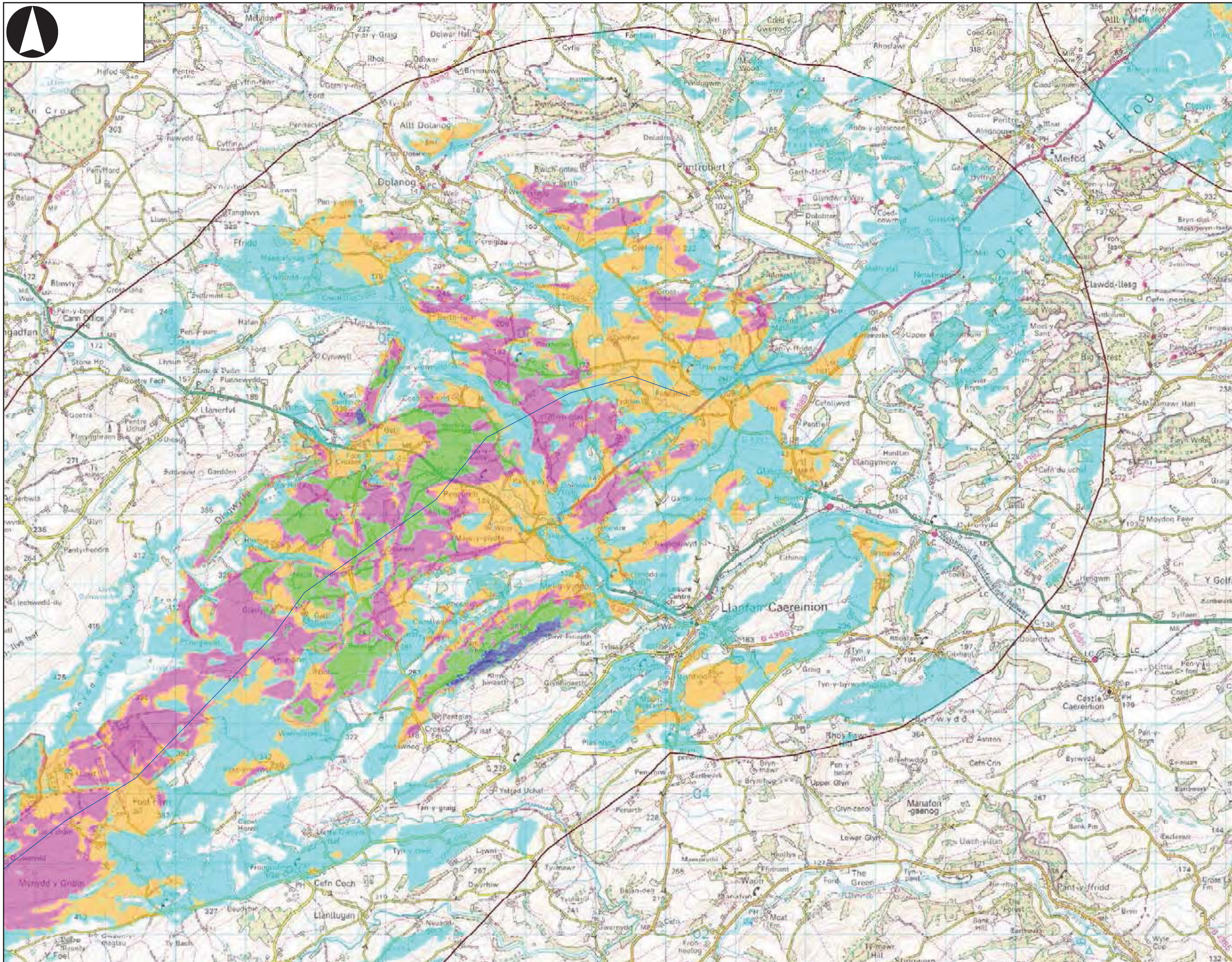

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Rheoliad / Regulation:
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Teitl / Title:
5km ZTV (Zone of Theoretical Visibility)

Allwedd / Legend:

KEY:

Proposed Route Option

ZONE OF THEORETICAL VISIBILITY (ZTV) TECHNICAL NOTES:

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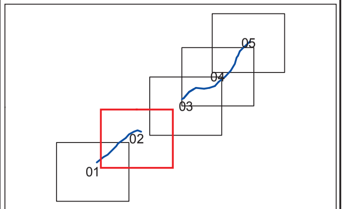

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Cyfeirnod Lluniad y Cychwynnydd / Originator Drawing Ref:
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Tynnwyd / Drawn:	Gwiriwyd / Checked:	Cymeradwywyd / Approved:	Fersiwn / Version:	Dyddiad / Date:
PL	HJ	HJ	A	21/05/2014

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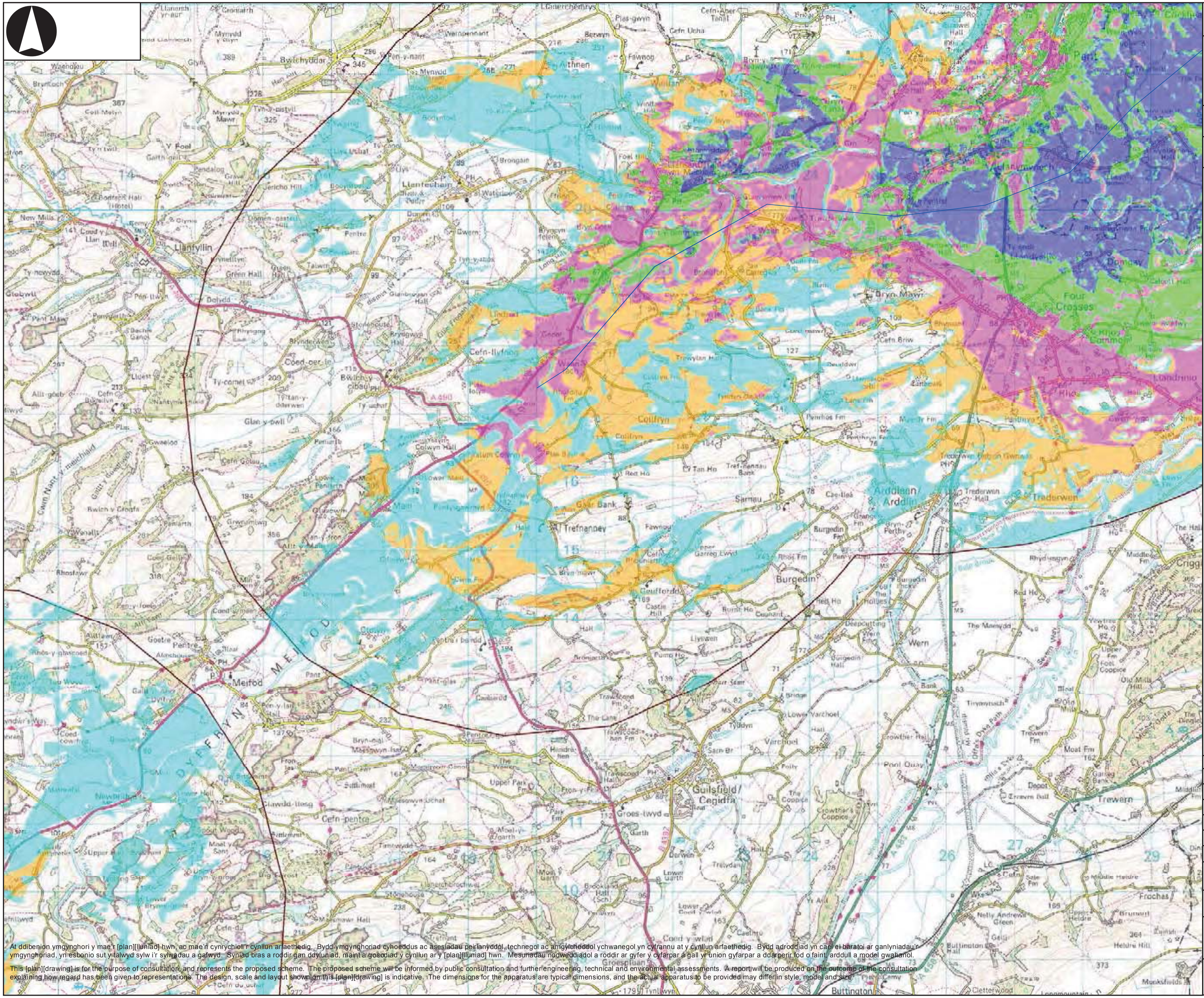

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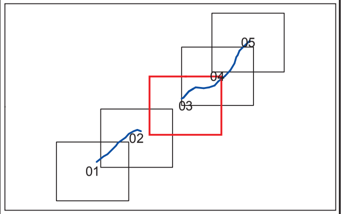

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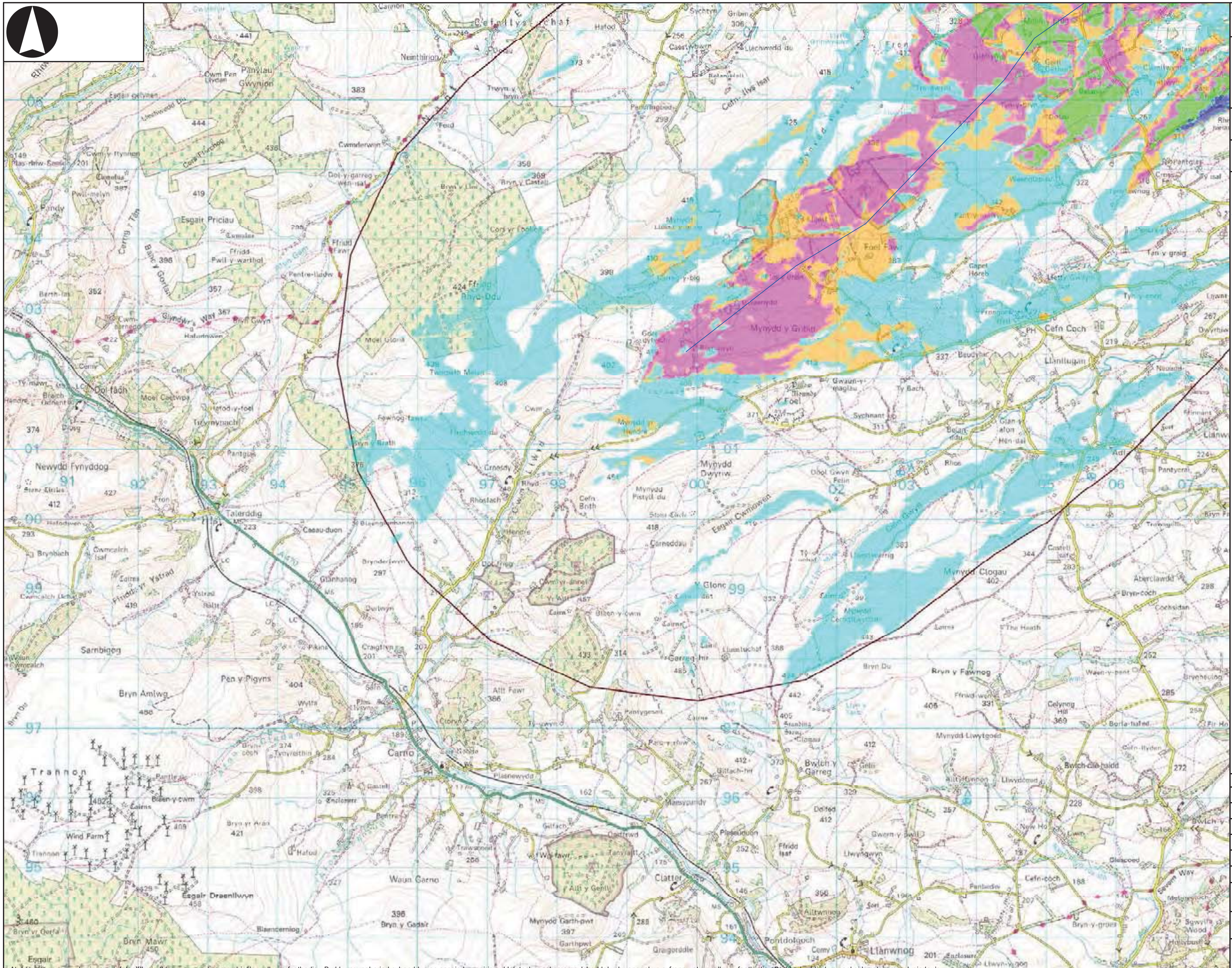

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Rheoliad / Regulation:
-

Teitl / Title:

5km ZTV (Zone of Theoretical Visibility)

Allwedd / Legend:

KEY:

Proposed Route Option

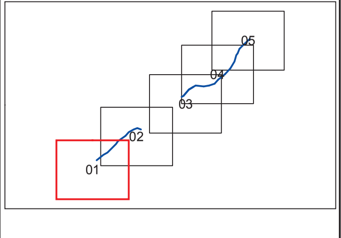
ZONE OF THEORETICAL VISIBILITY (ZTV) TECHNICAL NOTES:

ZTV layer created using OHL Route option, based on L8 tower locations and individual tower heights

ZTV Radius: 5,000m - Beyond this distance it is considered that effects would not be significant. A 10km ZTV will be undertaken on the final alignment to understand potential distant views.

Elevation information used for the production of ZTV layers based on Nextmap 5m resolution Synthetic Aperture RADAR (SAR) generated Digital Terrain Model (DTM) with a height accuracy of +/-1m.

- 1-6 Towers Visible
- 7-12 Towers Visible
- 13-18 Towers Visible
- 19-24 Towers Visible
- 25-30 Towers Visible
- 31-36 Towers Visible



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Cyfeirnod Lluniad National Grid / National Grid Drawing Ref:
XX

Cyfeirnod Lluniad y Cychwynnydd / Originator Drawing Ref:
M9404/1

Tynnwyd / Drawn:	Gwiriwyd / Checked:	Cymeradwywyd / Approved:	Fersiwn / Version:	Dyddiad / Date:
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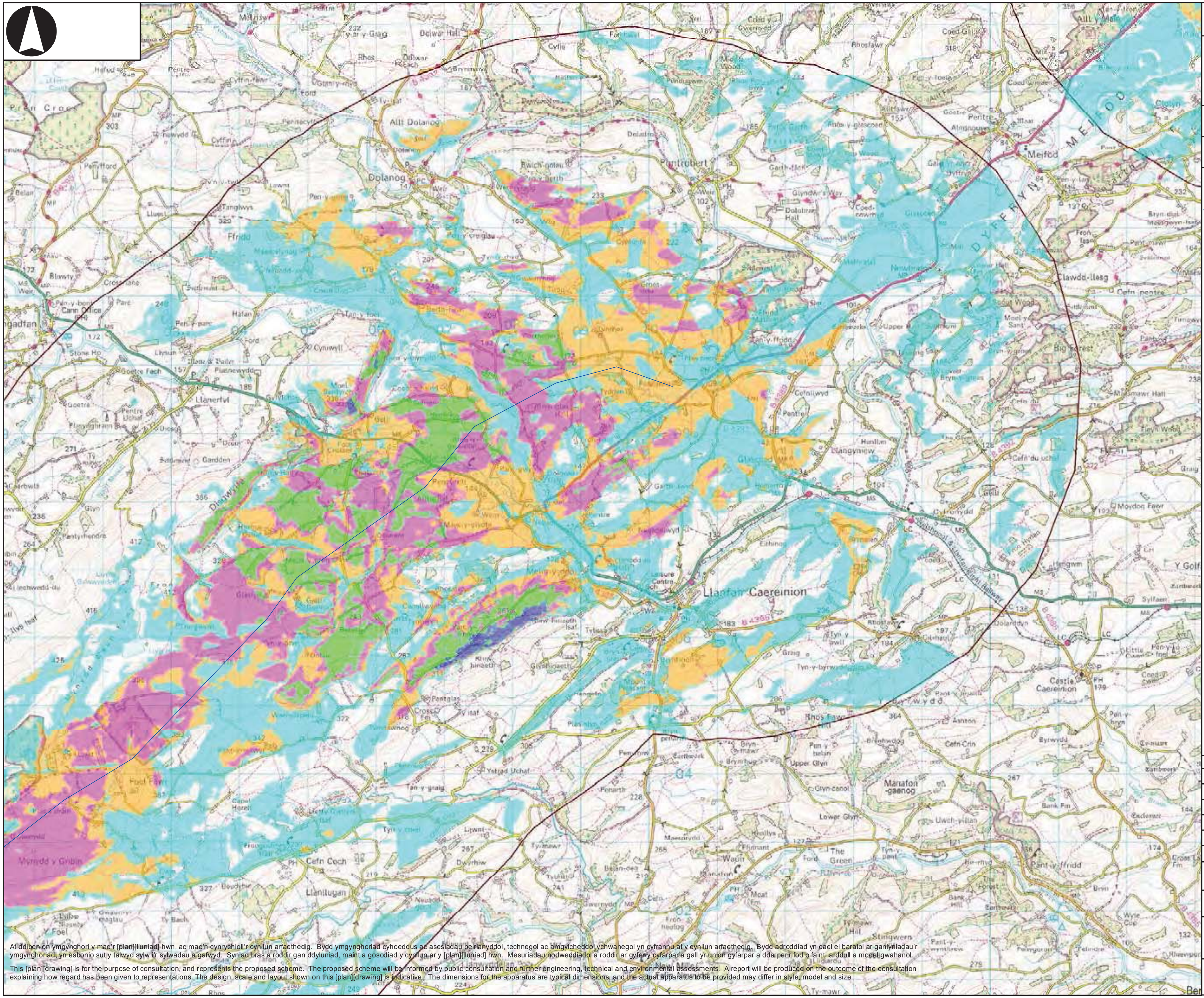

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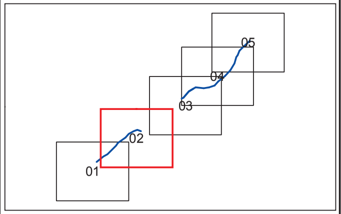

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APPENDIX 6.4

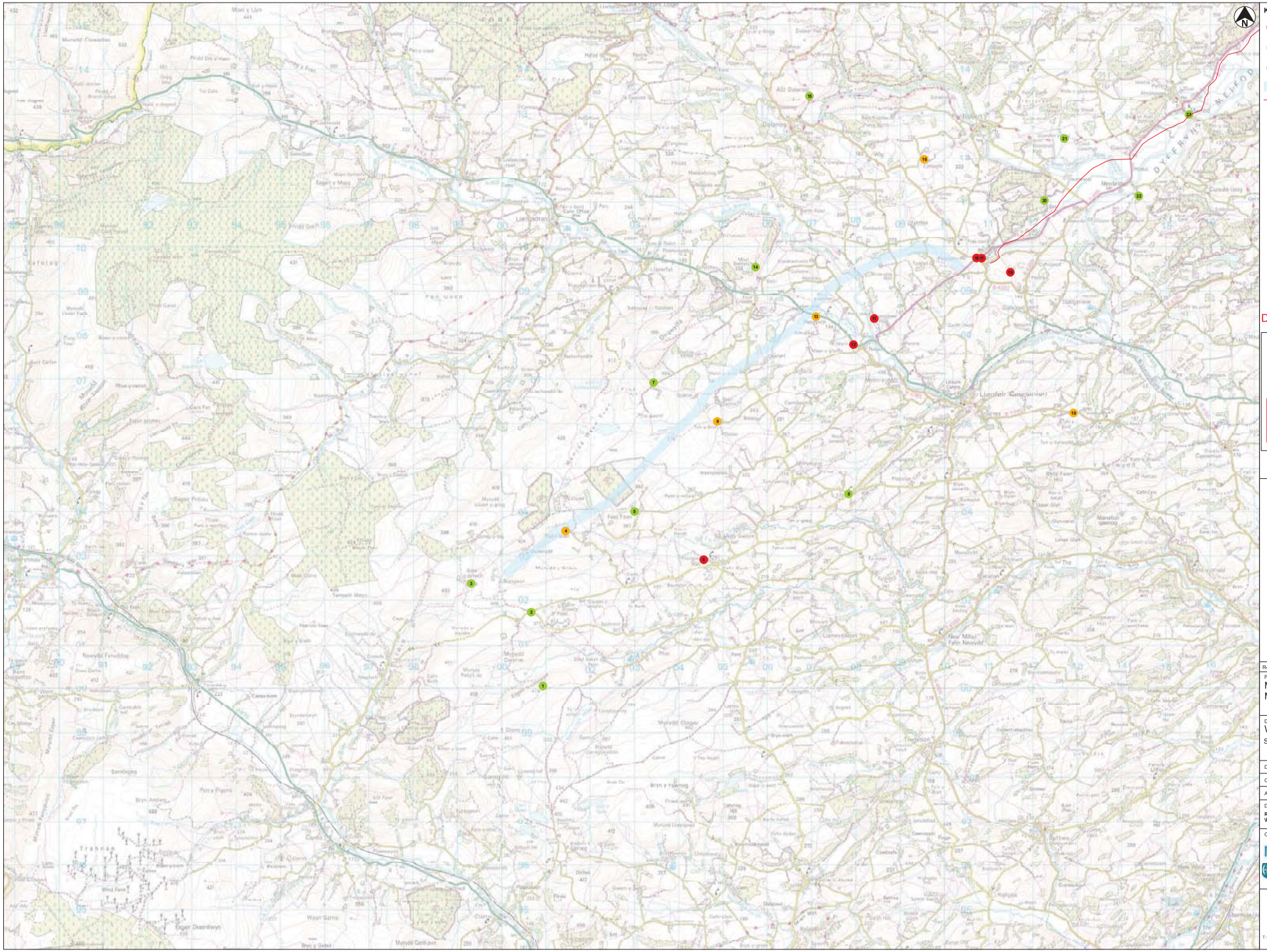
Proposed Viewpoint Locations

Ref.	Description / Location	General direction of view	Reason for selection	North /South of line
1	Public footpath onto summit of Esgair Cwmowem	north	Public right of way (footpath) on elevated land south of proposed substation	south
2	Minor road leading to Carno		minor road	south
3	Public footpath near Gors-dyfwch (property)	east	property, public right of way (footpath) close to proposed substation	south
4	Outdoor Pursuits Centre (Red Ridge Centre)	north east	recreational resource	south
5	Public footpath on northern slope of Foel Fawr	north west	public right of way (footpath), local landmark	south
6	Public footpath near Frongoch Hall on the edge of Cefn Coch village	north west	settlement	south
7	Property and end of minor road on southern slopes of Disgwylfa		Property, minor road	north
8	Ystrad Uchaf (settlement)		Properties, junction of minor road, distant elevated vantage point settlement	south
9	Bridleway close Tyn-y-bryn (property)		Property, public right of way (bridleway and footpath)	south
10	Junction of B4385 with minor road east Llanfair Caereinion	north west	Property (close to), minor road	south
11	Footpath near Dolgead Hall		Public right of way (footpath), Caravan Park	south
12	A458 near Caravan Park in valley of Afon Einion	north west	close to caravan park, tourist route	south
13	A458 near Pentyrch (property) and view towards Moel Bentyrch		Property, tourist route	south
14	Footpath near summit of Moel Bentyrch		Public right of way (footpath), important viewpoint and local landmark	north
15	Distant elevated vantage point on National Trail (Glyndwr's Way) close to Allt Dolanog Hillfort	south	national trail, cultural heritage receptor	north
16	Caravan park (Parc Cynhinfa) close to Cynhinfa, south west of Pontrobert		caravan park, public rights of way (footpaths)	north
17	Junction of A495 with B4382 south of Ffridd Mathrafal	west / north west	Tourist route, view of sealing end compound	north
18	Junction of A495 with B4382 south of Ffridd Mathrafal	north east	Tourist route, view of sealing end compound	north
19	Footpath near B4382		Close to properties, close to fort (Scheduled Ancient Monument)	south

Ref.	Description / Location	General direction of view	Reason for selection	North /South of line
20	Bridleway close to eastern edge of Ffridd Mathrafal		Property, public right of way, construction effects of undergrounding	north
21	Glyndwr's Way west of Meifod Valley		National Trail, construction effects of undergrounding	north
22	Footpath near Newbridge		Public right of way (footpath), construction effects of undergrounding	south
23	Glyndwr's Way on edge of Meifod village		Settlement, National Trail view along Meifod Valley towards Sealing End Compound	north
24	Glyndwr's Way on Broniarth Hill		National Trail, elevated view along Meifod Valley towards Sealing End Compound	south
25	Properties near junction of A490 with A495		Properties, listed buildings, tourist route, view along Meifod Valley towards Sealing End Compound	north
26	Properties at Geuffordd	north	Elevated properties	south
27	A495 near Fferm		Property close to Sealing End Compound	north
28	Properties at Collfryn	north	Elevated properties	south
29	Properties near Cefn-llyfnog at junction of footpaths with minor road		Properties, public right of way, elevated viewpoint	north
30	A495 near Godar (property)		View from road users	north
31	Bridleway on east side of Long Hill	east	Elevated viewpoint, Scheduled Ancient Monument	north
32	Junction of bridleway and footpath near property		Property, public rights of way, elevated viewpoint close to Scheduled Ancient Monument	south
33	Properties on edge of Llansantffraid-yn-Mechain		edge of settlement	north
34	Minor lane on western side of Foel Hill close to Scheduled Ancient Monument		Elevated viewpoint looking down Afon Cain Valley, Scheduled Ancient Monument	north
35	Footpath near Aithnen (property)		Property, distant elevated viewpoint	north
36	View from hill north of Bronhyddon		Property, elevated viewpoint	north
37	A495 near Bryn Vrynwy Farm		Edge of settlement, caravan park, elevated viewpoint looking east along Vrynwy flood plain	north
38	B4373 east of Llansantffraid-yn-Mechain		Properties, caravan park	south
39	View from Offa's Dyke National Trail on B4398 near Wern	east / west	National Trail, canal towpath	on
40	Rodney's Pillar on summit of Breidden Hill		Local landmark, public right of way, elevated viewpoint	south
41	Close to junction of Offa's Dyke National Trail with Severn Way Regional Trail		National / regional trail, public right of way, distant view looking toward Llanymynech Hill	south

Ref.	Description / Location	General direction of view	Reason for selection	North /South of line
42	Offa's Dyke on canal towpath near Llandysilio		National Trail, canal towpath, public right of way, close to properties	south
43	A483 between Llandysilio and Llanymynech		Properties, road users looking toward Llanymynech Hill	south
44	Offa's Dyke on B4398 in Llanymynech near Walls Bridge		Settlement, National Trail	north
45	B4398 on eastern edge of Llanymynech		Properties, road users	north
46	Offa's Dyke National Trail on Llanymynech Hill		National Trail, public right of way, Scheduled Ancient Monument, local heritage area	north
47	Junction of bridleway and footpath on eastern edge of Pant		Settlement, public rights of way	north
48	Public right of way at Maesbrook		Settlement, public rights of way	south
49	Junction of bridleway with B4396 on western edge of Knockin		Settlement, public rights of way	south
50	Junction of footpaths west of Osbaston		Close to settlement, public rights of way	south
51	Public right of way near mill on edge of Morton		Properties, public rights of way close to line of canal	north
52	Junction of public rights of way with minor road at Maesbury		Properties, public rights of way	north
53	Southern edge of Oswestry near Wat's Dyke		Settlement, Cultural heritage receptor, heritage trail	north
54	Footpath near Bromwich		Property, Scheduled Ancient Monument, public right of way	north
55	Junction of public rights of way with minor road near Lady Hill Farm at West Felton		Property, public rights of way	south
56	Towpath of Montgomery and Shropshire and Union Canal near Maesbury March		Settlement, public rights of way, canal	north
57	Public right of way on northern edge of Woolston		Settlement, public rights of way	south
58	Canal towpath at Queen's Head picnic area	north west	Properties, picnic area, public right of way, canal	south
59	Junction of footpaths near Aston Hall		Public rights of way, Aston Hall estate	north
60	Footpath close to Oswestry Golf Club club house and golf course		Public right of way, golf course	south
61	View from A5		Road users	north
62	Junction of footpaths and minor road near Sutton		Properties, public rights of way	south
63	Junction of footpaths at Pradoe		Registered Park and Garden, properties, public rights of way	south
64	Footpaths at Tedsmore Hall Estate		Properties, public rights of way	south

Ref.	Description / Location	General direction of view	Reason for selection	North /South of line
65	Canal towpath where it crosses River Perry north west of Woodhouse		Public right of way	south
66	Minor road near Rednal Mill close to Woodhouse and Woodhouse Estate		Close to properties, road users	south
67	A495 near Drenewydd between Oswestry and Whittington		Settlement	north
68	Junction of footpath with B5009 between Whittington and Babbinswood		Public right of way (footpath)	north
69	Minor road at Berghill Cottages close to Halston Hall		Properties	north
70	A495 at Welsh Frankton		Settlement, elevated viewpoint towards junction of proposed route with existing overhead line	north
71	Minor road at Lower Frankton close to canal bridge		Settlement, canal bridge, close to picnic area	south
72	Minor road at Kenwick Park			south
73	Public right of way at Nesscliffe Hill Country Park and close to The Cliffe		Country Park, recreation, elevated viewpoint	south
74	Footpaths on Sweeney Mountain		Public rights of way, distant elevated viewpoint	north



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M4906-2
Mid Wales EIA - LVIA

Drawing Title:
Winter Viewpoints Selection
Sheet 01 of 03

Drawn: PL	Sheet Size: A1 (841mm x 594mm)
Checked: HJ	Date: 26/02/2014
Approved: HJ	Scale: 1:30,000

Drawing File Location:
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Client:
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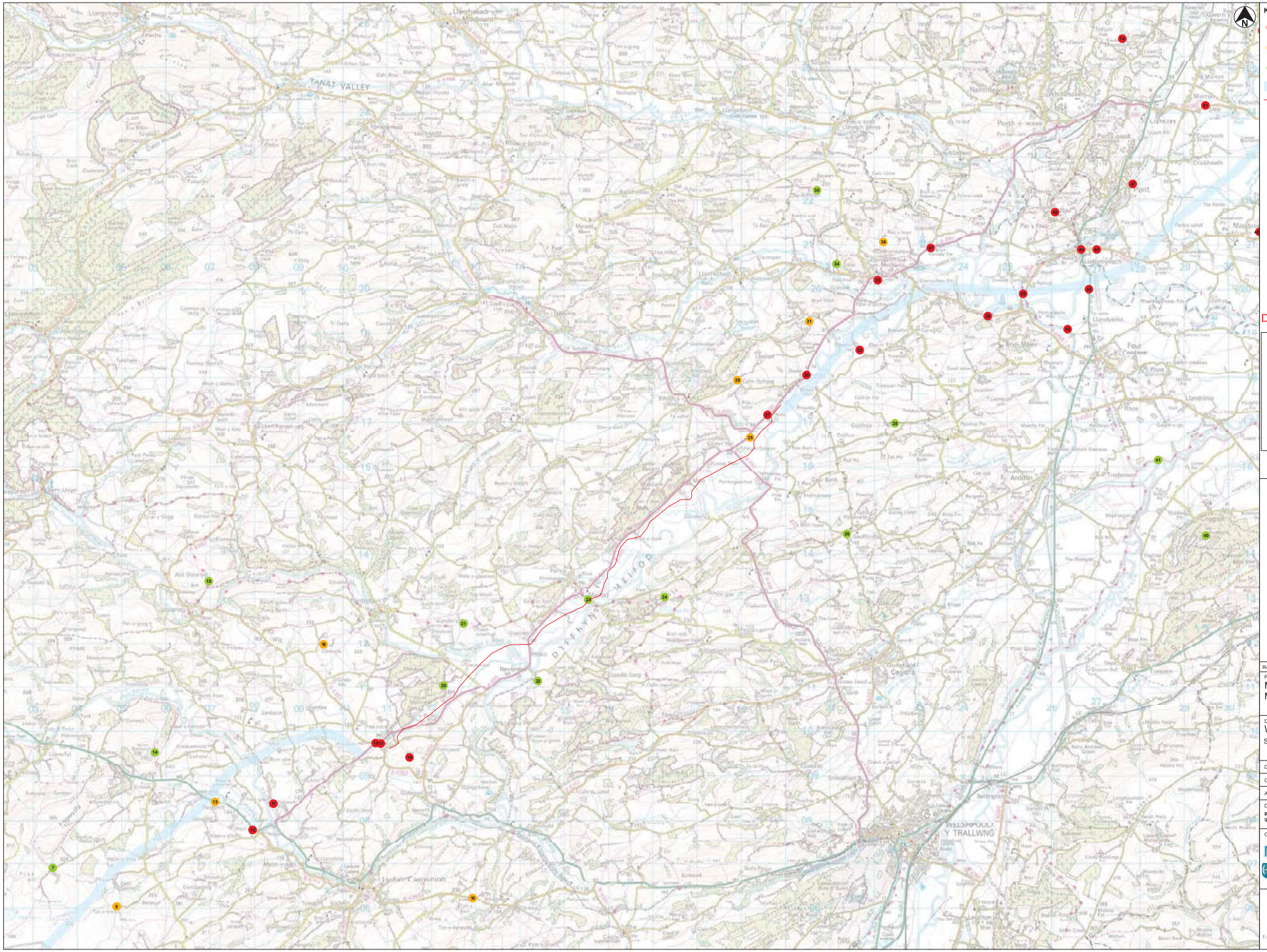

Key:

- winter
- spring
- summer
- Proposed Alignment
- Proposed Underground Route

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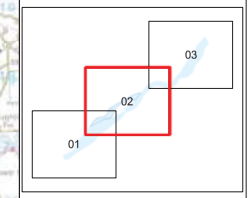

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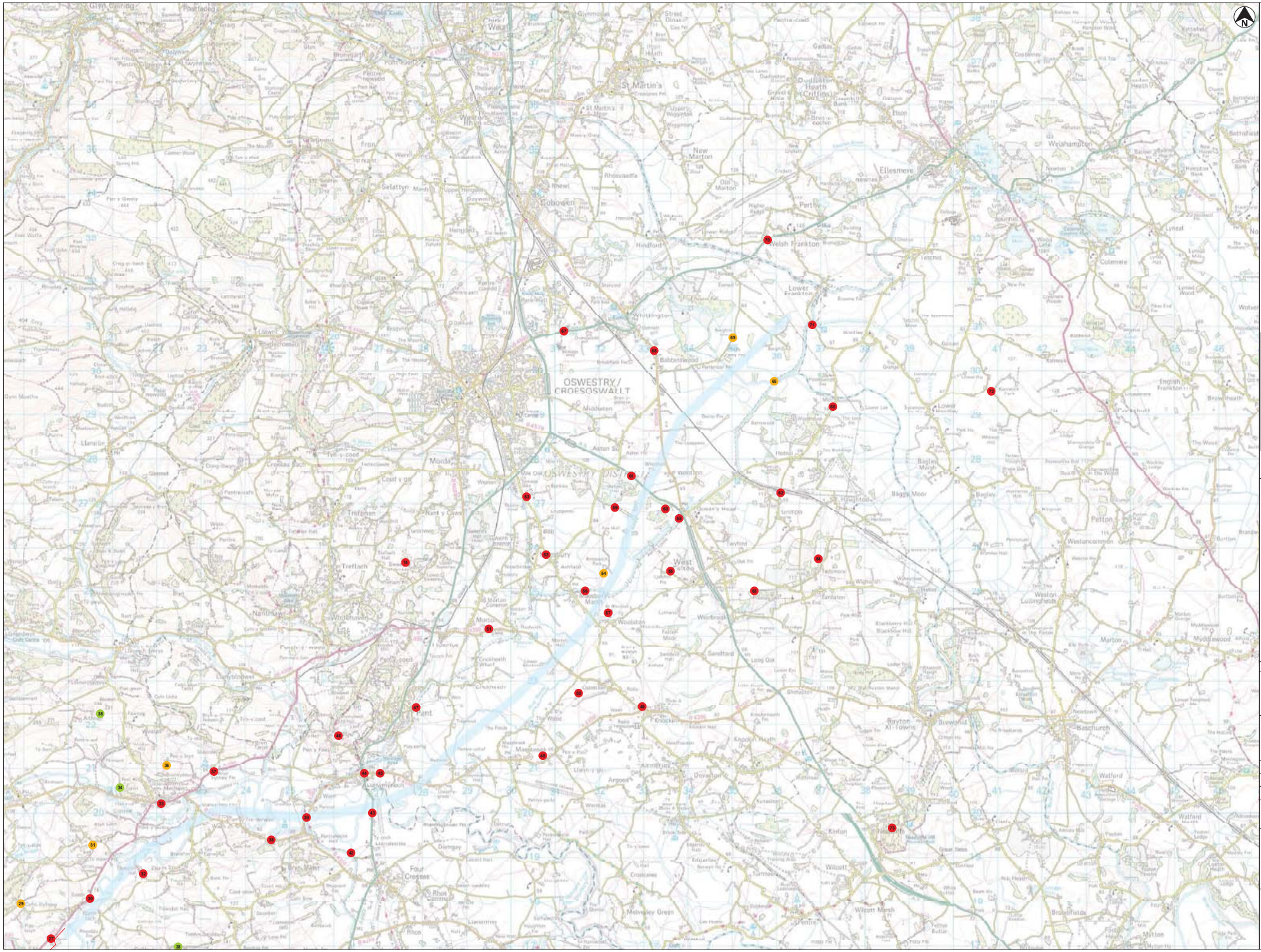

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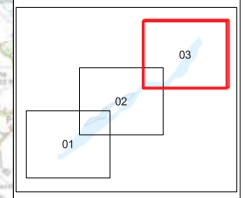

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APPENDIX 8.1

Summary of Relevant Ecological Legislation

Statutory Wildlife Sites

Statutory wildlife sites are those which have protection in law, at international and/or national level, including:

- Special Protection Areas for birds (SPAs) and Wetlands of International Importance (Ramsar sites) are identified under various European Community Directives and international conventions.
- Special Areas of Conservation (SACs) are designated by the UK Government under EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive).
- Sites of Special Scientific Interest (SSSI) are areas of land notified by Natural England under Section 28 of the Wildlife and Countryside Act 1981 as being of special value for nature conservation.

Legally Protected Sites

Legally protected species are those with statutory protection according to the following legal Acts and Regulations, including:

- The Wildlife and Countryside Act 1981 (as amended) gives general protection measures for wildlife and special measures for species included on Schedules of the Act.
- The Countryside and Rights of Way Act (2000) amends the Wildlife and Countryside Act to also make it an offence to intentionally or recklessly damage, destroy or obstruct a place that a species, listed on schedules of the Wildlife and Countryside Act, use for shelter or protection.
- The Protection of Badgers Act (1992); and
- The European Communities Council Directive on the Conservation of Natural Habitats and Wild Fauna and Flora (implemented in the UK by the Conservation of Habitats and Species Regulations 2010).

BAP Habitats & Species (Habitats & Species of Principal Importance for Biodiversity Conservation)

Legal reference for Biodiversity Action Plan Species and Habitats is given under Section 41 of the Natural Environment and Rural Communities Act (2006). The Secretary of State must, as respects England, publish a list of the living organisms and types of habitat which are of principal importance for the purpose of conserving biodiversity. Further, the Secretary of State must take steps and promote the taking of steps by others, to further the conservation of the habitats and species on the list. This provision reapplied Section 74 of the Countryside and Rights of Way Act, under which DEFRA published a list in 2002 which was identical with the UK BAP list at the time.

The following table is an overview of protected species protection and licensing.

Species	Legislation (England & Wales)	Offences	Licensing procedures (England & Wales)
Bats *European protected species*	The Conservation of Habitats and Species Regulations 2010 Reg.41	Deliberately: capture, injure or kill a bat; deliberate disturbance of bats; or damage or destroy a breeding site or resting place used by a bat. [The protection of bat roosts is considered to apply regardless of whether bats are present.]	A Natural England (NE) licence in respect of development is required in England or a licence from the Welsh Assembly Government in consultation with Countryside Council of Wales (NRW) in Wales. European Protected Species Guidance Note (NE 2009) Bat Mitigation Guidelines (English Nature 2004) Bat Workers Manual (JNCC 2004)
	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb a bat in such a place.	Licences issued for science (survey), education and conservation by Natural England or the Countryside Council for Wales.
Badger	Protection of Badgers Act 1992	Intentionally kill, injure or take a badger; disturb a badger in its sett; or intentionally or recklessly damage, destroy or obstruct access to a badger sett. [It is not illegal to carry out disturbance activities in the vicinity of setts that are not occupied.]	Licences for development activities involving disturbance or sett interference or closure are issued by Natural England (NE) or Natural Resources Wales (NRW). Licences for activities involving watercourse maintenance, drainage works or flood defences are issued under a separate process. A licence may be required for any work within the vicinity of a sett that is likely to cause disturbance to badgers. Licences are not granted from December to June inclusive because cubs may be present within setts. Badgers & Development (NE 2007)
Dormouse *European protected species*	The Conservation of Habitats and Species Regulations 2010 Reg.41	Deliberately capture, injure or kill a dormouse; deliberate disturbance of a dormouse; or damage or destroy a breeding site or resting place used by a dormouse.	A Natural England licence in respect of development is required in England of from the Welsh Assembly Government in consultation with the Natural Resources Wales (NRW) in Wales. European Protected Species Guidance Note (NE 2009) Dormouse Conservation Handbook (English Nature 2006)
	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb a dormouse in such a place.	Licence issued for survey and conservation by Natural England or Natural Resources Wales.

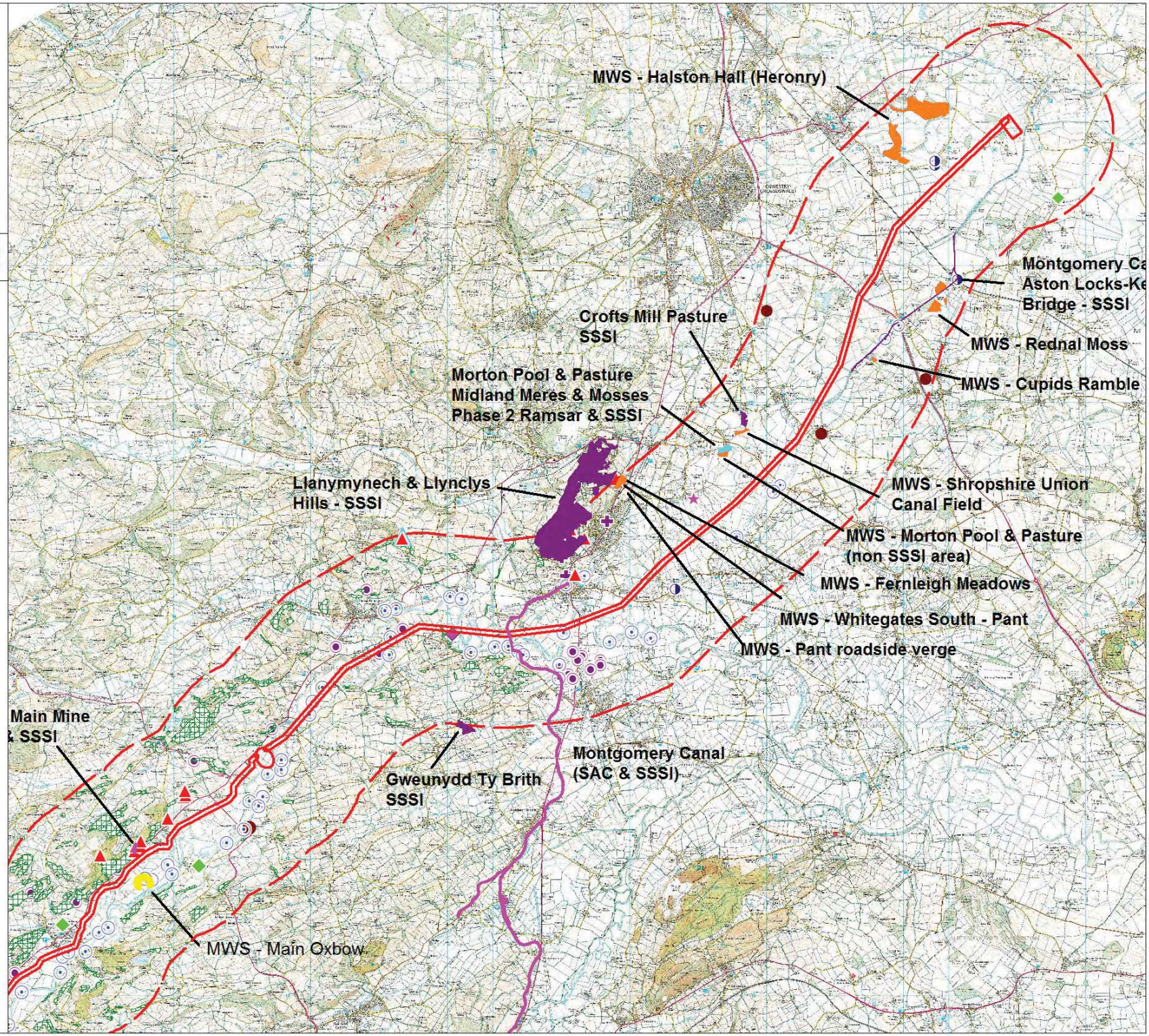
Water vole	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally kill, injure or take water voles; intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection or disturb a water vole in such a place.	No licence is required for survey in England or Wales, unless you are likely to commit an action that is otherwise illegal. There are currently no licensing purposes that explicitly cover development activities or activities associated with the improvement or maintenance of waterways. However when a proposed lawful activity has no opportunity to retain water voles within a development site and their translocation would result in conservation benefit then a licence from Natural England or the Natural Resources Wales may be obtained. The Water Vole Conservation Handbook (R. Strachan & T. Moorhouse, Wildlife Conservation Research Unit, 2nd Edition 2006) England: Water voles and development licensing policy -NE Technical Information Note TIN042 2008 http://naturalengland.communisis.com/naturalenglandshop/docs/ne86.pdf Wales: Water Voles – Guidance for recent legislation changes (2008) http://new.wales.gov.uk/topics/environmentcountryside/consmanagement/conservation_biodiversity/watervoles/?lang=en
Otter *European protected species*	The Conservation of Habitats and Species Regulations 2010 Reg.41	Deliberately capture, injure or kill an otter; deliberate disturbance of an otter; or damage or destroy a breeding site or resting place used by otter.	A Natural England licence in respect of development is required in England of from the Welsh Assembly Government in consultation with the Natural Resources Wales (NRW) in Wales. Ecology of the European Otter, Natural England, 2003 Monitoring the European Otter, Natural England, 2003
	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb otter in such a place.	Licence issued for survey and conservation by Natural England or Natural Resources Wales.
Red squirrel	Wildlife and Countryside Act 1981 (as amended) S.5	Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb red squirrel in such a place.	Licence issued for survey and conservation by Natural England or Natural Resources Wales.
	Natural Environment and Rural Communities Act 2006, S41		A species of Principal Importance for the conservation of biodiversity in England A Natural England licence in respect of development is required in England of from the Welsh Assembly Government in consultation with the Natural Resources Wales (NRW) in Wales. Gurnell J, Lurz P, McDonald R and Pepper H (2009) Practical Techniques for Surveying and Monitoring Squirrels. Practice Note. Forestry Commission, Edinburgh.

Birds	Wildlife and Countryside Act 1981 (as amended) S.	Intentionally 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; intentionally take or destroy the nest or eggs of any wild bird. [Special penalties are liable for these offences involving birds on Schedule 1 (e.g. most birds of prey, kingfisher, barn owl, black redstart, little ringed plover).]	Licence issued for survey and conservation by Natural England or Natural Resources Wales (Schedule 1 species). No licences are available to disturb any birds in regard to development.
Great crested newt *European protected species*	The Conservation of Habitats and Species Regulations 2010 Reg.41	Deliberately capture, injure or kill a great crested newt; deliberate disturbance of a great crested newt; deliberately take or destroy its eggs; or damage or destroy a breeding site or resting place used by a great crested newt.	Licences issued for development by Natural England or from the Welsh Assembly Government in consultation with the Natural Resources Wales. European Protected Species Guidance Note (NE 2009) Great Crested Newt Mitigation Guidelines (English Nature 2001)
	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb a great crested newt in such a place.	Licences issued for science (survey), education and conservation by Natural England or the Natural Resources Wales.
Reptiles: Common lizard Slow worm	Wildlife and Countryside Act 1981 S.9(1) (part); S.9(5)	Intentionally kill or injure any common reptile species.	No licence is required in England or Wales. However an assessment for the potential of a site to support reptiles should be undertaken prior to any development works which have potential to affect these animals.
White-clawed crayfish	Wildlife and Countryside Act 1981 S.9(1) (part) only	Intentionally take from the wild. Licences issued for survey by Natural England and by the Natural Resources Wales.	No licences in respect of development are available. Trapping and removal of crayfish for maintenance or development activities in a watercourse requires a conservation licence from Natural England or Natural Resources Wales and a permit from the Environment Agency.
Japanese knotweed, giant hogweed and additional species added in April 2010	Wildlife and Countryside Act 1981 S.14	Plant or otherwise cause to grow in the wild.	Any Japanese knotweed/giant hogweed contaminated soil or plant material is classified as controlled waste and should be disposed of in a suitably licensed landfill site, accompanied by appropriate Waste Transfer documentation, and must comply with section 34 of the Environmental Protection Act 1990. The Knotweed Code of Practice (Environment Agency 2006)

APPENDIX 8.2

Ecological Scoping Plan

Mid Wales Connection Ecological Scoping Report Plan



N

Drawn By: CW	Date: Oct 2013	howland ecology
Checked By: JJ	Scale: NTS	

Legend

- Route Corridor
- 2 Km Buffer
- Ramsar
- SAC
- SSSI
- Shropshire County Wildlife Site Line
- Montgomeryshire Wildlife Site
- Ancient Woodland
- Otter
- Water Vole
- White Clawed Crayfish
- Great Crested Newt
- Badger
- Barn Owl
- Dormouse
- Greater Horseshoe Bat
- Lesser Horseshoe Bat
- Heronry

Due to the quantity of bat records only those for Greater and Lesser Horseshoe Bats are included

Mid Wales Connection Ecological Scoping Report Plan

Drawn By: CW Checked By: JJ	Date: Oct 2013 Scale: NTS	howland ecology

Legend

- Route Corridor
- 2 Km Buffer
- Ramsar
- SAC
- SSSI
- Shropshire County Wildlife Site Line
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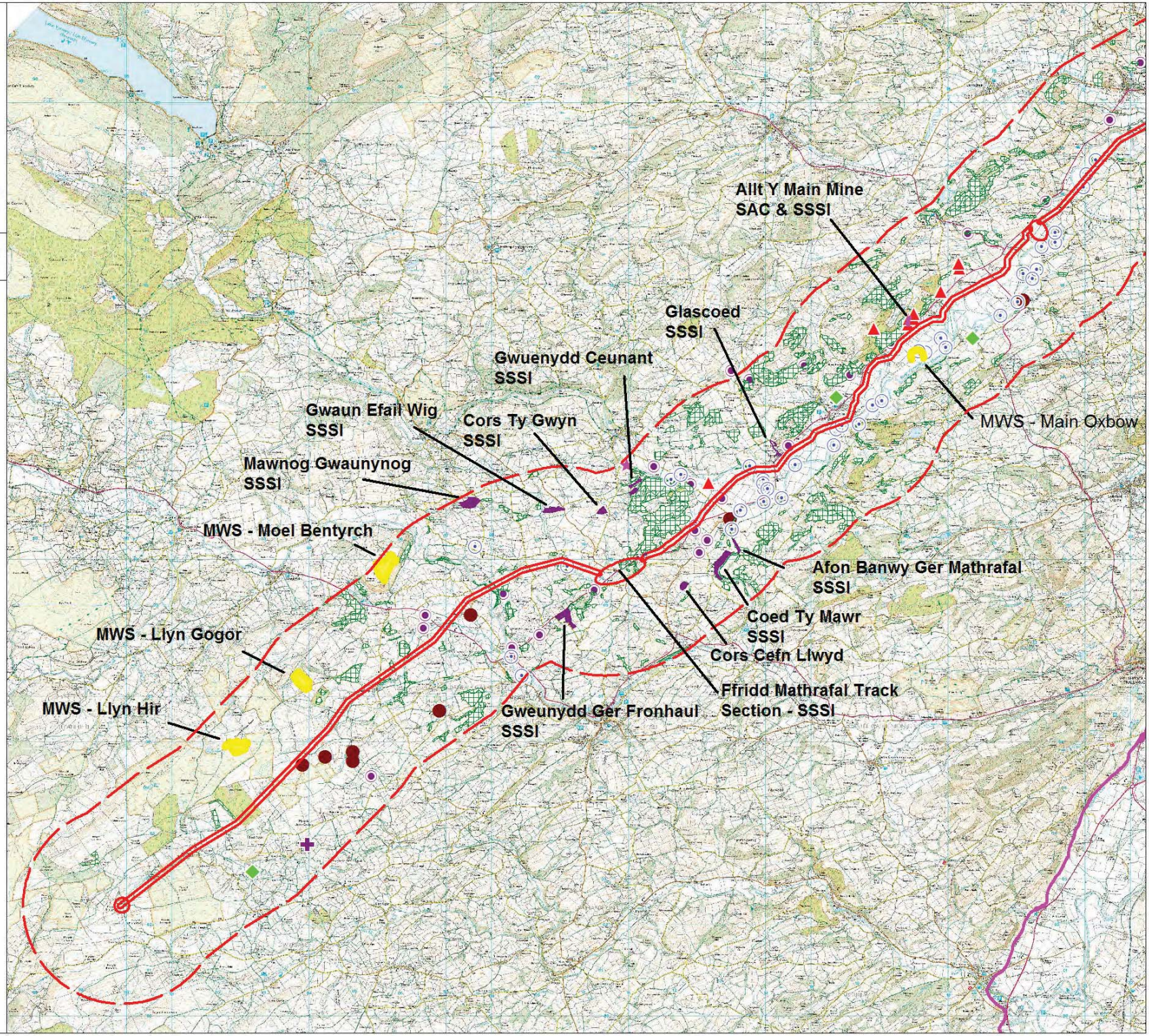
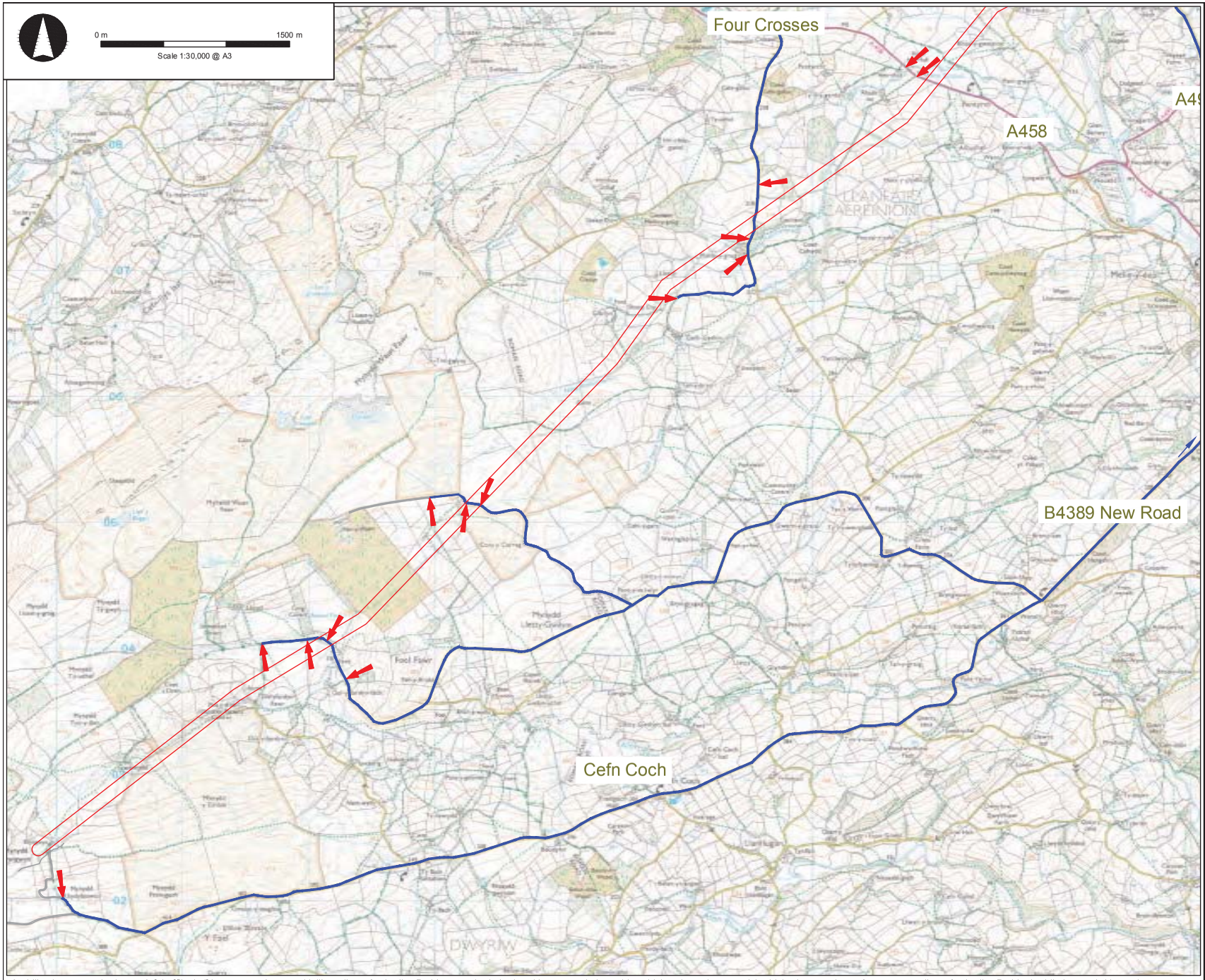


APPENIDX 14.1

Indicative Routes for HGV Deliveries



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Teitl / Title: Blue Line Plans
Potential Access Routes

Allwedd / Legend:

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Hanes y fersiwn / Version history:

Fersiwn / Version	Dyddiad / Date:	Sylwadau / Remarks	Tynnwyd / Drawn:	Gwiriwyd / Checked:	Cymeradwywyd / Approved:
A	19.05.2014	Draft	AG	GP	NS

Cyfeirnod Lluniad National Grid / National Grid Drawing Ref:

PDD-21066L-OHL-0058

Cyfeirnod Lluniad y Cychwynnydd / Originator Drawing Ref:

34851-Shr11

Tynnwyd / Drawn:	Gwiriwyd / Checked:	Cymeradwywyd / Approved:	Fersiwn / Version:	Dyddiad / Date:
AG	GP	NS	A	19.05.2014

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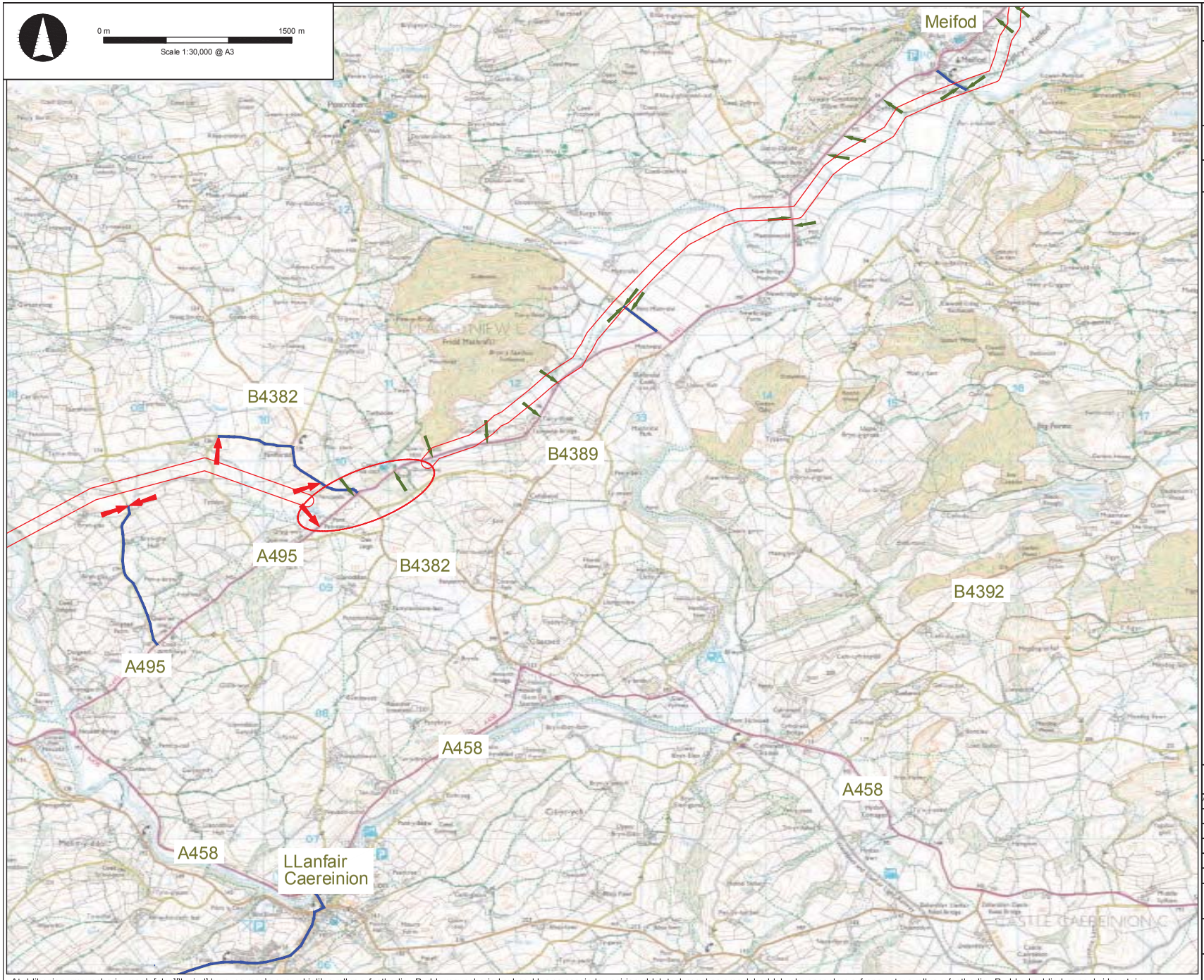

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Rheoliad / Regulation:

Teitl / Title: Blue Line Plans
Potential Access Routes

Allwedd / Legend:

- Proposed Access Route
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- The Draft Route
- Sealing End Compound Siting Areas

Hanes y fersiwn / Version history:

Fersiwn / Version	Dyddiad / Date:	Sylwadau / Remarks	Tynnwyd / Drawn:	Gwiriwyd / Checked:	Cymeradwywyd / Approved:
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Cyfeirnod Lluniad National Grid / National Grid Drawing Ref:

PDD-21066L-OHL-0059

Cyfeirnod Lluniad y Cychwynnydd / Originator Drawing Ref:

34851-Shr12

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AG	GP	NS	A	19.05.2014

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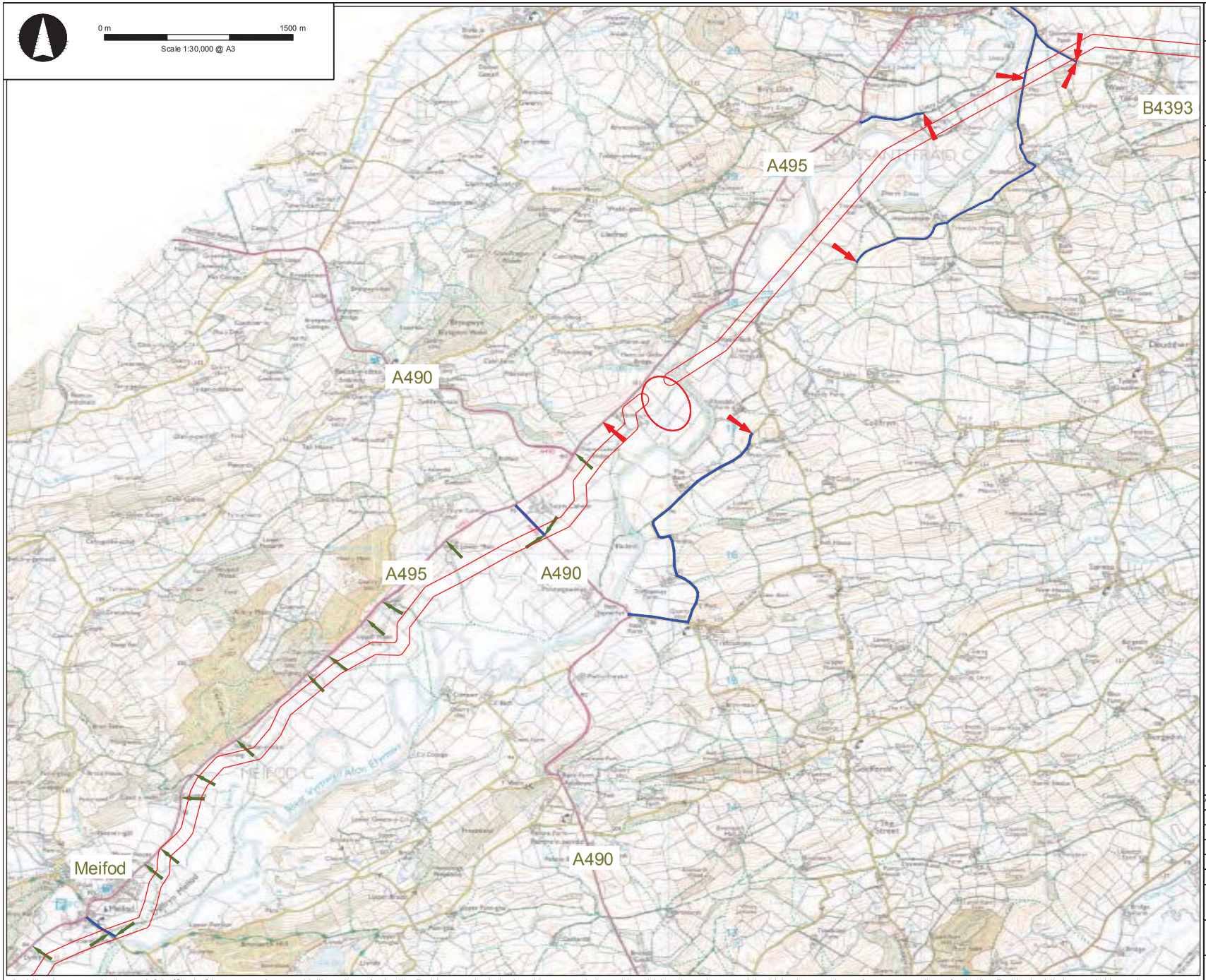

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Teitl / Title: Blue Line Plans
Potential Access Routes

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Hanes y fersiwn / Version history:

Fersiwn / Version	Dyddiad / Date:	Sylwadau / Remarks	Tynnwyd / Drawn:	Gwiriwyd / Checked:	Cymeradwywyd / Approved:
A	19.05.2014	Draft	AG	GP	NS

Cyfeirnod Lluniad National Grid / National Grid Drawing Ref:

PDD-21066L-OHL-0060

Cyfeirnod Lluniad y Cychwynnydd / Originator Drawing Ref:

34851-Shr13

Tynnwyd / Drawn:	Gwiriwyd / Checked:	Cymeradwywyd / Approved:	Fersiwn / Version:	Dyddiad / Date:
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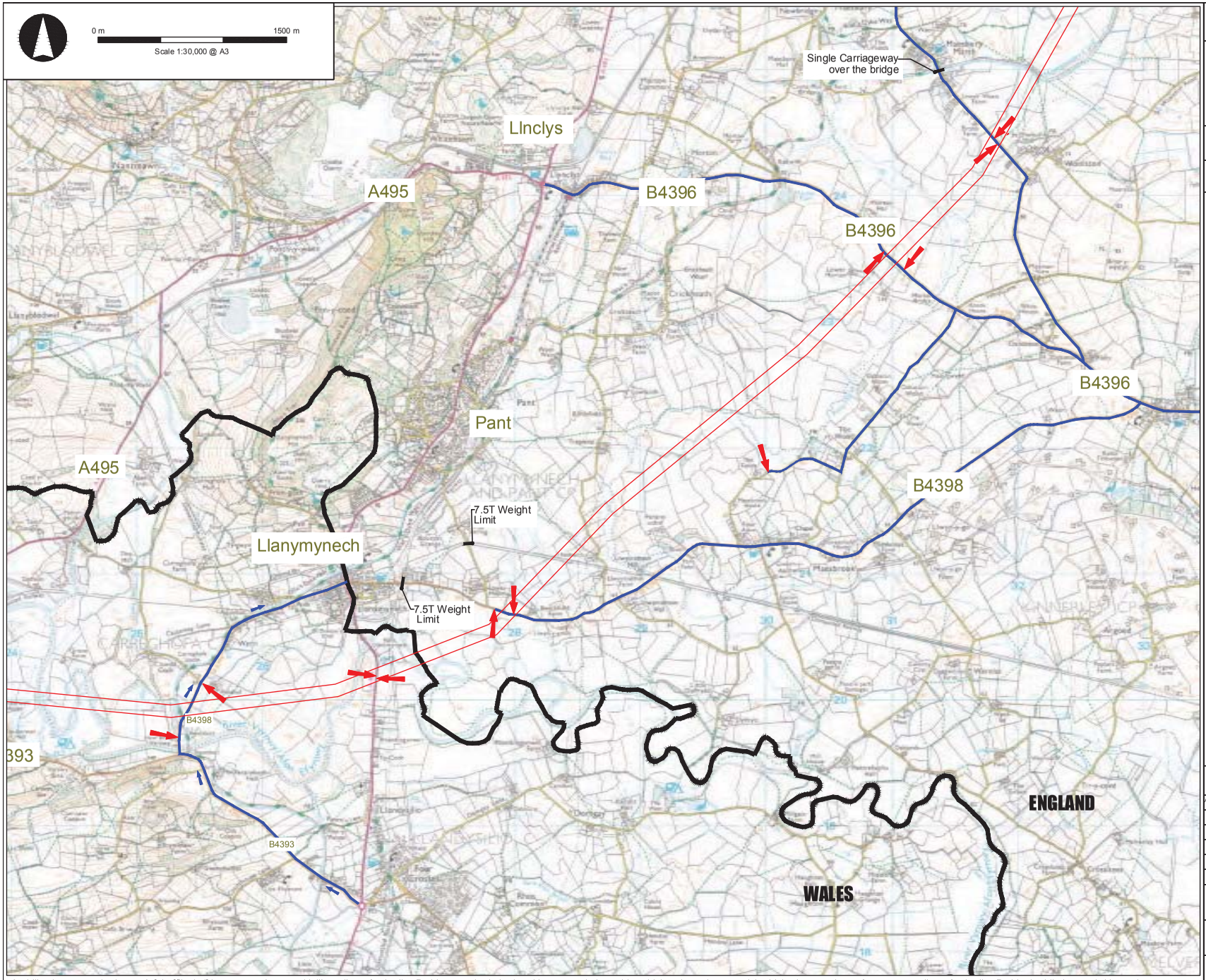

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Cyfeirnod Lluniad National Grid / National Grid Drawing Ref:

PDD-21066L-OHL-0061

Cyfeirnod Lluniad y Cychwynnydd / Originator Drawing Ref:

34851-Shr14

Tynnwyd / Drawn:	Gwiriwyd / Checked:	Cymeradwywyd / Approved:	Fersiwn / Version:	Dyddiad / Date:
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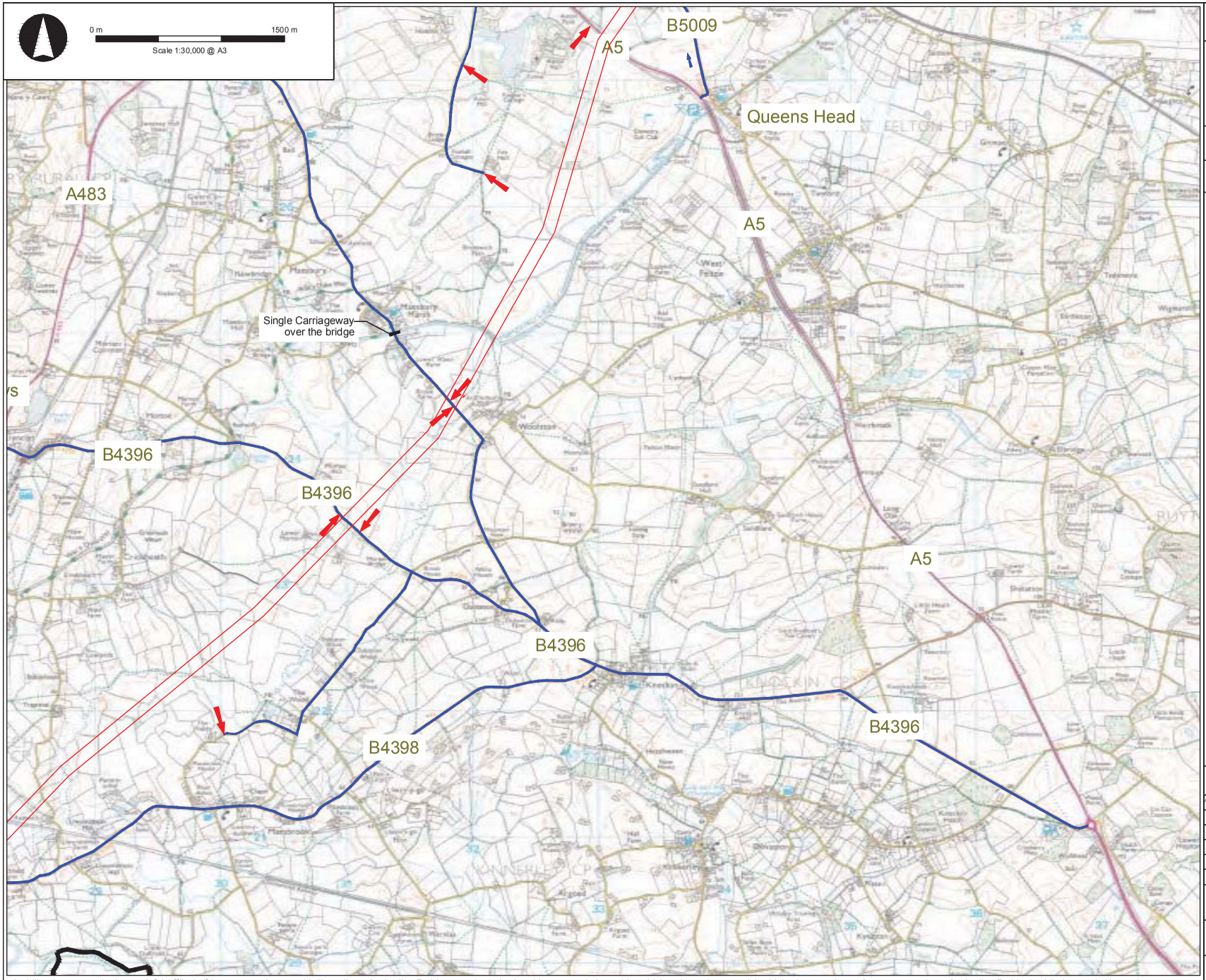

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Cyfeirnod Lluniad National Grid / National Grid Drawing Ref:

PDD-21066L-OHL-0062

Cyfeirnod Lluniad y Cychwynnydd / Originator Drawing Ref:

34851-Shr15

Tynnwyd / Drawn:	Gwiriwyd / Checked:	Cymeradwywyd / Approved:	Fersiwn / Version:	Dyddiad / Date:
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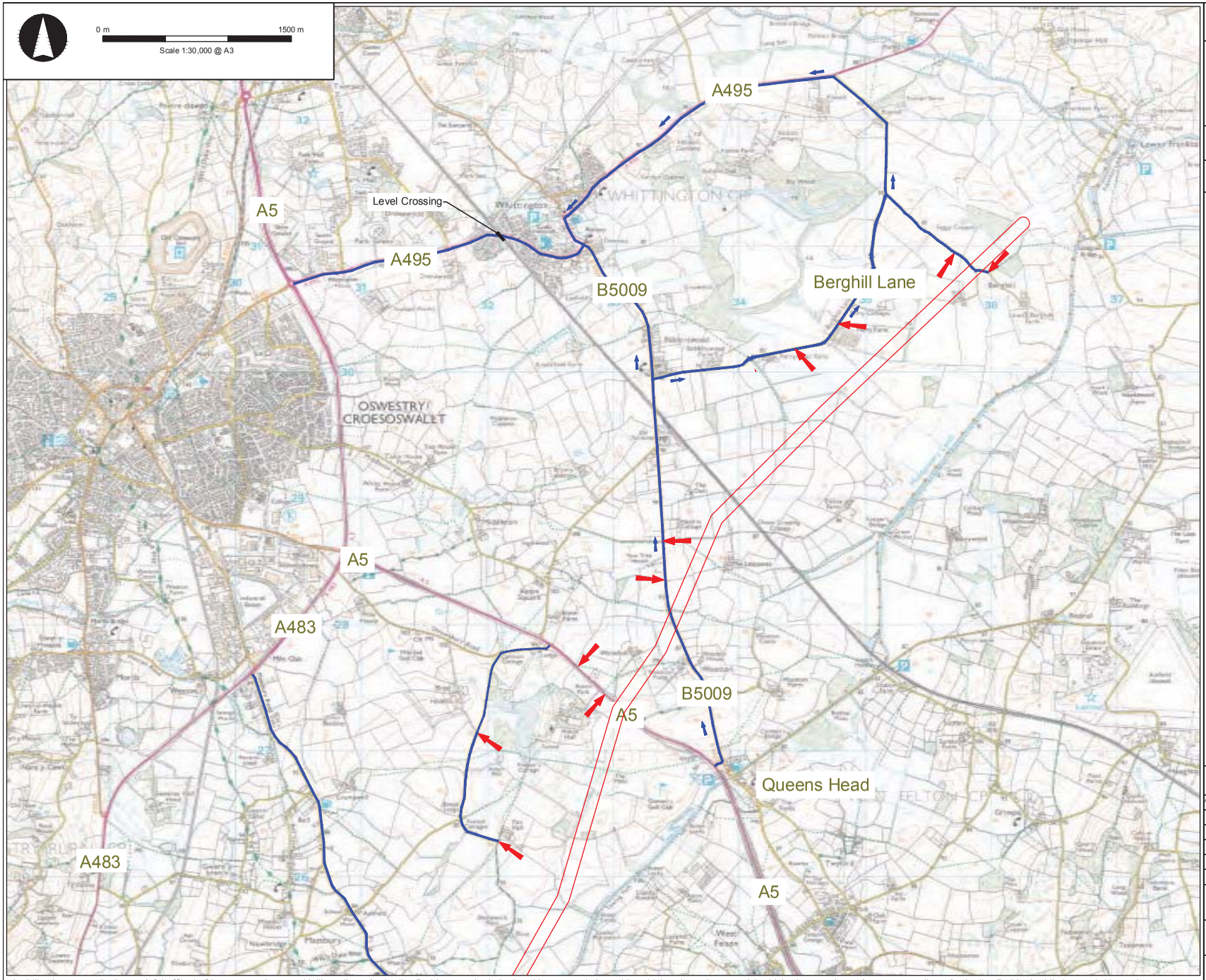

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Teitl / Title: Blue Line Plans
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Hanes y fersiwn / Version history:

Fersiwn / Version	Dyddiad / Date:	Sylwadau / Remarks	Tynnwyd / Drawn:	Gwiriwyd / Checked:	Cymeradwywyd / Approved:
A	19.05.2014	Draft	AG	GP	NS

Cyfeirnod Lluniad National Grid / National Grid Drawing Ref:

PDD-21066L-OHL-0063

Cyfeirnod Lluniad y Cychwynnydd / Originator Drawing Ref:

34851-Shr16

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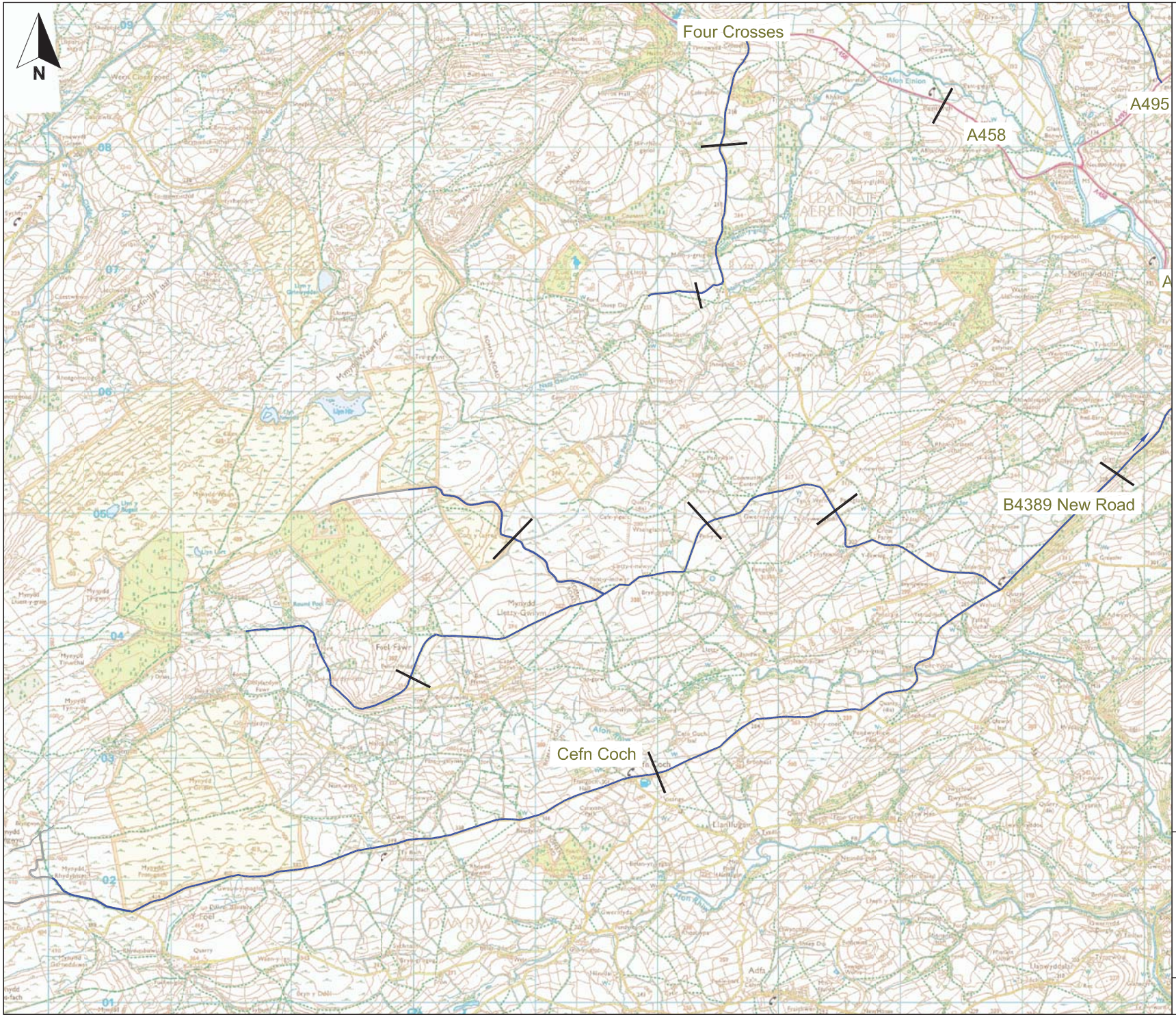
APPENDIX 14.2

Proposed Traffic Count Survey Locations



Key

Proposed Access Route

Potential Count Location

Draft for Discussion

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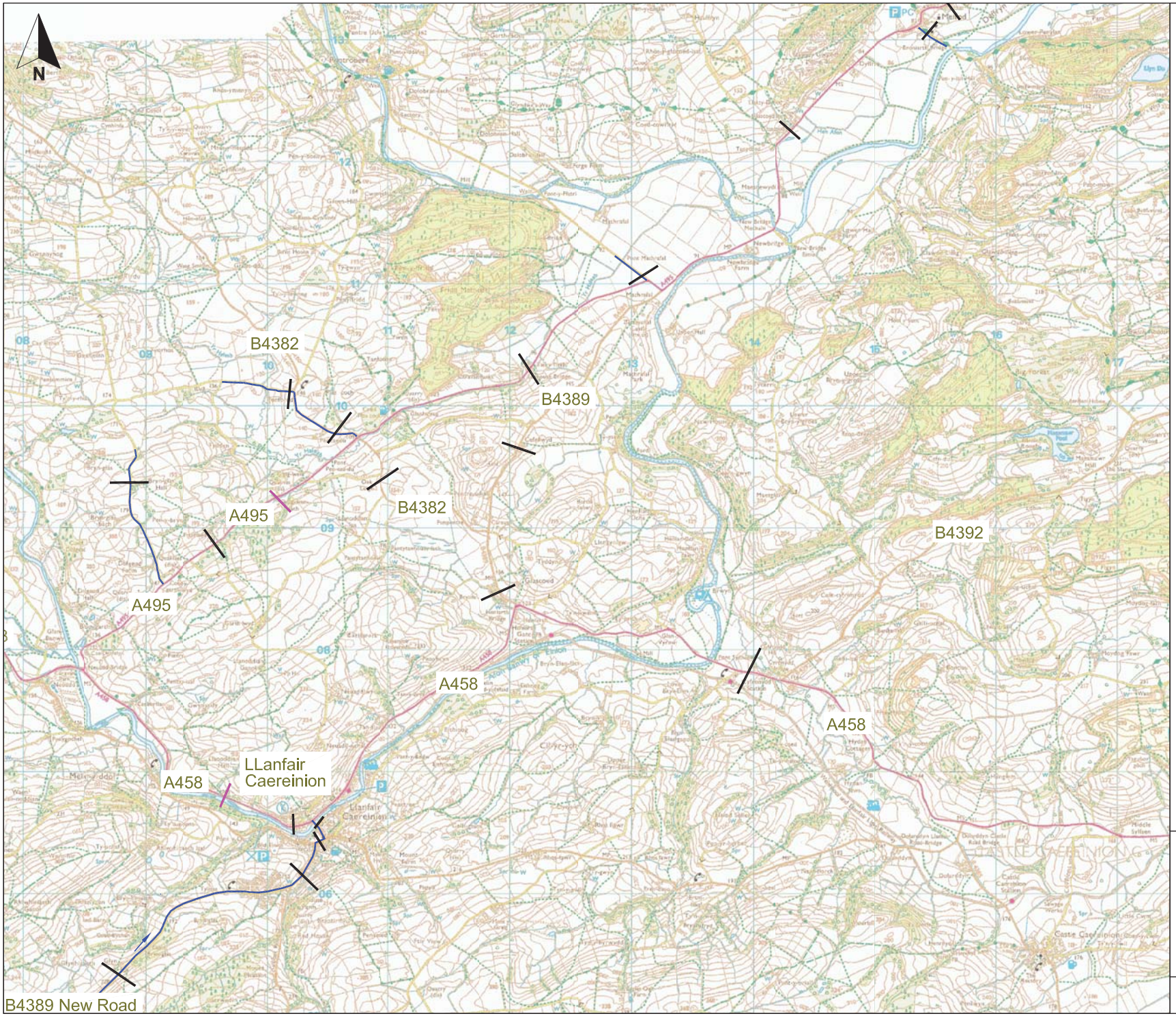
Scale 1:30,000 @ A3

Highways and Transport for Mid Wales Connection

Potential Count Locations 1

May 2014
34851-Shr309 guya

amec



Key

- Proposed Access Route
- Potential Count Location
- Existing Count

Draft for Discussion

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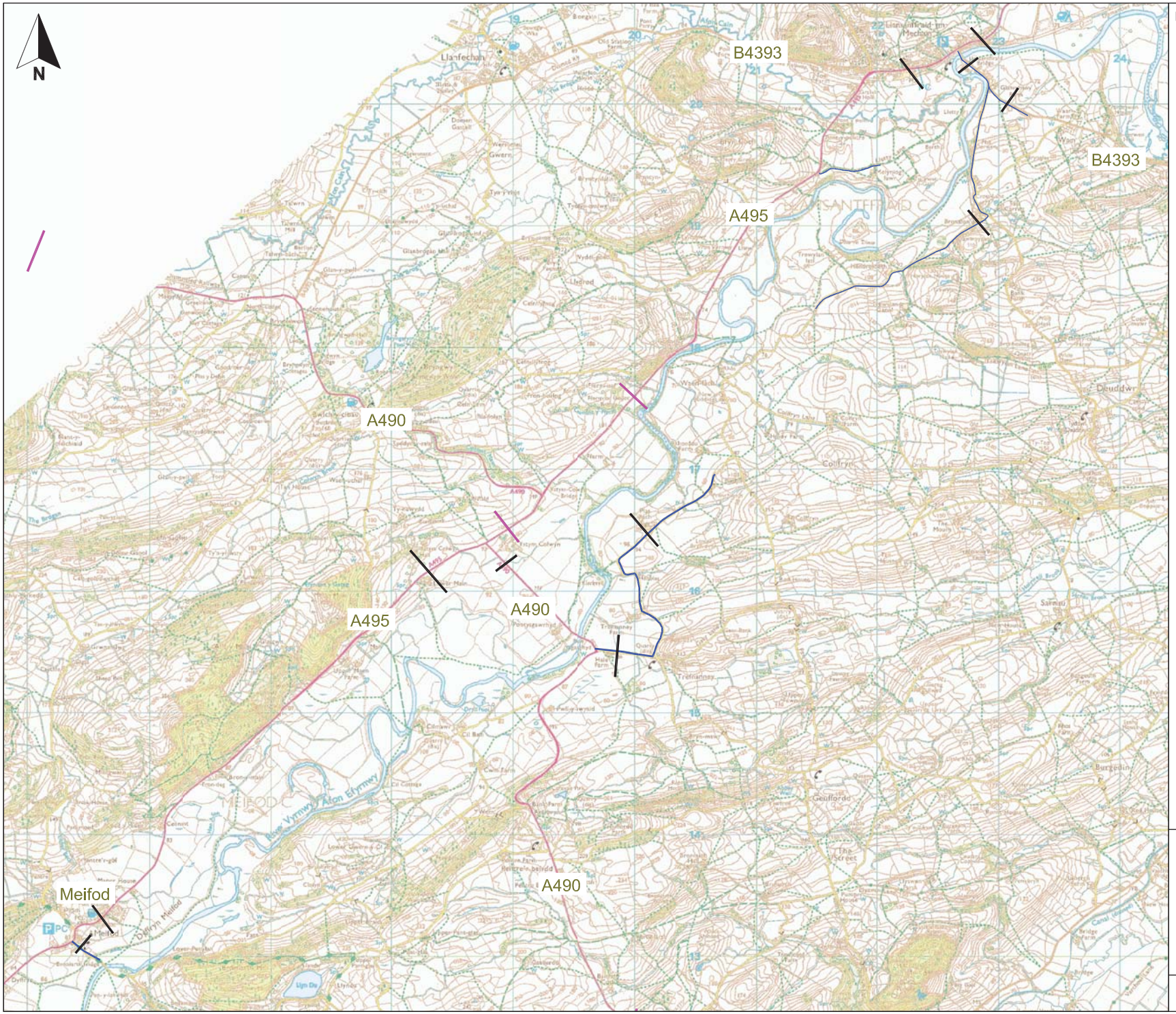
Scale 1:30,000 @ A3

Highways and Transport for Mid Wales Connection

Potential Count Locations 2

May 2014
34851-Shr310.dwg guya

amec



Key

- Proposed Access Route
- Potential Count Location
- Existing Count

Draft for Discussion

0 m — 1500 m

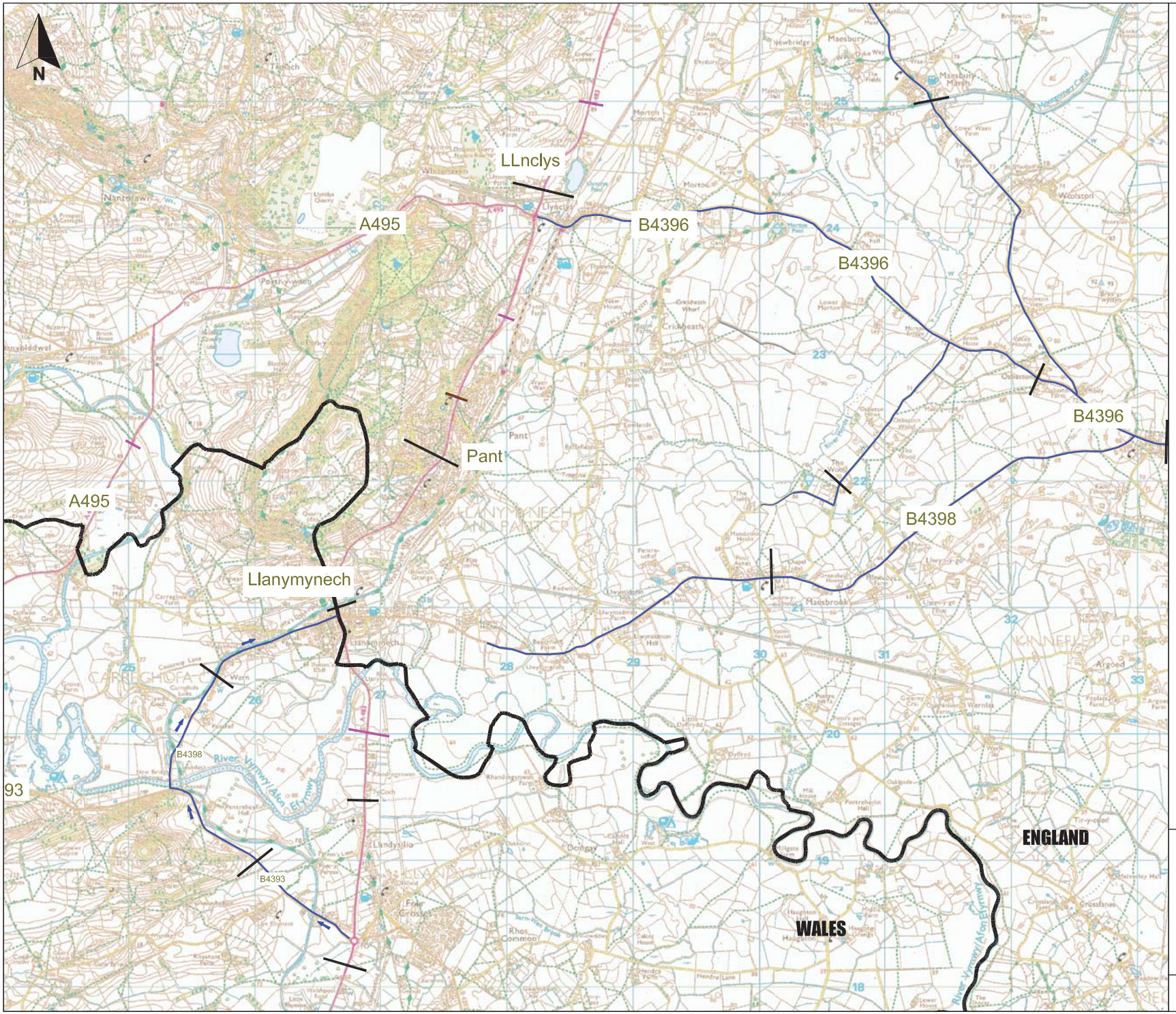
Scale 1:30,000 @ A3

Highways and Transport for Mid Wales Connection

Potential Count Locations 3

May 2014
34851-Shr311.dwg guya

amec



Key

- Proposed Access Route
- Potential Count Location
- Existing Count

Draft for Discussion

0 m — 1500 m

Scale 1:30,000 @ A3

Highways and Transport for Mid Wales Connection

Potential Count Locations 4

May 2014
34851-Shr312.dwg guya

amec

Key

- Proposed Access Route
- Potential Count Location
- Existing Count

Draft for Discussion

0 m 1500 m

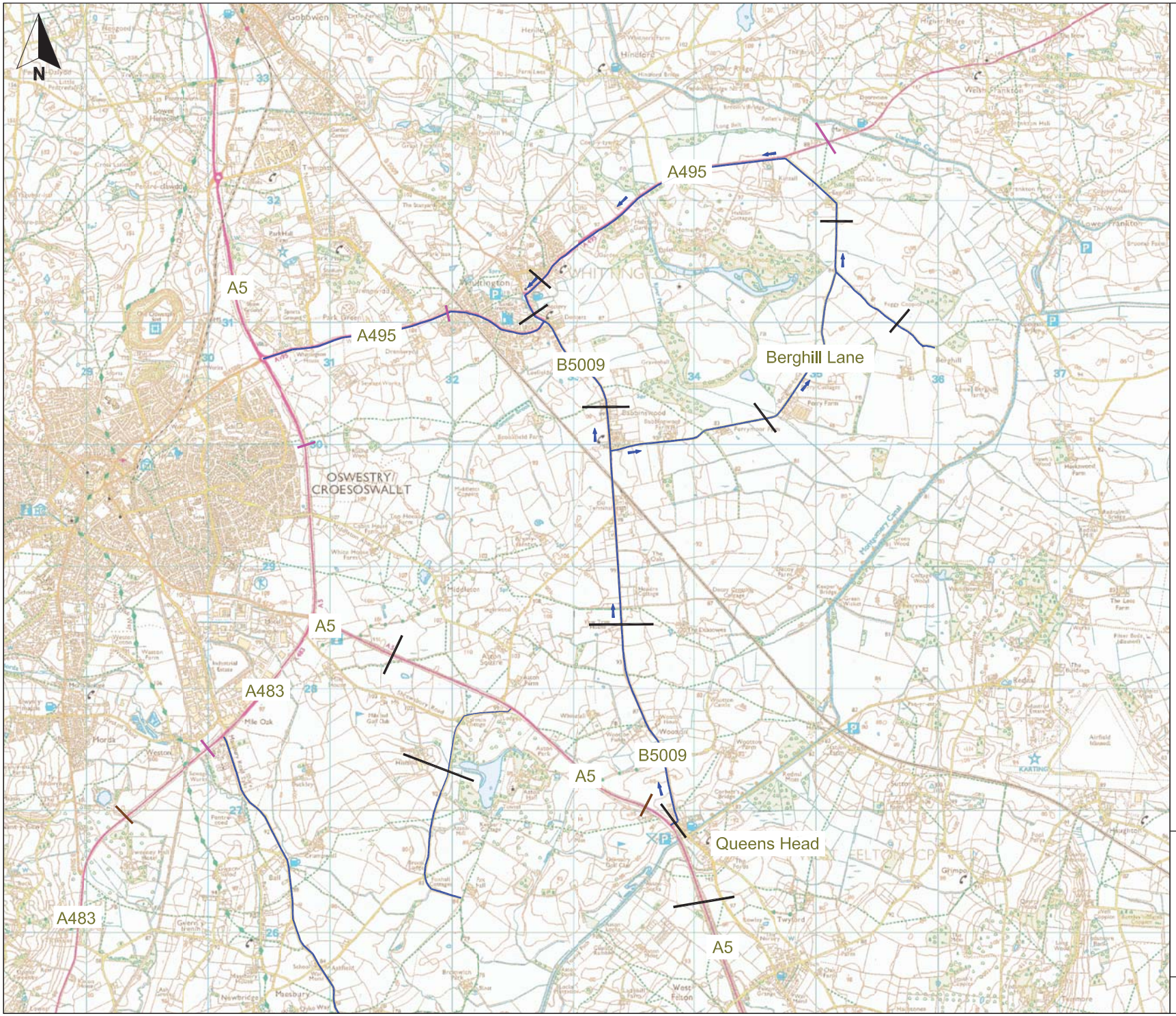
Scale 1:30,000 @ A3

Highways and Transport for Mid Wales Connection

Potential Count Locations 5

May 2014
34851-Shr313.dwg guya

amec



Key

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- Potential Count Location
- Existing Count

Draft for Discussion

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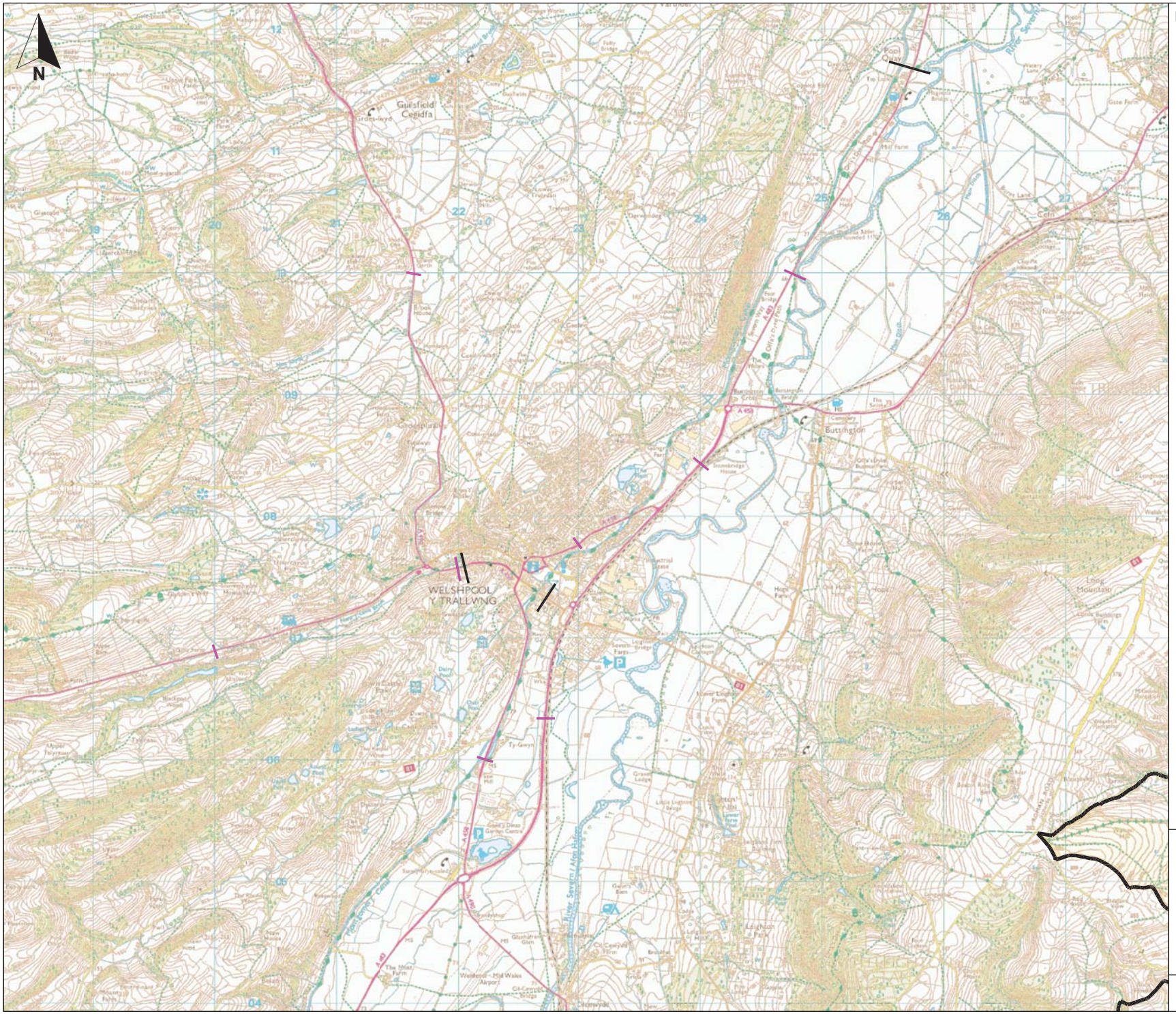
Scale 1:30,000 @ A3

Highways and Transport for Mid Wales Connection

Potential Count Locations 6

May 2014
34851-Shr314.dwg guya

amec



Key

- Proposed Access Route
- Potential Count Location
- Existing Count

Draft for Discussion

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Highways and Transport for Mid Wales Connection

Potential Count Locations 8

May 2014
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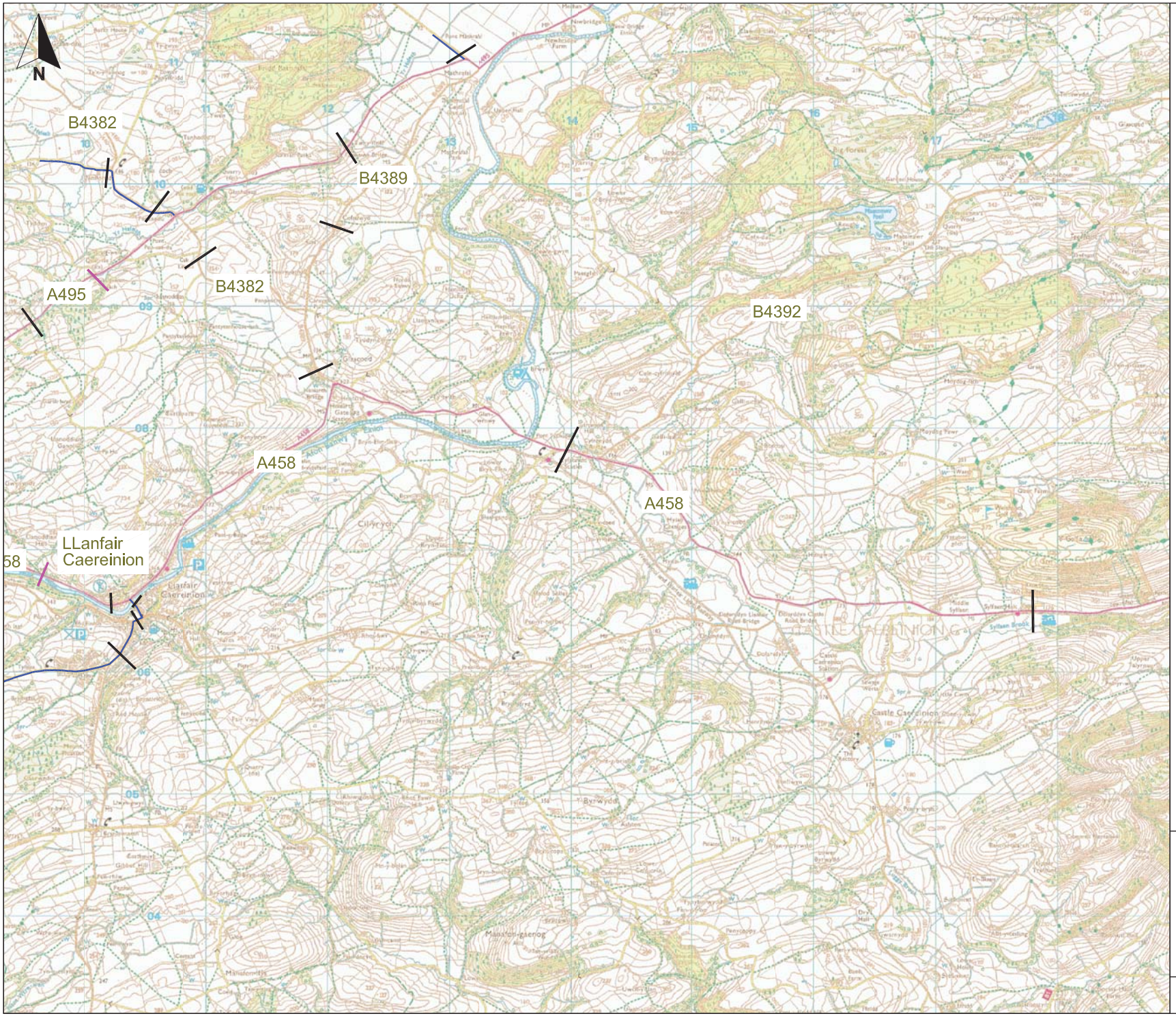


Key

- Proposed Access Route
- Potential Count Location
- Existing Count

Draft for Discussion

0 m 1500 m

Scale 1:30,000 @ A3

Highways and Transport for Mid Wales Connection

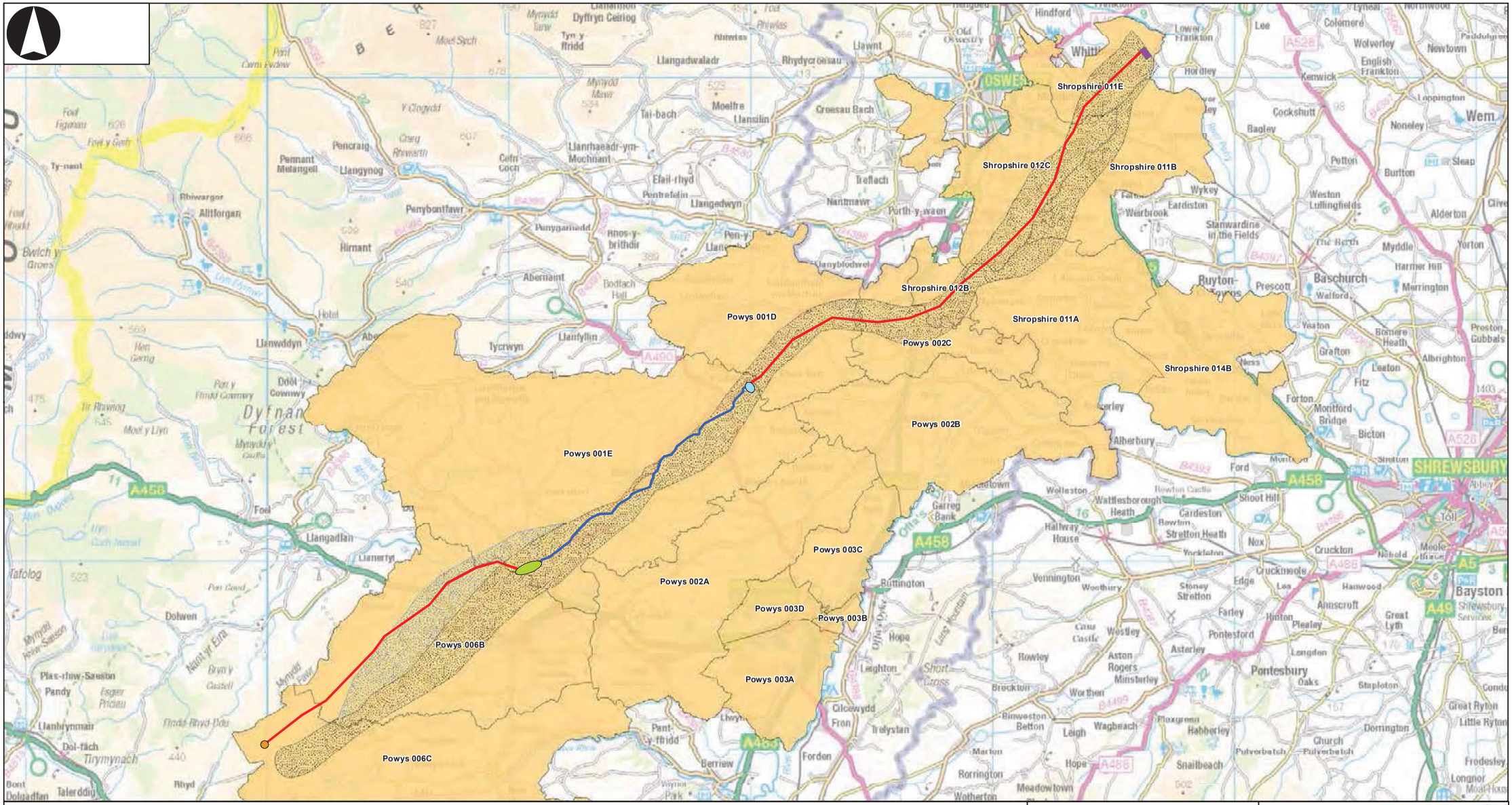
Potential Count Locations 9

May 2014
34851-Shr317.dwg guya

amec

APPENDIX 15.1

Socio-Economic Study Area



Allwedd / Legend:

- Proposed Study Area
- Substation Siting Area
- Sealing End Compound Siting Area East
- Sealing End Compound Siting Area West
- Tee-In Siting Area
- Draft Route Overhead
- Draft Route Underground
- Preferred Route Corridor
- Widened Route Corridor

At ddibenion ymgynghori y mae'r [plan][lluniad] hwn, ac mae'n cynrychioli'r cynllun arfaethedig. Bydd ymgynghoriad cyhoeddus ac asesiadau peirianyddol, technegol ac amgylcheddol ychwanegol yn cyfrannu at y cynllun arfaethedig. Bydd adroddiad yn cael ei baratoi ar ganlyniadau'r ymgynghoriad, yn esbonio sut y talwyd sylw i'r sylwadau a gafwyd. Syniad bras a roddir gan ddyluniad, maint a gosodiad y cynllun ar y [plan][lluniad] hwn. Mesuriadau nodweddiadol a roddir ar gyfer y cyfarpar a gall yr union gyfarpar a ddarperir fod o faint, arddull a model gwahanol.

This [plan][drawing] is for the purpose of consultation, and represents the proposed scheme. The proposed scheme will be informed by public consultation and further engineering, technical and environmental assessments. A report will be produced on the outcome of the consultation explaining how regard has been given to representations. The design, scale and layout shown on this [plan][drawing] is indicative. The dimensions for the apparatus are typical dimensions, and the actual apparatus to be provided may differ in style, model and size.

Hanes y fersiwn / Version history:

Fersiwn / Version:	Dyddiad / Date:	Sylwadau / Remarks	Tynnwyd / Drawn:	Gwiriwyd / Checked:	Cymeradwywyd / Approved:

Cyfeirnod Lluniad National Grid / National Grid Drawing Ref:
XX

Cyfeirnod Lluniad y Cychwynnydd / Originator Drawing Ref:
XX

Tynnwyd / Drawn:	Gwiriwyd / Checked:	Cymeradwywyd / Approved:	Fersiwn / Version:	Dyddiad / Date:
JA	BC	XX	A	22/05/2014

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1:150,000	A3	Sheet 1 of 1	Draft

nationalgrid

Prosiect Cysylltiad Canolbarth Cymru
Cysylltu ffermydd gwynt trwy Ganolbarth Cymru a Sydd Amwythig
http://www.cysylltiadcanolbarthcymru.com

Mid Wales Connection Project
Connecting Wind Farms through Mid Wales and Shropshire
http://www.midwalesconnection.com

Rheoliad / Regulation:
xx

Teitl / Title:

Draft Route and Super Output Areas

APPENDIX 15.2

Socio-Economic Baseline Data

The following information has been taken from http://www.neighbourhood.statistics.gov.uk and presents Census 2011 data according to the Office for National Statistics (unless otherwise indicated)

Population Statistics

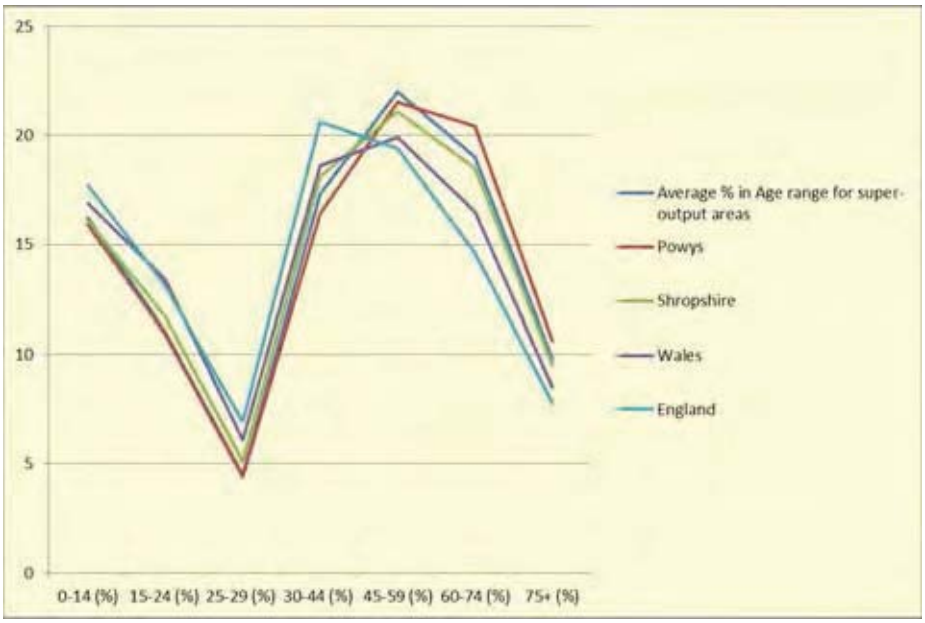
Area	Males	Females	Total
Powys 006C	1,128 (52%)	1,052 (48%)	2,180
Powys 006B	891 (49%)	919 (51%)	1,810
Powys 001E	1,178 (50%)	1,193 (50%)	2,371
Powys 001D	914 (49%)	966 (51%)	1,880
Powys 002A	1,129 (49%)	1,190 (51%)	2,319
Powys 002B	1,090 (50%)	1,101 (50%)	2,191
Powys 002C	888 (50%)	901 (50%)	1,789
Powys 003A	746 (49%)	792 (51%)	1,538
Powys 003B	626(49%)	664 (51%)	1,290
Powys 003C	767 (50%)	769 (50%)	1,536
Powys 003D	1,134 (49%)	1,166 (51%)	2,300
Shropshire 012B	662 (49%)	701 (51%)	1,363
Shropshire 011A	761 (49%)	785 (51%)	1,546
Shropshire 012C	650 (51%)	637 (49%)	1,287
Shropshire 011B	712 (48%)	763 (52%)	1,475
Shropshire 011E	750 (49%)	786 (51%)	1,536
Shropshire 014B	695 (47%)	787 (53%)	1,482
Average % and number for super-output areas	49.4%	50.6%	1758
Powys	65,683 (49%)	67,293 (51%)	132,976
Shropshire	151,606 (50%)	154,523 (50%)	306,129
Wales	1,504,228 (49%)	1,559,228 (51%)	3,063,456
England	26,069,148 (49%)	26,943,308 (51%)	53,012,456

Age Statistics

Area	0-14 (%)	15-24 (%)	25-29 (%)	30-44 (%)	45-59 (%)	60-74 (%)	75+ (%)
Powys 006C	15.9	10.5	4.7	16.6	22.8	21.9	7.6
Powys 006B	19.0	12.7	3.3	16.0	23.1	18.8	7.1
Powys 001E	14.3	10.8	3.8	14.4	24.5	22.1	10.0
Powys 001D	14.1	10.1	4.5	16.3	21.1	19.8	14.0
Powys 002A	15.7	10.8	3.7	15	22	20.8	12
Powys 002B	18.3	9.3	3.6	20.3	21.5	18.9	8.2
Powys 002C	17.1	8.4	4.9	18.9	22.9	18.0	9.7
Powys 003A	15	14	5.7	17.8	20.4	14.2	10
Powys 003B	15.6	13.1	8.4	19.6	16.3	14.3	12.6
Powys 003C	16.2	12.6	5.1	18.1	23.8	16	8.1
Powys 003D	16.2	10.4	5.2	16.6	18.6	18.9	14.1
Shropshire 012B	14.7	9.8	4.6	16.0	22.2	22.9	9.9
Shropshire 011A	15.3	9.6	3.0	16.8	25.5	20.9	9.1
Shropshire 012C	14.4	11.0	4.0	16.6	22.5	20.6	10.8
Shropshire 011B	17.8	10.6	4.8	20.6	20.7	16.7	8.9
Shropshire 011E	15.9	11.6	4.2	17.3	24.3	18.9	7.9
Shropshire 014B	20	12.5	3.1	17.9	21.3	18.6	6.7
Average % in Age range for super-output areas	16.2	11	4.5	17.3	22	19	9.8
Powys	15.9	10.9	4.4	16.4	21.5	20.4	10.6
Shropshire	16.1	11.7	5.1	18.1	21.1	18.5	9.5
Wales	16.9	13.4	6.1	18.6	19.9	16.5	8.5
England	17.7	13.1	6.9	20.6	19.4	14.6	7.8

A summary of the age distribution for the super-output areas is shown in Graph 15.1.

Graph 15.1: Age Range Within Super-Output Areas Against Regional and National Average Percentages



Population Density

Area	Persons per hectare
Powys 006C	0.2
Powys 006B	0.3
Powys 001E	0.2
Powys 001D	0.4
Powys 002A	0.4
Powys 002B	0.5
Powys 002C	0.9
Powys 003A	0.9
Powys 003B	7.0
Powys 003C	1.3
Powys 003D	3.3
Shropshire 012B	2.2
Shropshire 011A	0.4
Shropshire 012C	0.4
Shropshire 011B	0.6

Education and Qualification Levels

Area	Total number of residents aged 16 and over	People with no qualifications (%)	People who have attained level 1 (%)	People who have attained level 2 (%)	People who have attained level 3 (%)	People who have attained level 4 / 5 (%)	People with other qualifications / level unknown (%)
Powys 006C	1,801	21.4	14.0	17.7	11.7	26.8	4.0
Powys 006B	1,439	21.4	11.6	19.4	11.7	27.9	3.5
Powys 001E	2,007	22.9	11.3	17.0	11.4	29.7	4.2
Powys 001D	1,598	26.4	11.5	16.9	10.7	26.8	4.4
Powys 002A	1,919	21.2	12.9	17.6	12.7	27.3	4.5
Powys 002B	1,753	19.4	15.4	17.2	12.2	28.4	7.4
Powys 002C	1,464	22.1	14.2	18.0	12.4	26.3	3.2

Level 1: 1+ O level, GCSE, CSE pass any grade, NVQ level 1 or foundation GNVQ

Level 2: 5+ O levels 5+ CSE's (grade one) 5+ GCSE's (A-C), School certificate, 1+ A/AS level, NVQ level 2 or Intermediate GNVQ.

Level 3: 2+A levels, 4+ AS levels, Higher School Certificate, NVQ level 3, Advanced GNVQ.

Level 4/5: First Degree, Higher Degree, NVQ level 4 and 5, HNC, HND, Qualified teacher status, Qualified Medical Doctor, Qualified Dentist, Qualified Nurse, Midwife, Health Visitor.

Other Qualifications e.g. City and Guilds, RSA, BTEC or professional qualifications

Occupation of Residents Aged 16 to 74 in Employment

Area	Managers, Directors and Senior Officials (%)	Professional Occupations (%)	Associate Professional and Technical Occupations (%)	Administrative and Secretarial Occupations (%)	Skilled Trades Occupations (%)	Caring, Leisure and Other Service Occupations (%)	Sales and Customer Service Occupation (%)	Process, Plant and Machine Operatives (%)	Elementary Occupations (%)
Powys 006C	10.1	12.9	9.9	10.1	25.5	8.1	5.9	7.3	10.2
Powys 006B	11.5	15	9.1	8.8	25.1	9.1	6.2	6.8	8.5
Powys 001E	11.3	17.4	7.3	7.5	26.6	8.4	5.1	6.7	9.8
Powys 001D	12.4	13.6	8.2	9	22	10.8	6.3	7.5	10.2
Powys 002A	12.1	14.5	8.7	9.8	20.3	9.1	7.1	8.6	9.6
Powys 002B	10.8	16	11	9.7	19.4	9.2	5.8	8.3	9.7
Powys 002C	11.3	15.3	9.1	10.1	18.8	9.3	7	8.3	10.7
Powys 003A	7.8	6.4	4.3	6.1	15.2	11	11.8	19.9	17.5
Powys 003B	7.8	8.6	5.7	7.3	14.7	9.5	7.3	19.5	19.7
Powys 003C	9.1	10.1	7.7	9.1	18.6	8.4	10	11.5	15.3
Powys 003D	8.2	12.9	8.7	8.1	16.4	8.7	9.7	13.3	13.9
Shropshire 012B	10.8	15.4	12.4	9	17	10.8	6.9	8.3	9.3
Shropshire 011A	14.9	18.5	9.3	10.1	17.3	9.5	4.2	6.5	9.7
Shropshire 012C	13.1	15.6	9.8	10.7	20.2	8.7	5	8.7	8.2
Shropshire 011B	13.9	18.2	10.9	8.6	16.4	11.9	4.3	6	9.8
Shropshire 011E	12.9	14	9.3	10.2	17.1	10.2	6.3	9.3	10.6
Shropshire 014B	13.4	17.3	10.7	10.2	17.1	9.9	5.6	7.1	8.8
Average for super-output areas	11.26	14.22	8.95	9.08	19.28	9.56	6.74	9.62	11.26
Powys	10.5	14.1	8.9	9.4	21.2	10.1	6.5	7.7	11.5

Area	Managers, Directors and Senior Officials (%)	Professional Occupations (%)	Associate Professional and Technical Occupations (%)	Administrative and Secretarial Occupations (%)	Skilled Trades Occupations (%)	Caring, Leisure and Other Service Occupations (%)	Sales and Customer Service Occupation (%)	Process, Plant and Machine Operatives (%)	Elementary Occupations (%)
Shropshire	11.7	15.9	11.3	10	15.2	10.1	7.2	7.4	11.3
Wales	9.2	15.8	10.8	11.1	13.4	10.5	9	8.1	11.9
England	10.9	17.5	12.8	11.5	11.4	9.3	8.4	7.2	11.1

Employee Jobs (taken from http://www.nomisweb.co.uk , 2012)

	Powys	Shropshire	Wales	Great Britain
Primary Services (%)	0.3	0.3	0.2	0.3
Energy and Water (%)	1.6	1.1	1.6	1.1
Manufacturing (%)	10.7	10.4	11.4	8.7
Construction (%)	5.2	4.9	4.4	4.5
Services (%)	82.2	83.3	8.4	85.5
Wholesale and retail, including motor trades (%)	17.3	18.5	16.4	16.1
Transport storage (%)	3.8	4.6	3.3	4.6
Accommodation and food services (%)	9.3	7.5	7.6	6.9
Information and Communication (%)	0.9	2.0	1.9	3.9
Financial and other business services (%)	11.3	12.6	13.5	21.5
Public admin, education and health (%)	34.2	33.2	35.1	28.1
Other Services (%)	5.4	4.9	4.6	4.5

Earnings by Workplace (2013) www.nomisweb.co.uk

Gross Weekly Pay

	Powys	Shropshire	Wales	Great Britain
Full Time Workers	414.4	444.9	472.3	517.8
Male Full-Time Workers	458.6	499.0	502.4	558.3
Female Full-Time Workers	359.2	375.5	421.9	459.6

Hourly Pay – Excluding Overtime

	Powys	Shropshire	Wales	Great Britain
Full Time Workers	10.26	11.06	11.88	13.07
Male Full-Time Workers	10.35	11.47	12.27	13.66
Female Full-Time Workers	9.85	9.91	11.25	12.26

Economic Activity of the Population Aged 16 to 74

Area	Full-time employed (%)	Part-time employed (%)	Self Employed (%)	Unemployed (%)	Economically active student (%)	Retired (%)	Economically inactive student (%)	Looking after home / family (%)	Permanently sick / disabled (%)	Other Economically inactive (%)
Powys 006C	32.5	14.3	22.5	2	2	17.2	3.2	2.2	3	1.4
Powys 006B	32.6	13.3	22.5	1.7	1.8	14.3	5	3.4	4.3	1.1
Powys 001E	28.6	13.8	27.1	1.5	1.8	17.4	3.8	2.8	2.1	1
Powys 001D	31.8	16.7	17.6	2	1.9	18.1	3.7	3.4	3	1.9
Powys 002A	32.7	16.3	19.2	2.4	2.9	17.6	2.6	2.7	2.6	1
Powys 002B	36.2	15.4	17.8	2.4	1.9	16.9	3	3.4	2	1.1
Powys 002C	36.8	14.3	16	2.2	1.9	17.4	2.8	3.8	3.7	1.1

Housing

Area	Detached house or Bungalow (%)	Semi-detached house or bungalow (%)	Terraced house or bungalow (including end terrace) (%)	Flat; maisonette or apartment (%)	Mobile or temporary structure (%)
Powys 006C	74	18.1	5.5	1.7	0.6
Powys 006B	59.6	21.8	12.8	4.7	1.3
Powys 001E	76	13.7	6.3	1.9	2
Powys 001D	59.1	21.8	13.8	4.7	0.6
Powys 002A	65.8	24.9	4.5	3.8	1
Powys 002B	75.9	14.7	7	2	0.2
Powys 002C	60.4	25	10.6	3.4	0.6
Powys 003A	18.3	22.4	29	30.1	0.3
Powys 003B	17.9	24.2	36.6	20.4	0.9
Powys 003C	46.2	36.1	14	3.5	0.11
Powys 003D	36	29.5	17.7	15.3	1.5
Shropshire 012B	64.7	24	7.9	3.2	0.2
Shropshire 011A	72.4	20.9	2.4	2.3	1.9
Shropshire 012C	71.4	21.2	5	1.2	1.2
Shropshire 011B	59.3	25.8	12.8	1.8	0.2
Shropshire 011E	40.6	43.5	12.3	3.4	0.3
Shropshire 014B	51.2	42	4.1	2.4	0.8
Average for super-output areas	55.81	25.27	11.9	6.22	0.81
Powys	47.9	24.5	18	8.8	1
Shropshire	39.5	33.4	16.8	9.5	0.8

Area	Detached house or Bungalow (%)	Semi-detached house or bungalow (%)	Terraced house or bungalow (including end terrace) (%)	Flat; maisonette or apartment (%)	Mobile or temporary structure (%)
Wales	27.7	31	27.8	13	0.4
England	22.3	30.7	24.5	22.1	0.4

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Project Website: www.nationalgrid.com/midwalesconnection