2.2 PEIR Non-Technical Summary

Mid Wales Connection Project

The Preliminary Environmental Information Report (PEIR) is a preliminary assessment of the likely environmental effects of the proposals and the measures we propose to limit them, where we can.
INTRODUCTION TO THE PEIR

1.1 This document is a non-technical summary (NTS) of the Preliminary Environmental Information Report (PEIR) relating to an application that National Grid Electricity Transmission plc (National Grid) intends to make to connect new onshore wind generation in Mid Wales by constructing a substation, at Bryngwyn in the Cefn Coch area of Powys, Mid Wales, and a new 400 kilo volts (400 kV) connection from that substation at Bryngwyn, to a point on the existing National Electricity Transmission System at Berghill, near Lower Frankton, Shropshire (the proposed development). The location of the proposed development is shown in Figure 1.1.

1.2 The information contained in the PEIR is ‘preliminary’ and has been produced with the intention to seek comment on the proposed development for consideration in project design and further assessment. It has been prepared for the purposes of statutory consultation with the local community, landowners and other statutory consultees in accordance with the requirements of Sections 42 and 47 of the Planning Act 2008. The final design of the proposed development remains open to change and will be influenced by the statutory consultation. The PEIR and this NTS form part of a suite of documents which are available as part of this statutory consultation stage and should be read in conjunction with those documents.

1.3 Preliminary environmental information has been used to inform the preliminary assessment of the proposed development and will be taken forward as part of the on-going information gathering and data collection to inform the process of Environmental Impact Assessment (EIA).

1.4 National Grid is seeking feedback on the information presented in the PEIR. Feedback will be considered and used to develop a final design and in the production of the Environmental Statement (ES), which reports the findings of the EIA.

1.5 The PEIR is a mechanism to enable the local community, and other statutory consultees and stakeholders, to:

- Gain an understanding of the proposed development, and enable them to develop an informed view;
- Assist with the identification of potential issues; and
- Gain an understanding of the potential environmental effects, their likely significance and measures proposed to reduce them.

1.6 The PEIR also aims to:

- Provide clarity and the context for consultation;
- Describe the outstanding information that National Grid anticipates will subsequently be provided in the ES to accompany the consent applications; and
- Inform the responses of the local community, and other statutory consultees and stakeholders to this consultation.

1.7 The PEIR has also been prepared taking into account the relevant guidance including National Policy Statements (NPSs) for energy. These are EN-1 (the overarching NPS for energy) and EN-5 (the NPS for electricity networks infrastructure). These policies require that adverse environmental, social and economic issues are taken into account and weighed against the benefits of the proposal.

National Grid and its Duties under the Electricity Act 1989

1.8 National Grid is the owner and operator of the high voltage electricity transmission system in England and Wales. The overhead lines and underground cables of the transmission system connect to substations which provide points of connection to the local distribution networks, owned by Distribution Network Operators (DNOs), supplying power to consumers.

1.9 National Grid has a statutory obligation, under the terms of its transmission licence, to offer a connection to the transmission system in response to each valid application made. Under the Electricity Act 1989 National Grid must also “develop and maintain an efficient, co-ordinated and economical system of electricity transmission” and “facilitate competition in the supply and generation of electricity”.

1.10 When planning new works, National Grid is also required 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. National Grid is required to 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.
Appraisal Processes Adopted for Preliminary Environmental Information

1.11 The PEIR uses the following processes:

- Appraisal of Effects - reflecting judgements as to the importance or sensitivity of the affected receptor(s) and the nature and size of the predicted changes.

- Mitigation Measures:
  - Primary or ‘embedded’ mitigation measures which are part of the design of the proposed development;
  - Standard construction practices for avoiding and minimising environmental effects; and
  - Secondary mitigation measures which are designed to address any significant adverse effects remaining after primary measures and standard construction practices have been applied.

- In terms of potential cumulative effects the PEIR considers these on a preliminary basis. The assessment in the EIA will be based on the following 3 scenarios:
  - Stage 1 (baseline) – In the area around Bryngwyn this includes a cumulative assessment of proposed development (i.e. 400 kV / 132 kV substation and the 400 kV overhead line) against baseline conditions;
  - Stage 2 (related developments) – this would consider the proposed development against a future baseline including the wind farms with connection agreements with SPManWeb, SPManWeb’s connections to the 132 kV substation and Tigrwynt wind farm (due to its proximity to the proposed substation and its construction programme); and
  - Stage 3 (other developments) – this would assess the proposed development in respect of other wind farms in the vicinity (10km) of Bryngwyn and the overhead line, and other developments not already mentioned above.

2. PROJECT DESCRIPTION

Introduction to the Project

2.1 National Grid proposes to build a new 400 kV connection (referred to as the proposed development), which would be a combination of:

- A new substation;
- Two sections of overhead line (approximately 13km and 23km in length);
- A section of underground cable (approximately 13km in length) with two associated sealing end compounds (SECs) that connect the overhead line to the cable; and
- A ‘tee-in’, which is a junction connecting the proposed overhead line to the existing 400 kV overhead line.

2.2 The proposed development also includes minor works at the existing Shrewsbury substation and offsite works mainly associated with transportation of construction materials. The proposed development is shown in Figure 1.1 and described as follows:

- **Bryngwyn Substation**: This new substation would occupy a remote rural upland location adjacent to a proposed wind farm near Cefn Coch, Powys. The substation would ‘collect’ the electricity generated by the wind farms and change it to the higher voltage (400 kV) required for the national electricity network. The substation would comprise two compound equipment areas connected by short lengths of underground cables. One compound would contain the 132 kV equipment for the proposed connections from the wind farms. The other compound would contain the 400 kV equipment. The total combined size would be approximately 6 hectares (15 acres).

- **Western Overhead Line (OHL) Section**: This overhead line would be approximately 13km long and connect Bryngwyn Substation to the Western SEC at Dyfrlyn Meifod West. Low-height lattice pylons and T-pylons were considered for this area and could both be options.
Both pylon types provide opportunity to use trees and landform throughout the area for natural screening and through careful routeing. These pylons are also shorter than conventional height pylons, hence less would be seen against the skyline.

- **Western Sealing End Compound (SEC):** Located at Dyffryn Meifod West, this SEC connects the western overhead line to the proposed cable section. The SEC compound would be approximately 80m x 40m and surrounded by a perimeter fence. It would comprise associated steel support structures and a gravelled surface within the compound. The site would require a permanent access road from the public highway.

- **Underground Cable Section:** The proposed underground cable section would be approximately 13km long connecting the two SECs at Dyffryn Meifod West and East. The cable would mainly follow the course of the Meifod Valley and would run close to the River Vyrnwy (Afon Efyrnwy) for a significant proportion of its length.

- **Eastern SEC:** Located at Dyffryn Meifod East, this SEC connects the cable to the eastern overhead line section. The specification would be similar to that of the Western SEC.

- **Eastern OHL Section:** This overhead line would be approximately 23km long and connect the Eastern SEC to the Tee-in at point at Berghill in Shropshire. Low-height lattice pylons and T-pylons were again considered for this area and could both be options.

- **Tee-in Point at Berghill:** The Tee-in point at Berghill near Lower Frankton, Shropshire is where the proposed overhead line would join the existing 400 kV overhead line. The proposed works here comprise a replacement pylon and two cable SEC compounds (each approximately 35m x 31m) either side of the existing overhead line. This allows for the new overhead line to connect to both sides of the existing overhead line.

- **Shrewsbury Substation:** To facilitate the proposed development, an extension of approximately 20m x 7m will be required to the existing Shrewsbury substation for all permanent works including an extension of the perimeter fence together with the installation of electrical plant and equipment. An approximate area of 300m$^2$ of earthworks is also proposed, within and outside the fence line.

3. **ALTERNATIVES AND PROJECT HISTORY**

3.1 National Grid has a statutory duty to connect new energy generation to the national electricity transmission network. The Project Need Case (March 2011, updated July 2012) sets out why the proposed development is needed.

3.2 The proposed development has evolved through stages, each with an assessment of alternatives carried out, and informed by consultation.

**Stage 1 – Identification of Strategic Options (Spring 2011)**

3.3 This stage considered the location of the required connection, technology, National Grid’s statutory obligations and also the location of existing high voltage electricity transmission infrastructure into which the connection could be made.

**Stage 2 – Selection of Substation Siting Areas and Route Corridor (Spring 2012)**

3.4 This stage, detailed in the Route Corridor and Substation Siting Study\(^1\), identified potential route corridors and options for substation site areas based on National Grid’s technical requirements and obligations, and evaluated them against environmental considerations.

3.5 An appraisal of alternative options identified the substation siting area at Cefn Coch and the ‘Red North’ route corridor (from Cefn Coch, via Llansantffraed, to Lower Frankton) as the preferred scheme.

3.6 As a result of consultation feedback and National Grid’s own assessment of the route corridors, a widened corridor east of Cefn Coch and a variation to the route corridor through the Peniarth Valley were identified as alternatives for further consideration. Consultation on the preferred connection option and alternatives took place during the summer of 2012.

**Stage 3 – Draft Route and Preferred Substation Site (Summer 2013)**

3.7 This stage identified seven alternative substation sites within and to the east and west of the original siting area at Cefn Coch. All were assessed and, on the balance of considerations, site ‘NW’ (now called Bryngwyn), to the west of Cefn Coch, was preferred.

3.8 This stage also identified the routeing of a 100m-wide corridor within the Draft Route corridor for the proposed connection from Bryngwyn to Lower Frankton having regard to consultation feedback, environmental and technical considerations. A number of alternative routes were considered and assessed as part of this process. In addition a siting study was also undertaken to identify the available options for the location of the new Tee-In (now known as Berghill) to the existing 400 kV overhead line. The assessment is documented within the Draft Route Report\(^2\) and Preferred Substation Site Report\(^3\) (September 2013).

3.9 Consultation on the draft route and substation site took place in autumn 2013.

**Stage 4 - Proposed Connection Alignment (September 2013 to present)**

3.10 Following consultation, further investigations were undertaken including engineering walkovers and environmental surveys, to inform the development of the proposed connection and, for the overhead line sections, the detailed pylon siting.

3.11 The alignment was developed by locating pylons and the underground cable initially along a centre line of the 100m-wide draft route. Focused consultation on the alignment was undertaken with landowners and alterations to the proposed connection were investigated and informed by assessment of environmental, socio-economic, land and technical considerations as well as consultation feedback.

3.12 The assessment of alternatives has led to the proposed development which is the subject of statutory consultation.

3.13 A number of alternative pylons are available to support the overhead line sections of the proposed development. These are known as L8, L12 Low Height and L13 lattice pylons. T-Pylons could also be used. An appraisal of these pylon options was undertaken in the Pylon Design Options Report\(^4\). This concluded that for the overhead line sections two pylon designs could be used, the L12 Low Height Pylon and T-Pylon.

4. NON STATUTORY PRE-APPLICATION CONSULTATION

4.1 Duties to undertake statutory pre-application consultation were introduced by the Planning Act 2008. Government guidance also encourages developers of linear schemes to consider informal consultation in two or more stages.

4.2 National Grid is committed to undertaking multi-stage consultation\(^5\) and a Consultation Strategy\(^6\) for the proposed development provides details of all stages of informal pre-application consultation to date. National Grid will also publish a statement of community consultation (SOCC) during this stage of consultation (Stage 4), as well as a supporting Consultation Strategy setting out how statutory consultation will be undertaken.

4.3 Through compliance with these documents, National Grid ensures the consultation process and associated communications are made as accessible as possible, including to the Welsh speaking community.

**Consultation Undertaken to Date**

4.4 Three stages of consultation have been undertaken by National Grid to date excluding this

---

\(^2\) [http://nationalgrid.opendebate.co.uk/files/Mid-Wales_Draft_Route_Report.pdf](http://nationalgrid.opendebate.co.uk/files/Mid-Wales_Draft_Route_Report.pdf)

\(^3\) [http://nationalgrid.opendebate.co.uk/files/Mid-Wales_Substation_Site_Report.pdf](http://nationalgrid.opendebate.co.uk/files/Mid-Wales_Substation_Site_Report.pdf)

\(^4\) Mid Wales Connection Project - Connecting wind farms through Mid Wales and Shropshire: Pylon Design Option Report, National Grid November 2014

\(^5\) National Grid policy document ‘Our approach to the design and routeing of new electricity transmission lines 2012’

\(^6\) Mid Wales Wind Farms Connection Project Consultation Strategy’ (2011 and 2013)
current stage:

**Stage One: Pre-consultation engagement (2010 – March 2011) and Route Corridor and Substation Siting Areas Consultation (March-June 2011)**

4.5 Stage One comprised discussions with Powys County Council and Shropshire Council, and MPs and AMs from Powys and Shropshire whose constituencies could be affected, to explain National Grid’s role in connecting the new wind farms and provided a broad overview of the proposed works and the approach to consultation.

4.6 Stage One also comprised consultation with stakeholders and the community about potential route corridors and substation siting areas, via meetings with stakeholders and public exhibitions held throughout the area where the proposed connection could be routed.

**Stage Two: Feedback on Stage One Consultation and announcement of Preferred Route Corridor and Preferred Substation Siting Area (July 2012 – March 2013)**

4.7 Feedback from Stage One was used in the selection of the preferred route corridor and substation siting area, confirmed in July 2012, as well as identifying a widening of the corridor at the western end of the route and an additional route option through the Peniarth Valley.

4.8 Comments were then invited, supported by a number of community events and briefings, including specific events for landowners.

4.9 Following this consultation, in April 2013, National Grid announced it would not be progressing with the Peniarth Valley route option and would be considering putting the connection underground around the village of Meifod in the Vyrnwy Valley, and further comments were invited.

**Stage Three: Announcement of Draft Route and Substation Site (September 2013 – November 2014)**

4.10 In September 2013, National Grid announced a preferred substation site and draft route, and comments were invited on these plus the proposed sites for sealing end compounds, the connection point to the existing line in Shropshire, pylon designs, and any other issues consultees and the public wanted to raise. A range of activities were undertaken to engage with landowners and communities.

4.11 Feedback, along with results of environmental assessments, was used to develop the proposed development which is the subject of the PEIR and this Stage 4 consultation.

---

7 Mid Wales Connection Project Selection of Preferred Connection (July 2012)
PART TWO: PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

5. LANDSCAPE AND VIEWS

5.1 The preliminary assessment considers the potential for and extent of effects on landscape character and views as a result of the proposed development. It considers the nature of the existing landscape and views currently experienced from representative viewpoints in the local area. Views are described from a range of representative locations.

5.2 The landscape of the area in which the proposed development would be sited ranges from exposed uplands in the west, through the rolling farmland of the Montgomeryshire Hills, and on to the large scale low lying floodplains of the Afon Efyrnwy and River Severn in the east. The area includes many small villages, hamlets and individual properties. Larger settlements include Pentre/Meifod, Llansantffraid-y-m-Mechain, Llanymynech, Four Crosses, Maesbrook, Woolston, Maesbury Marsh, West Felton, Queens Head, Lower Frankton and Welsh Frankton.

5.3 Locally valued landscapes are identified and include:
   - Important views at Llanymynech Hill and Breidden Hill;
   - Landscapes experienced from important tourist and recreation routes such as Moel Bentyrch from the A458 west of Llanfair Caereinion and the Montgomery/Shropshire Union Canal;
   - Designed landscapes at Tedsmore, Aston Hall, Woodhouse and Halston Hall;
   - Landscapes valued for their cultural associations or distinctiveness such as the Meifod Valley; and
   - Notable landscape features especially trees and woodlands.

5.4 Potential sources of effects on landscape and views during construction are identified by the assessment and would include activities such as site clearance, tree felling and hedgerow removal, earthworks, and the construction of temporary site access.

5.5 The assessment concludes generally that effects of construction may be significant. The most significant temporary effects from construction are likely to be as a result of installing underground cable as this would involve a construction area (approximately 40m wide) over approximately 13 linear kilometres.

5.6 Effects on landscape and views during the operation of the proposed development would result from the introduction of permanent above ground structures such as overhead lines in the landscape. These effects could be significant in some circumstances.

5.7 The decommissioning phase would require the removal of pylons and therefore the landscape and visual effects would likely be beneficial. Generally adverse effects relating to decommissioning would be similar to construction but likely to be of shorter duration.

5.8 There would be no likely significant effects on Snowdonia National Park or the Shropshire Hills Area of Outstanding Natural Beauty (AONB) due to the distance from the proposed development.

5.9 The effects of the Bryngwyn Substation near Cefn Coch may be locally significant. Mitigation proposals including mounding and planting around the perimeter would in time lessen its effects and in addition any potential long term effects would be geographically localised due to natural screening provided by surrounding landform.

5.10 The effects of the Western and Eastern SECs at Dyffryn Meifod West and East respectively may initially be significant although the inclusion of proposed mitigation including mounding and planting around the sealing end compounds would lessen effects.

5.11 Along the Cable Section long term effects on the Meifod Valley would be limited after reinstatement, other than through the narrow Yr Hafesb Valley where residual effects would be anticipated to be significant due to the extent of tree removal required for construction and because replacement may be restricted above cables in operation.

5.12 The effects of the Tee-in at Berghill with its associated SEC may initially be significant.
although mitigation proposals including mounding and planting would lessen these effects.

5.13 The extension works to Shrewsbury Substation would be mainly inside the existing compound. Minor effects on landscape and views would be experienced during construction. Effects during operation would be restricted as it is anticipated that mitigation planting would be established and would provide long term screening.

5.14 The most significant effects on landscape character and visual amenity would arise from the Western and Eastern OHL Sections of the proposed development. National Grid has worked to avoid and minimise potential effects during the routeing stages of the project and has developed a preferred alignment which seeks to achieve this as far as practicable at this stage and is subject to change following the outcome of this consultation. Effects would be broadly similar for either of the pylon options being considered.

5.15 Work is ongoing as part of the EIA process and would include Landscape and Visual Impact Assessment (LVIA) and residential visual amenity assessment as an integral part. The LVIA would review and build on the information presented in the PEIR. Computer generated Zone of Theoretical Visibility (ZTV) maps would be updated as part of the EIA work as the design is progressed to ensure viewpoints are located appropriately and locations adjusted if required.

6. HISTORIC ENVIRONMENT

6.1 The preliminary assessment considers the implications for the historic environment in relation to the proposed development.

6.2 Desk-based assessment and field surveys have identified over 15,000 heritage assets within the defined study areas. Less than 25% are designated, comprising one World Heritage Site, one Registered Battlefield, three Historic Landscapes (Wales), Scheduled (Ancient) Monuments, listed buildings, Registered Parks and Gardens, and Conservation Areas. Of these designated assets, over 90% are listed buildings, including Grade I, II* and II.

6.3 The proposed development is likely to generate adverse effects on the historic environment during the construction, operational and decommissioning stages.

6.4 The ‘footprint’ of the proposed development, that is the pylon bases, cable trench, built components of the substation and SECs, access tracks and ancillary areas, and also potentially transportation, would give rise to direct physical impacts on the historic environment during the construction and decommissioning phases. Indirect effects of construction on below-ground components of the historic environment may also result in the event of dewatering. Some of the above effects are likely to be significant.

6.5 During the operational phase of the proposed development, indirect visual (and noise) effects on the historic environment, particularly Scheduled (Ancient) Monuments, Conservation Areas and Listed Buildings, are predicted. Some of these effects are likely to be significant.

6.6 The Byngwyn Substation is predicted to generate potential significant (indirect) effects on one Scheduled (Ancient) Monument locally. Effects on further Scheduled (Ancient) Monuments, situated on the ridgelines surrounding the head of the valley, are also predicted but these are unlikely to be significant. Two undesignated assets are subject to potentially significant direct physical impacts.

6.7 The Western OHL Section is predicted to generate potential significant (indirect) effects on three Scheduled (Ancient) Monuments, and two Grade II listed buildings with near-distance views. The effects on further Grade II listed buildings, which are more removed from the proposed development, are unlikely to be significant. Six undesignated assets are subject to potentially significant direct physical impacts.

6.8 The Western SEC at Dyfryn Meifod West is predicted to generate no potential significant effects (direct or indirect) on designated or undesignated assets.

6.9 The Underground Cable Section is predicted to generate potentially significant direct physical effects on seven undesignated assets. Indirect effects on below ground components of the historic environment are likely in the event of sub-surface dewatering.
6.10 The Eastern SEC at Dyffryn Meifod East is predicted to generate potential significant (indirect) effects on two Scheduled (Ancient) Monuments but potential effects on other designated assets are unlikely to be significant. There are no predicted direct physical impacts.

6.11 The Eastern OHL Section is predicted to generate potential significant (indirect) effects on nine Scheduled (Ancient) Monuments, two Conservation Areas, and 28 listed buildings. Three of these listed buildings are Grade II* and the remainder are Grade II, including a single group of 14 listed buildings.

6.12 The Tee-in Point at Berghill is predicted to generate no potential significant effects (direct or indirect) on designated or undesignated assets.

6.13 Shrewsbury Substation is predicted to generate no potential significant effects (direct or indirect) on designated or undesignated assets.

6.14 In addition to the effects described above, each component of the proposed development has the potential to give rise to direct physical impacts on below-ground archaeology as yet undiscovered, palaeo-channels, peat deposits, ancient woodland, historic landscape and historic landscape components.

6.15 In terms of mitigating the predicted effects of the proposed development, design mitigation is the preferred approach. In situations where preservation in situ cannot be achieved, the implementation of a programme of archaeological fieldwork mitigation, would ensure ‘preservation by record’ of those heritage assets which are unavoidably the subject of direct physical impacts.

6.16 Mitigation for the predicted indirect visual effects include on-site screening by tree-planting and targeted off-site screening of specific heritage assets. There would be limited opportunities for any further mitigation. As a consequence, most of the predicted indirect effects would be retained as residual effects.

6.17 This preliminary assessment will be supplemented with further information, prior to compilation of the Environmental Statement, from the following studies:
- Desk-based assessment;
- Reconnaissance survey;
- Structured field-walking;
- Geophysical survey;
- Mapping/topographic surveys;
- Geo-archaeological and palaeo-environmental desk-based assessment and field survey;
- Sub-surface deposit modelling;
- Targeted archaeological trench evaluation, and
- Preparation of photomontages and wireframes of appropriate designated assets.

7. ECOLOGY AND BIODIVERSITY

7.1 This preliminary assessment includes a summary of findings from the desk based study and a wide range of comprehensive field surveys.

7.2 The potential ecological features (receptors) include; the Tanat and Vrynwy bat Special Area of Conservation (SAC), Glascoed Site of Special Scientific Interest (SSSI), ancient woodland, bog and upland heathland, hedgerows, veteran trees and birds.

7.3 Appropriate mitigation such as the application of a Construction Environmental Management Plan (CEMP) and the adjustment of pylon positions to avoid disturbance to ancient woodland soils would minimise impacts and therefore the residual impacts would be minor.

7.4 The proposed development would be likely to lead to the loss of bog and upland heathland habitats; these are of national and regional importance. The significance of residual impacts on these peatland habitats may be minimised through the implementation of suitable mitigation and habitat management plans.

7.5 The Tanat and Vrynwy SAC, together with the Berwyn Special Protection Area (SPA) and
Meres and Mosses Ramsar Site (Morton Pool) are known as ‘European sites’ as they have a high level of protection under European legislation, the Conservation of Habitats and Species (Amendment) Regulations 2012. Appraisal relating to European sites is ongoing and at the present time National Grid is unable to say whether there would be effects or not. The scope and emerging findings of assessments have been and will continue to be presented to and discussed with Natural Resources Wales and the biodiversity consultees up to the submission of applications for consent.

7.6 The proposed development has the potential to affect very old (veteran) trees. National Grid will seek to avoid veteran trees as far as practical, however should this not be possible then mitigation in the form of replanting of native species trees would be applied.

7.7 The proposed development would be likely to lead to the loss of breeding and foraging habitat for curlew. The implementation of suitable mitigation including the creation of new breeding and foraging habitat and careful timing of works would minimise the residual impacts on curlew.

7.8 Construction of the Eastern OHL Section would present a collision risk to birds flying to and from a heronry. As part of ongoing work National Grid would seek to minimise effects and consider the installation of anti-collision devices and or other mitigation measures where appropriate.

7.9 The proposed development has the potential to impact on a number of protected species and other habitats but with appropriate mitigation these impacts could be avoided and or minimised.

7.10 Additional measures to enhance the biodiversity value of the wider landscape can be implemented. Of particular benefit would be: the enhancement of wildlife connectivity by managing and planting hedgerows; and the enhancement of peatland and terrestrial habitat of high value.

8. WATER QUALITY AND RESOURCES (INCLUDING FLOOD RISK)

8.1 The preliminary assessment considers the potential effects on the water environment and flooding in relation to the proposed development.

8.2 The proposed development lies within the catchment of the Upper Severn River Basin. It crosses the Afon Rhiw, before running parallel to and across the floodplain of the Afon Vyrnwy. The Eastern OHL Section crosses the catchment of the River Perry.

8.3 The overhead line and cable sections cross numerous ‘main’ rivers, smaller tributaries and drainage ditches, as shown in Table 8.1. There are also several water-dependent features of interest within the vicinity of the proposed development, such as ponds and ox-bow lakes, some of which are designated as having ecological value.

Table 8.1: Main surface water catchments crossed by the proposed development

<table>
<thead>
<tr>
<th>Catchment</th>
<th>Tributary of:</th>
<th>Relevant components of the proposed development</th>
<th>Approximate linear length within the main catchment (km)</th>
<th>No of river crossings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afon Rhiw</td>
<td>River Severn</td>
<td>Bryngwyn Substation, Western OHL Section</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Afon Banwy</td>
<td>River Vyrnwy</td>
<td>Western OHL Section</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Afon Vyrnwy</td>
<td>River Severn</td>
<td>Cable Section</td>
<td>29</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eastern OHL Section</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>River Perry</td>
<td>River Severn</td>
<td>Eastern OHL Section</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

8.4 The proposed development also crosses a number of aquifers. The aquifers in the Western OHL Section and Underground Cable Section are located along the river valleys and are
locally important for private groundwater abstractions; and in some cases for sustaining flow to the local river systems and surface water features. The Eastern OHL Section, between Waen-fâch and Berghill, is located above a regionally important aquifer that is also of importance for public water supply.

**Water Quality**

8.5 The changes to groundwater quality as a result of the proposed development are likely to be most substantial where there would be significant underground structures, due to the potential to generate turbidity, create new pathways from the surface and/or encounter contaminated soils. The most sensitive receptors are likely to be private supply wells adjacent to the proposed development, there are also designated ecosystems that could also be affected.

8.6 Additional studies would be completed to ascertain the potential connection between those sections of the proposed development most likely to cause water quality changes in order to properly quantify and determine mitigation measures.

8.7 Changes to surface water quality are likely to be greatest for sections of the proposed development close to surface watercourses, and/or sections that have the potential to generate suspended solids, such as linear trenches, surface or below ground watercourse crossings and diversions, and areas where soils would be stockpiled or exposed. The risks of substantial changes to water quality are likely to be most significant in those areas of the proposed development in the floodplain, due to the potential for rapid inundation of the working areas in the event of flooding.

8.8 Many of these potential effects can be mitigated by appropriate construction programming and site management plans. Further consideration of construction methodology would be completed to minimise risks, particularly from cumulative effects from the development as a whole, where several sections of the proposed development are being constructed simultaneously.

**Water Quantity**

8.9 Effects of the proposed development on surface water quantity are likely to be relatively small and any changes to runoff would likely be reduced as part of the flood mitigation strategy.

8.10 The potential effect is more likely to arise from changes to groundwater levels around underground structures. This may happen:

- During the construction phase during dewatering, potentially causing temporary effects that are local to the site which could affect water levels in ecosystems very near the proposed development and, to a lesser extent, private supply wells.

- During the operation phase, once the permanent below ground structures have been installed, as this could substantially change groundwater levels. This is most likely to be significant for parts of the Underground Cable Section. A more detailed review is required to determine the scale of this effect and any indirect effects, such as depletion of baseflow to surface water features (particularly Yr Hafesb and the River Vyrnwy) and local groundwater flooding. Appropriate mitigation measures would then be considered.

**Hydromorphology**

8.11 The effect of the proposed development on hydromorphology could be significant and National Grid will consider adopting appropriate measures during construction and/or in any changes to the design of the proposed development. Particular risks are associated with movement of the river channel, any proposals to remove flood defences to re-naturalise the river channel, risks to critical flow paths and connectivity, risk of mobilising sediments, and the formation of new channels. Risks to river bed and bank stability could be associated with bankside vegetation removal or trimming.

8.12 The scale of potential impacts is likely to be greatest during construction of the Underground Cable Section, and the effects could be significant downstream, causing potentially permanent changes. This could also risk current and future Water Framework Directive
objectives and impact on flood risk. However, appropriate mitigation would be employed through the construction methodology and timing to reduce any effects, potentially to an insignificant level.

**Flooding**

8.13 The effect of the proposed development on the floodplain storage is likely to be relatively minor, because the reduction in floodplain storage caused by pylon structures and any changes in elevations required would be negligible when compared to the total storage potential within each floodplain.

8.14 The effect of the proposed development on the volume and rate of surface runoff is likely to be more significant, due to increases in impermeable areas associated with the substations, sealing end compounds and pylon foundation pads. Mitigation measures, such as Sustainable Drainage Systems, would be required at each location where there would be a noticeable increase in impermeable area. With this mitigation in place and maintained for the lifetime of the proposed development, it is anticipated that there would be no significant cumulative effect on surface water flood risk.

8.15 The Underground Cable Section has the potential to affect the existing flood defences around Meifod, although directional drilling is not proposed beneath the flood defences. A method statement would be prepared and agreed with Natural Resources Wales to ensure that the proposed directional drilling does not compromise the structural integrity of these assets. With a method statement and good operational practice in place there should not be any significant effects on the flood defences.

9. **GEOLOGY, SOILS AND CONTAMINATED LAND**

9.1 The preliminary assessment considers the potential effects on the ground conditions including geology, soils and contamination in relation to the proposed development.

9.2 The underlying geology of the proposed development comprises mainly sedimentary rocks of the Penstrowed Grits and Nantglyn Flags and Dolhir formations, interbedded siltstone and mudstone of the Allt-Tair-Ffynnon Formation, rocks of the Kinnerton Sandstone Formation and pebbly (gravelly) sandstone of the Chester Pebble Beds Formation. Superficial geology, where present, comprises mainly alluvial and glacial deposits, with areas of peat.

9.3 Peaty soils typically present, comprise slowly permeable seasonally waterlogged loamy upland soils with a peaty surface horizon and some very acid peat soils at the Bryngwyn Substation site and the western extent of the Western OHL Section. Peat is also present at the eastern extent of the Eastern OHL Section and at the Tee-in Point at Berghill where areas of fen peat extend across the majority of the land where the proposed development would be built. Peat is of particular importance when considering siting of any new structures such as the substation, sealing end compounds, underground cables and pylons. In general, the proposed development has been developed to avoid peat wherever possible.

9.4 A review of ground stability to identify geo-hazards within the area shows that the proposed development generally lies within areas of low or very low risk.

9.5 An active mineral site, Tan Y Foel Quarry, is located approximately 1km from the south-western extent of the proposed development, near to the proposed Bryngwyn Substation. The quarry is surrounded by an outer minerals buffer zone. Several other dormant / former mineral sites are present within 500m of the proposed development, including a former lead mine (Allt-y-Main Mine) now designated as a biological SSSI. Mining activities are not anticipated to extend into the Proposed Project Boundary. The Coal Authority has confirmed that the proposed development is located outside a defined coalfield. However, Shrewsbury Substation is located within a Development High Risk Area and underlain by surface coal resources.

9.6 There are several sites designated for geological protection within the vicinity of the proposed development. Of these, Graig-wen Quarries, Tan-y-Ffridd Quarry Regionally Important Geological Site (RIGS), Ffridd Mathrafal Track Section SSSI/Geological Conservation Review...
Due to the rural nature of the environment, it is considered unlikely that contaminated ground is present, however, small pockets of localised contaminated ground, including landfills may be present.

Disturbance to the soils and underlying geology would take place during the construction phase and be associated with earthworks required to provide access tracks, level platforms for equipment at the substation sites (Bryngwyn and Shrewsbury), sealing end compounds and at the Tee-in Point at Berghill, for the installation of foundations, and as part of the trenching works for the installation of the underground cable. Disturbance to top soils would also occur as part of works associated with temporary site compounds and laydown areas, and temporary access tracks.

In general, it is considered that disturbance effects on soils and geology would be highly localised, associated with areas of earthworks required to provide level platforms and foundations. In these areas, effects would be permanent, although some degree of reinstatement would be possible on decommissioning of the assets.

It is also considered that disturbance effects on soils as a result of temporary works, for temporary site compounds and laydown areas and for temporary access tracks, would be highly localised. These effects would, however, be temporary and reversible with reinstatement.

Earthworks associated with the cut to fill exercises to create level platforms and access tracks are likely to result in minor effects with potentially greater effects should excavated material prove to be unsuitable for re-use, particularly within the proposed substation site at Bryngwyn where the largest earthworks would be required.

Foundations are also anticipated to result in minor effects regardless of the type of foundation that may be required. However, when all foundations are considered together, effects across the proposed development would likely be greater.

Effects on topsoils associated with the temporary works, are anticipated to be of minor significance reducing further on reinstatement, as are the effects associated with the excavation, backfilling and reinstatement of the cable trench.

Of particular note are the potential effects on peat, which is present within the substation site at Bryngwyn, and also around the Tee-in Point at Berghill. Although efforts have been made to identify and avoid this resource, until intrusive geotechnical investigations have been completed, it is not possible to accurately assess the likely significance of effects.

Craig-wen Quarries RIGS is a designated site near to the Western SEC. Discussions are ongoing with NRW regarding potential effects of the proposed development on this site. Although it is anticipated that effects could be minimised through careful siting of the compound to avoid the designation. It is likely that the geology of importance at the RIGS site extends beyond the designation boundary and may be affected by the proposed works and ground works. The proposed works at the Western SEC may provide an opportunity for geological and palaeontological study.

AGRICULTURE AND LAND USE

The preliminary assessment considers the potential effects on the use of land and farming practice in relation to the proposed development.

Potential effects on agriculture and land use would mostly occur during the construction and decommissioning phases. Residual effects on agricultural operations would be unavoidable due to the presence of pylons, Bryngwyn Substation, SECs and Tee-in Point at Berghill. However the proposed development is anticipated to generally have effects of low significance on agricultural operations and employment because good construction practice would be adopted, suitable monetary compensation would be available and appropriate mitigation measures implemented.
10.3 The Proposed Project Boundary encompasses areas of best and most versatile agricultural land (approximately 10% of the land within the Proposed Project Boundary), areas which are the subject of agri-environment schemes (approximately 40% in Wales and approximately 60% in England) and nitrate vulnerable zones (approximately 30% of the land).

10.4 Further detailed design would continue prior to submission of applications for consent and the potential effects on agriculture and land use would be determined through technical studies and discussions with relevant landowners and occupiers. Aspects of further study would include quality and quantity of land take, suitability of soil reinstatement, current farming practices, access and existing field land drainage. National Grid would consider the outcomes and relevant details incorporated in project documentation to minimise effects as far as practical. National Grid would provide suitable monetary compensation to relevant parties affected by the proposed development in accordance with its legal obligations.

11. AIR QUALITY

11.1 The preliminary assessment considers the potential effects on air quality in relation to the proposed development.

11.2 Air quality effects and dust are likely to be associated mainly with the construction of the proposed development although effects may be similar for maintenance (including refurbishment) and decommissioning of the development.

11.3 The existing air quality data has been obtained from the local councils and presents the results of the nearest air quality monitoring station which is at Aston Hill on the border of Wales and England. In general, air quality recorded by this station is good, with low levels of pollutants recorded.

11.4 Air quality receptors in the vicinity of the proposed development include the occupiers of individual residential properties in the surrounding area. Potential effects on ecology are also considered. Nature conservation sites and species may be affected by dust and emissions during construction of the proposed development, but this would depend on the distance from the construction works and other factors including wind direction at the time.

11.5 Further detailed studies would be undertaken to identify matters including:

- Areas near to the proposed development where air quality could be affected;
- The likelihood of resulting effects being significant; and
- Suitable measures that would be taken to limit effects on people and the local environment.

11.6 Both Powys County Council and Shropshire Council have declared Air Quality Management Areas (AQMA). An AQMA is an area declared by the local authority where national air quality objectives put in place by the Government to protect health and the environment, are predicted to be met within an imposed deadline. Of the AQMAs, the Gate House AQMA includes the trunk road A483 that is anticipated to be used by construction traffic (heavy goods vehicles and light good vehicles). At present it can be reasonably assumed the proposed construction traffic would temporarily contribute to levels of pollution, via exhaust emissions. The Gate House AQMA also coincides with the proposed abnormal load route (for equipment such as transformers) but given the limited number of movements, the delivery of abnormal loads can be anticipated to result in negligible air quality effects.

11.7 A Code of Construction Practice (CoCP), or similar document together with Construction Environmental Management Plans (CEMP) would be put in place to manage operations during the construction period of the project. These plans would include best practice mitigation measures and control procedures to manage the release of dust and other emissions to air to acceptable levels. A Construction Traffic Management Plan would also be implemented during the construction phase to ensure appropriate mitigation measures are implemented in relation to construction traffic which may include limiting traffic numbers or movements and therefore associated emissions to air from vehicles.

11.8 It is anticipated that there would be no adverse air quality effects associated with operational phase traffic due to the low numbers vehicles required for inspection and maintenance visits.
It is also anticipated that there would be minor to negligible adverse effects on air quality and climate due to the low leakage volumes per annum associated with the use of Sulphur Hexafluoride (a greenhouse gas) at Bryngwyn Substation.

12. ELECTRIC AND MAGNETIC FIELDS

12.1 The components of the proposed development would be compliant with the current public exposure guidelines for EMFs documented in NPS EN-5 therefore there would be no resulting significant EMF effects. The proposed substation, substation extension, overhead line, sealing end compounds and underground cables would meet the government adopted exposure limits for EMF demonstrated using the principles set out in the Department of Energy and Climate Change Code of Practice.

12.2 With regard to EMFs, NPS EN-5, Part 2, section 2.10.6 concludes ‘The balance of scientific evidence over several decades of research has not proven a causal link between EMFs and cancer or any other disease.’ There is some scientific evidence of possible effects at lower levels at 50 Hz. The electricity industry takes this evidence seriously and recognises that it can generate public concern. All National Grid assets are designed to comply with government guidelines which are based on the scientific evidence. This PEIR demonstrates the adoption of the government’s precautionary measures that have been applied to further reduce EMFs.

13. TRAFFIC AND TRANSPORTATION

13.1 The preliminary assessment considers the potential effects of the proposed development in relation to all aspects of highways and transportation on the surrounding transportation network.

13.2 The assessment considers the potential effects during the construction, operational and decommissioning phases of the proposed development. Each of the phases is likely to have differing impacts on the surrounding transportation network, each of which is considered in the preliminary assessment.

13.3 The impact of the proposed development is considered on forms of transport and the transportation network, which include:

- Highways;
- Railways (both public and private);
- Canals; and
- Public rights of way (PRoW).

13.4 Likely significant effects resulting from the proposed development would relate to (temporary) impacts on the highway network during the construction and decommissioning phases. However, there could also be significant effects of shorter duration as a consequence of refurbishment (if required) works during the operational phase. For example refurbishment may include replacement of conductors and fittings. The assessment recognises that the decommissioning phase would be of a similar impact to the construction phase (effectively decommissioning being the reverse of construction) without the need for certain operations such as some of the earthworks.

13.5 The likely impacts on the highway network relate specifically to the following vehicular types:

- Light vehicle (cars and vans) of operatives required to construct the development;
- Heavy Goods Vehicles (HGV), vehicles over 7.5 tonnes that would transport material and plant required to construct the development; and
- Abnormal Indivisible Loads (AIL) which are required to transport specialist plant and equipment that fall outside the boundaries of standard HGV’s deliveries.

13.6 The assessment presents preliminary traffic routes and traffic numbers for both HGV movements and access routes for the required AIL movements to Bryngwyn Substation. It is generally concluded that the impacts would be significant due to the low volumes of traffic using the existing road network with particular reference to the number of HGV’s generated by
the construction and decommissioning phase of the development.

13.7 The preliminary assessment also identifies other elements of the transportation network including railways, canals and PProWs. It concludes that the impact of the proposed development on railways and canals would be insignificant. There would be permanent and temporary diversions of the PProW network required to facilitate the proposed development in both the construction, operation and decommissioning phases. These diversions are identified to be limited, either in terms of duration and or distance and are not considered to result in significant effects on the PProW network.

13.8 Work is ongoing as part of the EIA process and will include the production of a Transport Assessment and a Construction Traffic Management Plan. These would seek to reduce the impacts of the development on the highway network and form part of the ES submitted as part of applications for consent.

14. SOCIO-ECONOMICS, INCLUDING TOURISM
14.1 This preliminary assessment studies the potential impact on socio-economic and tourism resulting from the proposed development. A number of potential areas of impact, positive and negative, are identified including employment and skills, housing and community facilities, land use and tourism.

14.2 A study zone has been used that is wider than the proposed development to ensure individuals and businesses that may be affected are incorporated in the assessment. Impacts such as economic and visual can vary over distance. Therefore super output areas (geographic areas used for the collection and publication of statistics, built up of groups of areas from where data has been gathered) have been used as they provide a recognised boundary that can be used to collect baseline data whilst representing sufficient coverage to consider impacts that could be directly attributable to the project.

14.3 The baseline data demonstrates the rural nature of the study zone with generally low population numbers. There are a number of caravan parks in proximity to the proposed development that may affect population numbers in holiday seasons. The age of the population throughout the study area suggests an ageing population. Education, qualification and employment levels are fairly similar to national averages (for England and Wales). Employment is concentrated in the service sector in Powys and Shropshire. Public administration, education and health are other major sectors of employment in the regions.

14.4 There are a number of tourist attractions in the area including Powis Castle and the Montgomery / Shropshire Union Canal. The importance of tourism to the local economy has been noted in the socio-economic assessment process and so a tourism survey has been undertaken to help assess whether the proposed development would impact on visitors to the area in terms of their likelihood to return, stay and spend within the study zone. A business survey is also planned to assess if there is likely to be a positive or negative impact on local businesses.

14.5 Some public rights of way closures (temporary) and diversions (temporary and permanent) will be required. There is likely to also be some impact on the local road network and, therefore, work will continue to assess the likely extent of any impacts on the local communities.

14.6 The greatest areas of concern raised by the public and stakeholders to date include the perceived level of impact on tourism as a result of visual impacts, with cumulative effects also being an important consideration. Initial indications from the survey work undertaken to date, the baseline data collated, plus feedback from other chapters (particularly landscape and views) suggest there would not be any significant impacts from the construction and operation of the proposed development in terms of socio-economic effects.

15. CONSTRUCTION NOISE AND VIBRATION
15.1 Noise effects and disturbance may be experienced close to the proposed development by people living in properties nearby and potentially in settlements at greater distances. In terms of ecology, those species that are sensitive to noise and vibration, may also be affected. The
severity of noise experienced at any one time would be dependent on factors including distance to the source, intervening land form and weather conditions.

15.2 Construction activities and the equipment likely to be used, are typical of construction sites, with characteristic general engine noise, periodic impact noise and reversing alarms. The activity likely to generate the greatest noise and vibration effects could be piling for foundations, which may be required at pylon locations, depending on ground conditions. The characteristic of piling is loud impact noise together with vibration effects experienced through the ground close to the source. In the majority of cases it is unlikely that these would be significant because suitable noise control measures would be put in place.

15.3 People living in houses on the proposed construction transport routes and other people at sensitive locations including nurseries and primary schools, day care facilities, nursing homes and offices could be affected by noise disturbance and vibration during working hours as a result of construction vehicle movements.

15.4 The analysis of traffic information is set out in the PEIR and further assessment would be carried out, however, it can be anticipated that people living alongside some roads (especially rural roads) would generally experience an increase in noise throughout the construction phase. It is not likely that significant noise and vibration effects would be experienced as a consequence of abnormal load movements to and from the proposed substation at Bryngwyn.

16. OPERATIONAL NOISE

16.1 A preliminary assessment has been undertaken of operational noise effects arising from various components of the proposed development, including the proposed substation at Bryngwyn, works at the existing substation at Shrewsbury and the overhead line sections. Significant audible operational noise will not be produced by underground cables, SEGs or the Tee-in Point at Berghill and have not been considered further. The assessment therefore focusses on the overhead lines.

16.2 Baseline background noise surveys have been carried out at 29 separate locations selected to be representative of residential receivers as far as practicable. These locations cover the geographic area from west of the proposed substation at Bryngwyn to the Tee-in Point at Berghill. These surveys confirm that background noise levels along the proposed development are very low, especially during night-time periods.

16.3 Receptors potentially sensitive to operational noise include residential properties and areas used for leisure activities (e.g. public rights of way). The operational noise study area for the proposed substation extends up to 2km so that all of the nearest sensitive receptors are assessed. The level of operational noise from overhead lines falls quickly with distance (over tens of metres) from the overhead line. The initial study area to identify potentially noise-sensitive receptors extends to 300m either side of the overhead line although, based on the preliminary calculations and proposed equipment designs, it is anticipated that the zone to be assessed will be within 100m of the overhead line.

16.4 The selection of appropriate plant and noise control engineering measures will continue to be considered in order to minimise the potential for operational noise impacts. With such mitigation in place it is expected that the noise effects associated with the proposed substation at Bryngwyn will not be significant. At this stage it is anticipated that additional plant at the Shrewsbury Substation site will not generate significant additional noise.

16.5 Preliminary studies indicate that overhead line noise effects may occur, in both dry and wet conditions, at eight or less residential properties within approximately 100m of the overhead lines once it is operational. Ongoing studies will identify any further affected properties. Further measures to reduce effects from operational noise will be considered where appropriate, and the potential benefits assessed against engineering and other project requirements.

16.6 With the noise from overhead lines decreasing quickly with distance, the effect on users of public rights of way is expected to occur only when passing directly under the line and only
during particularly quiet or wet day time periods.

17. OTHER EMISSIONS

17.1 Emissions to air, land and water are likely to be mainly associated with the construction phase of the proposed development. There could be effects similar to those anticipated for construction associated with maintenance (including refurbishment) and decommissioning of the development.

17.2 The preliminary appraisal of potential impacts and effects are considered for emissions arising from waste, artificial light, mud and litter.

17.3 With the implementation of appropriate controls and mitigation measures in place, it is not anticipated that resultant effects would be significant.

17.4 A Code of Construction Practice (CoCP), or similar document together with a local Construction Environmental Management Plans (CEMP) would be put in place to manage operations and set out control measures during the construction period of the project. These plans would include best practice mitigation measures and control procedures to manage the release of emissions to acceptable levels.